



X-PARTICLES

cinema4d particle plugin

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X-Particles 3.5

Particle system plugin for Cinema 4D

Introduction

Welcome to X-Particles! Thank you for using this plugin for Cinema 4D.

X-Particles 3.5 is the latest version of the premier particle system for MAXON's Cinema 4D. Features of this system include:

- far greater power and speed than C4D's basic particle emitter or Thinking Particles
- most objects are multithreaded
- fluid simulation, constraints, and multiphysics
- volumetric rendering, smoke and fire
- spline rendering without geometry
- numerous particle modifiers
- its own unique control system that does not use Xpresso but utilises a system of question and action objects which are seen in the object manager in the same way as other objects
- an inbuilt sprite generator and particle skinner
- additional objects such as a Trail object, Fragmenter, Elektrix, Spline Mesher, etc.
- several special shaders to use with the system
- compatibility with the standard C4D particle modifiers and (when generating sprites or other geometry) with the C4D object deformers and Mograph effectors
- Xpresso nodes included
- inbuilt functions such as flocking, target following, and particle tracing
- compatibility with C4D's dynamics system
- a particle material to render particles without using geometry
- can optionally generate Thinking Particles so it can be used with Pyrocluster and the Hair renderer
- compatibility with Net render (Cinema 4D R14 and earlier), Team Render, and the command-line renderer for use with render farms
- compatibility with MAXON's Licence Server environment

Latest version

The current version is 3.50, released on November 30th 2015. New features and changes from earlier versions of X-Particles can be found on the page ['What's new in X-Particles 3.5'](#).

System requirements

Please see the [system requirements page](#) for full details.

Installation

Please see the separate [installation page](#) for details of how to install X-Particles. A fuller explanation can be found [on our web site](#).

Loading a palette

X-Particles has a lot of objects! For convenience, you might wish to have a palette (toolbar) docked to the main interface. If you click 'Load Palette' in the X-Particles menu, a default palette will be loaded and you can dock it wherever it suits you best. If you click the little options box to the right of the 'Load Palette' menu entry, a dialog box will appear with some more options.

For details, see the [Load Palette page](#).

Demo version

A demo version of X-Particles 3 is also available. This demo will not expire, but has a number of restrictions.

More information on the demo version can be found on the [X-Particles web site](#).

Entering a licence serial number

Please see the page on [managing licences and serial numbers](#) for details on X-Particles serial numbers and how to enter them.

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There is a [separate page](#) in this manual for users who are just getting started with X-Particles. Further information can be found in this manual, in the online video manual, and on our [forums](#) (registration is required using a valid X-Particles serial number).

Accessing Help

This help file can be accessed at any time by clicking the 'Show Help' button in the [System object](#), or by clicking the help button  at the bottom of the interface for each object.

In X-Particles 3.5, you can also access the video manual directly from any object by clicking the video manual button  which again is located at the bottom of the object's interface.

We hope you enjoy this system and look forward to comments and suggestions for improvement. You can get in touch with us in several ways, please see the [Contact page](#) for details.

Mike Batchelor
David O'Reilly
Steve Pedler

November 2015

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What's new in X-Particles 3.5



As well as a number of bug fixes and user interface improvements, X-Particles 3.5 has a number of new features. To find them easily in the manual, look for the 'New Feature' icon.



In addition, some features are deprecated in this version. These are often features made redundant due to the new data mapping system. They will be removed in a future version of X-Particles, so it is recommended that they are not used in new scenes.

New features

The new features include:

New [Sound Modifier](#) and [Sound Shader](#)

New [Trail Deformer](#) object

New [Data Mapping system](#) added for most modifiers

New [Particle-based Falloff](#)

Additional emitter shapes - Box and Cylinder

Emitter HUD can show additional particle data

Direct access to the X-Particles online video manual from each object

Several changes to Particle Groups including:

- group hierarchies now supported in all modifiers
- all emitter parameters are carried over when creating a new group in that emitter
- groups can now use all the emitter display types, e.g. each group can have its own gradient display

Emitter pulse emission has a new spline control added to it

Emission from an object can be controlled by object illumination

Several modifiers have enhanced functionality and/or new features - see the individual modifiers for details

Fragmenter object can use object hierarchies in Object List mode

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System requirements

Cinema 4D version

X-Particles 3 will work in any of these Cinema 4D versions:

- R13
- R14
- R15
- R16
- R17

Hardware

A 64-bit machine is required. There are no lower memory limits, but larger amounts of memory will allow larger numbers of particles to be generated.

Operating system

Either a 64-bit version of Windows or OSX 10.6.8 or higher for R14/R15, minimum 10.7.5 for R16, minimum 10.8.5 for R17.

Internet access

X-Particles must validate your licence after installation and once within every 21 days after that. Therefore to use it your machine MUST have access to the internet before you use it for the first time and sufficiently often after that to enable repeat validation. It does not require constant net access all the time.

Needless to say, internet access is required for the online updater to work, but you don't have to use the updater if you don't want to.

Other Cinema 4D modules

Dynamics

For use with C4D's Dynamics, a version of Cinema 4D containing the Dynamics system is required.

Thinking Particles and/or Hair

Thinking Particles is NOT required to use X-Particles. The only advantage of having Thinking Particles is that you can use the X-Particles emitter to generate Thinking Particles, which you could then render with Pyrocluster or the Hair renderer.

However, the X-Particles material provides a better solution to render particles instead of Hair, and its volumetric rendering is superior to Pyrocluster. Therefore if you don't have these modules, there is no loss of functionality within X-Particles.

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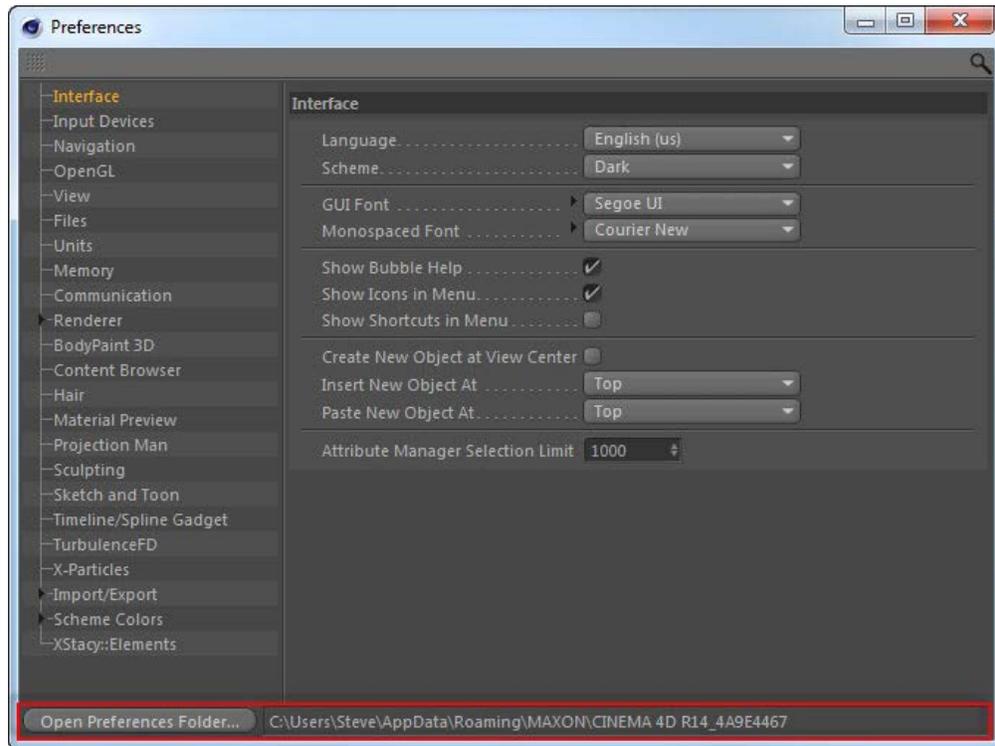
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X-Particles Installation

Install location

In X-Particles 3 it is recommended that X-Particles is installed in the plugins folder in the user preferences folder rather than the folder containing the Cinema 4D program file. The user data folder for Cinema 4D can be found in Cinema itself by opening the Preferences dialog and looking at the bottom of the 'Interface' tab:



Within that folder you will see a folder named 'plugins'. Unzip the downloaded archive file into that folder.

Why have we done this?

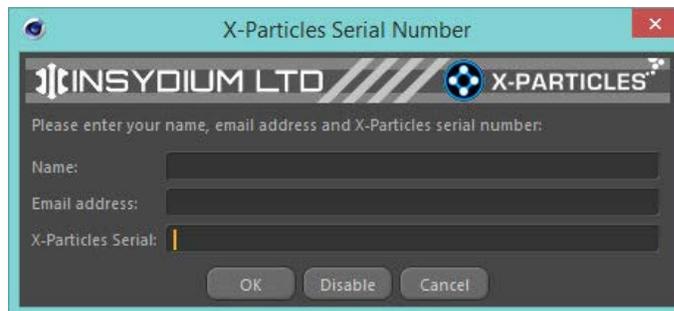
The reason for this is that if you install X-Particles into the plugins folder where the Cinema 4D executable is located, the online updater will sometimes fail, due to the protection given by the operating system to the Program Files or Applications folders.

If you install X-Particles into the same location as the Cinema 4D executable

If you do do this, X-Particles will still run, but the online updater may or may not work correctly if X-Particles is not installed in this location, for the reason given above.

Entering your serial number

When you restart Cinema after installation, you will need to enter your serial number. A dialog box appears like this:



Enter the name and email address used to purchase X-Particles into the relevant fields, and enter the serial number supplied by us into the serial number field.

When you click the 'OK' button X-Particles will validate your licence by communicating with our dedicated server. After that it will not need to validate the serial every time you run Cinema, but it will need to do so once within every 21 day period after installation. If it cannot do so, the licence will stop working and you will need to contact us by email through our support email address.

Please note that therefore your machine MUST have access to the internet before you can use it for the first time. If the licence cannot be validated the plugin will not work.

The X-Particles menu

Note that X-Particles does not appear in the Cinema 4D Plugins menu. Instead it has its own entry in the main menu bar.

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Serial number problems

If you have difficulty entering your serial number, please see the support pages on our website in the first instance. Go to <http://www.x-particles.com>, then choose 'Support for X-Particles 3', then click 'Serial/License Support'.

If you still having problems, you can contact us by email. The address is found in our support pages, as above.

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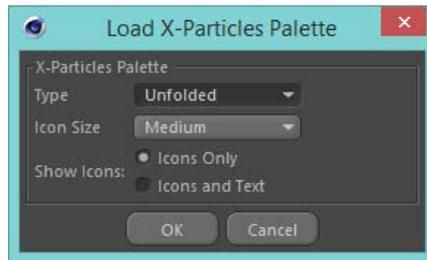
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Build Toolbars

X-Particles has a lot of objects! Many users like to create a palette (toolbar) of buttons to access these, but it takes time to do. We therefore supply a series of pre-built palettes which you can load using the 'Load Palette' command.

To access this command, click the 'Load Palette' command in the X-Particles main menu. This will load an unfolded palette with medium-sized icons and no text.

For more options, click the black square to the right of the command. The following dialog box appears:



Settings

Type

The palette will be unfolded or folded.

Icon Size

Small, medium, or large icons.

Show Icons

If 'Icons Only' is selected, no text is displayed in the palette. Otherwise icons and text are shown.

OK and Cancel

Click the 'OK' button to load the palette, or 'Cancel' if you decide not to load it.

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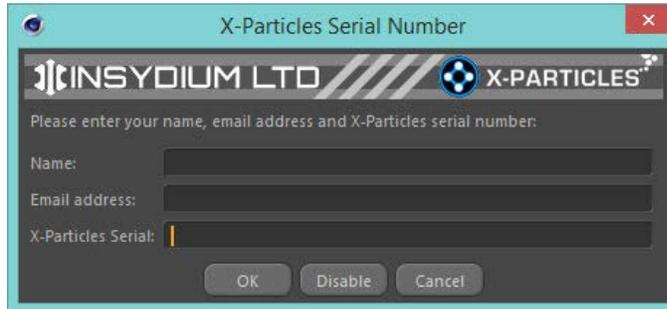
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Managing X-Particles Licences and Serial Numbers

Changing your serial number

In some cases you might need to change the serial number of the X-Particles licence on your machine (e.g. freelancers who work for more than one company and need to use the relevant company's licence).

You can do this by clicking 'Change Serial Number...' in the main X-Particles menu. Doing so will display this dialog box:



Your name, email address and current X-Particles serial number will automatically be filled in for you.

You can then alter these settings as required and click the OK button to make the change.

OK

Click this button to change the serial number.

Cancel

Click this button to abandon any changes and close the window.

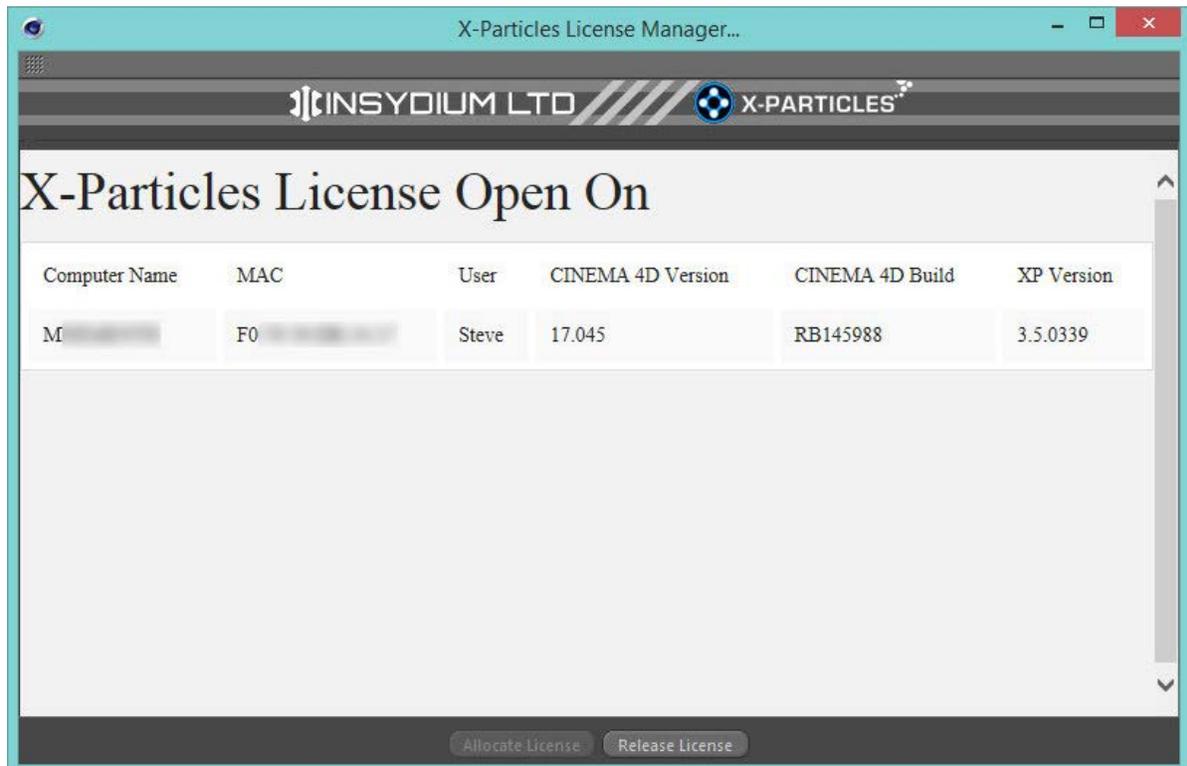
Disable

Clicking this button will disable the X-Particles licence on this machine, making the licence available for use in an installation of Cinema 4D on another machine (assuming you have an unlocked licence). Note that X-Particles will stay disabled on this machine until you re-enable it from this dialog box. It will not be re-enabled by restarting Cinema. Compare this to the Licence Manager (see below) which lets you temporarily release a licence for use on another machine.

Licence Manager

The X-Particles Licence Manager allows you to see which licences are open on which machines. This is of most use if you have multiple licences and need to close one to free it up; you can see which machines are using them using the licence manager.

To see the manager, click 'X-Particles Licence Manager...' from the main X-Particles menu. A window like this will appear (some details have been deliberately obscured):



You can close the licence on this computer if you are not currently using X-Particles but need to use the licence on another machine.

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Release License

Clicking this button will temporarily release the X-Particles licence so that you can use the licence on another machine (assuming this is an unlocked licence). You can use X-Particles on this machine again by clicking 'Allocate License' or by restarting Cinema 4D (in both cases this of course is dependent on a licence seat being available). Note that this differs from the serial number manager (see above) which lets you permanently disable an X-Particles licence on a machine until you deliberately re-enable it.

Allocate License

If you have released the X-Particles licence on a machine you can re-allocate it by clicking this button. This assumes that a licence seat is available, of course.

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About this manual

This is the reference manual for X-Particles 3.5. It is an offline manual in HTML format, and can be accessed from any object in X-Particles object by clicking the help button  at the bottom of the attributes manager or dialog box. You can also access the manual from the main X-Particles menu.

Themes

Please note: this is an experimental feature for the manual and may not work on all browsers.

The manual comes with three different themes. To switch between them, click the appropriate button below. Please note that this will store a cookie named 'xpmanstyle' on your computer.

The default theme with a white background.

A soft, pastel theme easy on the eye.

A dark, vibrant theme for those preferring dark backgrounds.

Theme switching should work fine on Firefox without any further action.

For Internet Explorer you may have to tell the browser to allow active content for this site. IE may tell you that it has prevented the 'site' from running scripts or ActiveX content. There is no ActiveX content used by this manual, just some simple Javascript to allow CSS file switching.

Finally, this will not work at all on Chrome, which does not allow file URLs (file:///...) to set cookies. In a future version of X-Particles the manual will be fully online and theme switching should then work on all platforms.

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Changes in X-Particles 3

Latest version

For details of changes in the latest release, please see the [separate manual page](#).

X-Particles 3

X-Particles 3 is a very different beast to the previous v2.5. The core engine has been rewritten to make it much faster and less memory-intensive. In addition there are many new features including (but not limited to) the following:

- new objects: SplineMesher, Elektrix, Volume Emission control, Flock Helper
- most existing objects have improved and additional functionality
- new modifiers (45 in total)
- new rendering options: render splines without geometry and volumetric rendering for fire/smoke
- new dynamics objects: much improved constraints and better particle-particle collisions
- improved SPH fluids
- new FLIP solver for better fluids, gas, etc.
- new licensing system which does not depend on the Cinema 4D serial number (so no need for a new XP serial when you get a new version of Cinema)
- greatly improved and much faster caching

This is just a short list of the main changes in X-Particles 3, there are many other enhancements in almost all areas of the plugin.

Location of parameters

You will find that some parameters have been moved or now have their own object. For example, the emitter Collisions tab no longer exists; some options have been moved to the [project settings](#), some to the [Collider tag](#) and the particle-to-particle collisions are now in a [separate object](#).

Loading existing scenes

Scenes created in v2.5 will load in X-Particles 3 of course, but the reverse is not true: an X-Particles 3 scene will not load correctly into v2.5. For this reason, when loading an older scene you will be warned that if the scene is saved, it won't be possible to load it again in v2.5.

However, you will find in many cases that although the scene loads, it will require some adjustment and tweaking in X-Particles 3 to get the same result. This is because some parameters have been changed to give better functionality or to approximate more closely to real-world effects.

Time values

This will be most noticeable for any object which in v2.5 used a parameter which gave a number of frames over which something took place. In v2.5 these were numeric values, with a value of '1' representing 1 frame, for example. The much improved sub-frame handling in X-Particles 3 made these settings obsolete, so all such settings have been changed to use time input fields.

For example, in the emitter's particle lifespan setting you would have seen this in v2.5:



But in X-Particles 3, you will see this:



(Depending on the animation units, you may see a display of seconds instead of frames.)

It might not look very different, but the change is very significant. If your project settings were set to 30 frames per second then in v2.5 a lifespan of 90 frames would be 3 seconds; but at 25 fps, 90 frames is 3.6 seconds. With time fields, these values change automatically if the frame rate is changed, so in X-Particles 3 the actual time in seconds is always the same.

You may need to adjust the value depending on the time you want the process to take.

Xpresso nodes

Most of the Xpresso nodes in v2.5 were simply wrappers for existing objects such as modifiers. They offered no additional functionality that you could not get by dragging the object into the Xpresso editor. With the emitter, the reverse was true: the emitter node only had a subset of the emitter object.

For this reason, and because very few people used the nodes anyway, the modifier nodes and the emitter node are no longer present in X-Particles 3. The existing data get/set nodes are still present, plus some additional nodes to get/set other data. The question node has also been greatly expanded.

If you load a scene which used the modifier nodes then you will need to replace them with the relevant objects and drag them into the editor, then connect them up. We appreciate that this is potentially a certain amount of extra work, but the overhead of supporting the modifier nodes and adding new ones for the new modifiers was not justified by the number of users of the nodes.

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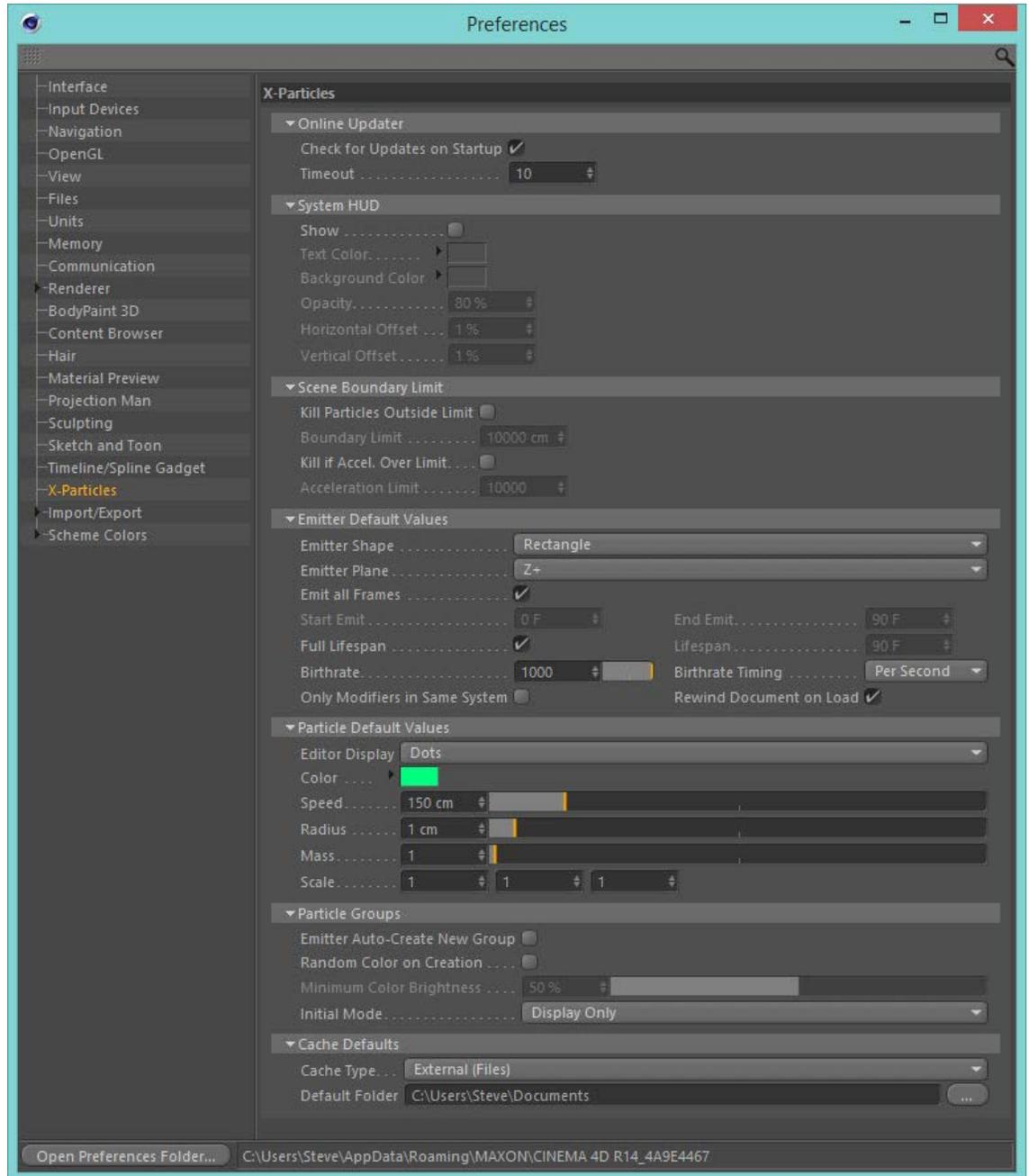
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X-Particles Preferences

There are a number of global preferences which can be found in the main Cinema 4D Preferences box. These are the X-Particles preferences:



Settings

Check for Updates on Startup

X-Particles can check for updates to the plugin and documentation each time it is started. If you don't want it to do this, uncheck this switch. The factory setting is

Timeout

When X-Particles attempts to connect to our server on startup, it will do so for the length of time (in seconds) given in this setting. If you find this results in a slight delay when Cinema starts up, you can reduce this value.

System HUD

Each Emitter can display its own HUD, but if you have multiple emitters this can be inconvenient. Instead (or in addition) there is a scene-wide HUD which simply displays the total number of emitters and the total live particle count in the scene.

Show

If checked, shows the HUD in the editor.

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Text Color, Background Color, and Opacity

These settings allow you to change the colours used in the HUD and its opacity.

Horizontal Offset and Vertical Offset

These settings give the location of the HUD on the screen, expressed as percentages of the screen width and height. You can change these to alter the HUD location. (Unlike the Cinema 4D HUD, you can't drag the HUD around the screen.)

Scene Boundary Limit

Sometimes particles can get out of hand and move extremely fast, or move a very long distance away. This can cause problems with features such as the Skinner or Fluids. You can kill these particles if they exceed certain set limits.

Kill Particles Outside Limit

If the particle is farther from the world centre by more than the value in 'Boundary Limit', they will be killed.

Boundary Limit

The distance limit from the origin (world centre).

Kill if Accel. Over Limit

If the particle's acceleration is higher than the value in Acceleration Limit, it will be killed.

Acceleration Limit

The maximum acceleration the particle is permitted.

Emitter Default Values

These are a set of default values for the emitter (as opposed to particles).

Emitter Shape

The shape of the emitter when first created. This corresponds to the shape settings in the emitter; possible choices are Rectangle, Circle, Ellipse or Sphere.

Emitter Plane

The plane the emitter lies on when first created. Possible choices are the X+, X-, Y+, Y-, Z+ and Z- planes.

Emit all Frames, Start Emit, End Emit

These correspond to the settings with the same names in the emitter: please refer to the relevant [Emitter page](#) for details.

Full Lifespan, Lifespan

These correspond to the settings with the same names in the emitter: please refer to the relevant [Emitter page](#) for details.

Birthrate, Birthrate Timing

These correspond to the settings with the same names in the emitter: please refer to the relevant [Emitter page](#) for details.

Only Modifiers in Same System

This is the same setting as in the emitter's Modifiers tab. If this switch is checked, all emitters will be created with this switch already checked in the Modifiers tab.

Rewind Document on Load

If a scene is saved at some point other than the start of the animation, particles may already have been generated. Although the particles are not saved with the scene file, when the scene is reloaded the emitter will try to generate as many particles as would otherwise have been generated up to that point. This may take some time, especially if large numbers of particles are generated.

If this switch is checked and the scene file contains an emitter, the document will be automatically rewound when it is loaded, abolishing the time required to generate particles. It is recommended that you leave this switch checked. If you really don't want the rewind to happen, uncheck this switch.

Note: rewinding will only occur if there is an emitter in the scene. If there is no emitter, the switch will have no effect.

Particle Default Values

These are the default values which are set in the Emitter when it is created or in a newly-created Group object. Note that, in the case of Groups, these settings are overridden if the Group is created by an Emitter and the switch 'Use Current Display Settings' is checked.

Editor Display

The shape of the particle in the editor viewport.

Color

The default particle colour.

Speed, Radius, Mass, and Scale

The default values for these four parameters.

Particle Groups

These settings affect the creation of new Groups.

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Emitter Auto-Create New Group

If this switch is checked, then when a new Emitter is created it will automatically create a new Group and assign that Group to itself.

Random Colour on Creation

Whenever a new Group is created, if this switch is checked the Group colour will be generated randomly. This setting will override both the default colour value and any colour carried over from an Emitter if the Group is created by an Emitter and the switch 'Use Current Display Settings' is checked.

Minimum Colour Brightness

If a random colour is created for the new Group, it will never be below this brightness value. This prevents excessively dark colours from being generated.

Initial Mode



A Group object can be set to three possible modes - please see the [Group object](#) for details. This drop-down allows you to choose which mode new Groups are created with. The options are the same as the Group object 'Mode' setting. The default value is 'Display Only'.

Cache Defaults

These are the default settings for the cache type and cache folder. See the [Cache object](#) for more details about these options.

Cache Type

The cache type, either external to separate files, or internally to memory.

Cache Folder

The default cache folder that will be used unless the user selects a different folder in the cache object.

The Factory Settings

If you want to return the preferences to the factory state, you will have to reset them manually. This table gives the factory settings:

Setting	Factory value
Online Updater	
Check for Updates on Startup	Enabled
Timeout	10 (seconds)
System HUD	
Show	Disabled
Text Color	Gold (RGB 255, 191, 0)
Background Color	Dark Grey (RGB 89, 89, 89)
Opacity	80%
Horizontal Offset	1%
Vertical Offset	1%
Scene Boundary Limit	
Kill Particles Outside Limit	Enabled
Boundary Limit	1,000,000 scene units
Kill if Accel. Over Limit	Enabled
Acceleration Limit	10,000
Emitter Default Values	
Emitter Shape	Rectangle
Emitter Plane	Z+
Emit all Frames	Enabled
Start Emit	0
End Emit	3 seconds (90 frames at 30 frames per second)
Full Lifespan	Enabled
Lifespan	3 seconds (90 frames at 30 frames per second)
Birthrate	1000
Birthrate Timing	Per Second
Only Modifiers in Same System	Disabled
Rewind Document on Load	Enabled
Particle Default Values	
Editor Display	Dots
Color	Blue-green (RGB 0, 255, 127)
Speed	150 scene units
Radius	1 scene unit

Mass	1
Scale	1, 1, 1
Particle Groups	
Emitter Auto-Create New Group	Disabled
Random Color on Creation	Disabled
Minimum Color Brightness	50%
Initial Mode	Display Only
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X-Particles 3.5

First update to X-Particles 3 other than bug fixes, released November 30th 2015.

For details of the contents of this update, please see the ['What's new'](#) page.

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Initial release version, released 16th March 2015.

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This page contains a number of hints and explanations about X-Particles which will help you get the most from the system.

1. The control system

1.1 Why doesn't the Question appear to do anything?

There are several possible reasons for this:

- the Question is not present in either of the Questions lists of the emitter. This may happen if you removed it manually from the list.
- the Question is disabled in the Object Manager.
- the Question is never tested by the emitter. This can happen if the Question is in the 'Test and Pass Once' list and is bypassed because another Question is answered first (see the [Question object](#) for more details).
- the parameter tested never satisfies the condition. E.g. if you test particle age and wait until that is greater than the number of frames in the scene, the Question will never be passed.
- the Question is being asked but the Action doesn't do anything (see below for possible reasons). It can be very helpful to have the Action alter the particle display, e.g. the editor colour, so that at least you know the Question is being asked and passing control to the Action.

1.2 The Action doesn't appear to do anything.

If this happens, first check that the Action is being called by the Question. If you make the Action alter the particle display, e.g. the editor colour, so you know that the Action is gaining control of the particle. Possible reasons why nothing apparently happens are:

- the Action is not present in the Actions list of a Question object (and it must be the correct Question object - it's easy to drag an Action into the list of the wrong Question). If you use the button in the Question object itself to add an Action, you will avoid this problem.
- the Action is disabled in the Object Manager.
- the Action can't do anything because it lacks some piece of information. For example, to affect a modifier you must drag the correct modifier into the link field in the Action.

2. The Emitter

2.1 How to make the Emitter emit one single particle

The easiest way to do this is to set the Emission Mode to 'Shot' and the Shot Count to 1. There are other methods which may be better depending in what you are trying to do:

- set the Max. Particles to 1, so that only one particle can be created
- or set the Birthrate to 1, uncheck 'Emit in all frames' and set 'Start emission' to 0 and 'End emission' to 1
- or turn on Pulse emission, set Birthrate to 1, and set the Pulse interval to longer than the scene length

2.2 How to emit particles from an object being generated by an X-Particles Generator object (or Sprite or Trail object)

For this you will need two emitters. For the first one, set it up as you like. Then add a Generator object and something for it to generate, such as a sphere. Link the Generator to the first emitter, and play the animation. You see spheres being generated, as you would expect.

Suppose you would like the spheres being generated to emit particles themselves. In the second emitter, set the 'Emitter shape' to 'Object'. Drag the Generator object into the 'Object' field. DON'T drag the sphere into that field - it won't work! Set up the second emitter as required and play. Now you see spheres which are also emitting particles.

You can do the same with the Sprite or Trail objects instead of a Generator object. You can also use the Trail object in a Sweep object and drop the Sweep object into the Object field of the second emitter so that particles are emitted from the Sweep object.

3. Using X-Particles with Pyrocluster

This is deprecated in X-Particles 3: use the [XP Material](#) or [Gaseous Material](#) for volumetric rendering instead.

If you want/need to use Pyrocluster for some reason, it requires Thinking Particles, so first you must set up X-Particles to generate Thinking Particles. To do this:

- in the Emitter object, Particles tab, Thinking Particles section, turn on 'Generate Thinking Particles'
- optionally, drag a TP group from the Thinking Particles settings dialog and set any other options
- set up Pyrocluster in the usual way - add a Particle Geometry and Environment object to the scene, create the two Pyrocluster shaders, apply the Volume Tracer to the Environment object and the Pyrocluster material to the Particle Geometry object.

That's really all you need to do.

4. Using the Hair material to render your particles

This is deprecated in X-Particles 3: use the [XP Material](#) instead.

If you must use a Hair material to render your particles, it requires Thinking Particles, so follow these steps:

- in the Emitter object, Particles tab, Thinking Particles section, turn on 'Generate Thinking Particles'
- optionally, drag a TP group from the Thinking Particles settings dialog and set any other options
- add a Hair material to the scene - this should set the Hair render options you need automatically
- add a Particle Geometry object to the scene and apply the Hair material to that object
- add a Hair render tag to the Particle Geometry object (Hair tags -> Render)
- play and render the animation

One other point to note: the Thickness setting in the Hair material will control the size of the rendered particles.

5. Rendering splines

X-Particles 3 allows you to render any spline, including those created by the Trail object, using the XP Material rather than the Hair material and without having to create geometry such as a Sweep object. Simply create the spline, assign an XP Material to it, and render.

6. The Trail object

5.1 How do you disable trails right from the start of an animation?

Normally, trails start to be generated as soon a particle is born. So how do you disable trails from particle birth and turn them on later? You do it with Actions. To turn trails off from the start, create a Question for the emitter which tests if the particle age is greater than zero. Add a Change trails action to the Question, and in the action set 'Per-particle effects' to 'Don't generate trails'. This will prevent trails from being

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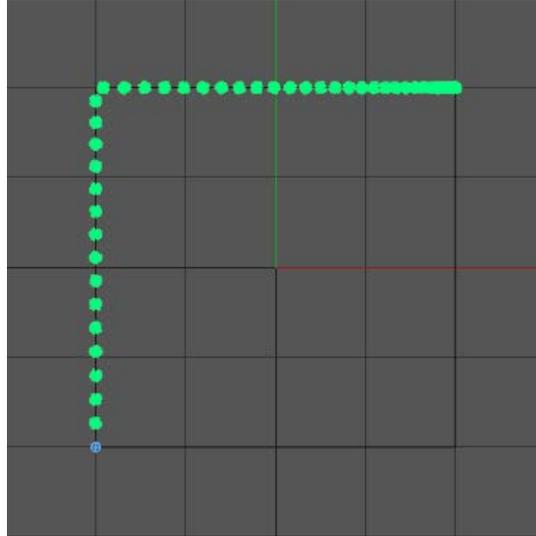
generated. To turn them on, just use another Question and Action, this time setting the action to 'Generate trails'.

7. Priorities

As anyone who has tried to develop a complex animation will know, and certainly many plugin developers will know, Cinema 4D has a priority system which is limited, to say the least. This system determines the order in which various objects in the scene carry out their roles. Objects with equal priorities are executed in order they appear in the Object Manager.

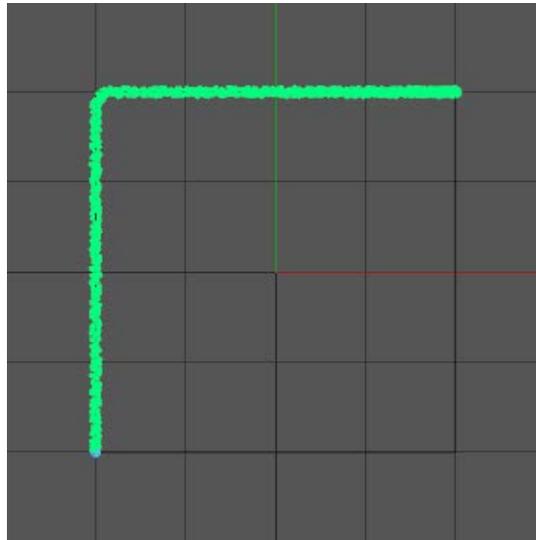
This doesn't matter much unless you have an animation in which correct playback depends on certain functions being carried out before others. In X-Particles, the Emitter must have first priority as it must execute its functions before the Generator, Sprite, etc. These priorities are set internally and can't be altered by the user.

But suppose you have an emitter, set to use Subframe emission (the default setting) and the emitter moves along a spline by using Cinema's Align to Spline tag with a keyframed 'Position' parameter. You see that the particle emission occurs in separate pulses rather than in one smooth stream of particles:



In the tag, priority is set to Expression with a value of 0 (zero), while the emitter is set internally to Animation + 10. This means that the emitter completes its execution before the tag, so it emits particles and then is moved by the tag to a new position. Next frame it emits another burst of particles but in a different position.

Now if we change the tag priority to Animation, so that the tag starts to execute before the emitter, everything works as intended:



In this case the tag starts to move the emitter which then (using subframe emission) emits particles while being moved.

If you run into problems like this, where things don't appear to work correctly, consider a possible priority conflict. You can change the priority of many Cinema features, and all you have to know is what to change it to. The following table indicates the priority assigned to various X-Particles objects:

Execution point	Priority setting
Emitter emits particles	Animation + 10
Modifiers executed	Expression - 10
Collision engine initialised	Generator + 50
Collisions executed	Generator + 60
Collisions updated	Generator + 90
Final particle update, particle positions/properties updated and killed if necessary	Generator + 100

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You can see now why setting the Align to Spline tag priority to Animation works. In fact it will work if it set to Animation + 9 (because that is less than the Emitter priority) but it fails at Animation + 10.

Hopefully this will let you solve these annoying issues. This is not X-Particle's fault, it's the nature of the priority system in Cinema 4D.

8. Object morphing

This is quite a complex process and for this reason it has its own [manual page](#). Please see that page for hints on how to use the morphing feature.

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Contact

We can be contacted in the following ways:

1. through the forums at www.x-particles.com/forum/
2. through the support email form at www.x-particles.com/contact
3. or through the other well-known Cinema 4D forums, especially [Cinema 4D Cafe](#) and the [CG Society](#) (we use the handles spedler (Steve), slouchcorp (Mike), and obeardy (David) at those sites)

Support questions for X-Particles will not be answered on any forum other than our own. The forum in point (1) above is the best place to ask general support questions as we and our beta-testers check there frequently.

For support about licensing and registration, please use the contact form in point (2) above as we cannot deal with these issues in an open forum.

Mike Batchelor
David O'Reilly
Steve Pedler

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Again, thanks to all our testers and especially those mentioned above. We hope they don't mind being named here, but we felt their contribution was so great we had to make it known to every user of X-Particles.

Steve Pedler
Mike Batchelor
David O'Reilly

March 2015

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For more details of our company please see the [company web site](#).

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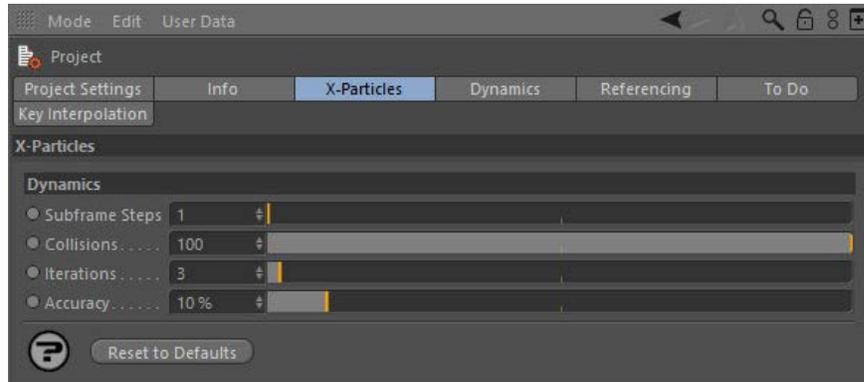
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Project settings

In addition to the general preferences, X-Particles has several settings which are used on a project-wide basis. These can be found in Cinema's Project attributes, which you can see by pressing Ctrl-D (or Cmd-D):



For the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Subframe steps

The value affects the Collisions, Fluids and Constraints (Multiphysics). Increasing the Time Steps divides each frame time into subframes, this reduces the velocity per step that each particle is moved by. In X-Particles 3, subframes are also used by most modifiers to reduce the banding effect which is sometimes seen.

If you have fast moving or complex particle motion increasing the Time Steps will increase the accuracy of the Fluids, Constraints and Collisions. It is advised to only increase it a small amount as it can greatly affect your particle simulation result and drastically slow down the speed of simulation.

If you experience collisions leaks, especially from rotating/moving objects or when particles are pinched between multiple object, then increasing the Time Steps will help the collision engine resolve these cases more accurately.

The second use for this setting is to reduce the banding in the particle stream caused by some modifiers. Increasing this value can eliminate banding but will slow down playback, so you should keep this setting as low as possible to avoid too much speed reduction.

You can also increase this value to increase the accuracy/stiffness of dynamics/collisions and constraints.

In v2.5 this value was found in the emitter's dynamics tab as 'Time Steps'.

Collisions

This is the maximum number of collisions per particle within one execution. For example, fast moving particles may hit many polygons over their movement within one frame/subframe, and this is the maximum number it is allowed to hit. It is a safety limit to avoid very fast particles colliding repeatedly and slowing down execution.

Iterations

This setting is used for constraints and SPH Fluids. Increase this value to make constraints and SPH more accurate/stiffer.

Accuracy

This setting stops the constraints/dynamics solving early if the execution of the constraints/dynamics doesn't change the particles velocity/position very much (the particles are already close to the constrained/dynamics final solution). Increasing the value will improve the accuracy of the solution at the expense of slower playback.

Please see the [Constraints object](#) for further discussion of constraints solving in X-Particles.

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Getting started with X-Particles

At its simplest, the X-Particles particle emitter can be used instead of the standard C4D emitter, giving you more options and control over particles than you would otherwise have. If you just want to generate some particles, the emitter is all you need and will work perfectly well on its own without the addition of the control system.

You can also add tags such as the Freeze tag to the emitter and a variety of particle modifiers (including all the standard Cinema 4D modifiers) and again these will work without the control system.

For the ultimate control over your particles, however, you will need to become familiar with the X-Particles control system.

For more information, you can:

- refer to this documentation (see the table of contents on the left of this page)
- refer to the online video manual
- watch the videos available on the X-Particles web site
- try the sample files provided and dissect them to see how they work
- ask on the [X-Particles forums](#)

In this section, we will take a brief overview of the X-Particles particle emitter and how to set up a basic control system.

Adding an emitter

To do most things with X-Particles you need an emitter. So, to add an X-Particles emitter to the scene, go to the Cinema 4D menu bar and find the 'X-Particles' entry. Click this entry to display the X-Particles menu, then click the entry 'xpEmitter' to add an emitter to your scene.

At this point, clicking the Play button on the timeline (or hitting the F8 key) will play the animation and start to generate particles.

Note: the animation only plays forward; you cannot scrub the timeline backwards and forwards unless you cache the system first. For more information on caching, please see the [Cache system](#).

By default the on-screen representation of the particles is the simplest possible one, to place least overhead on the computer. This will show the particles as small green dots. If you find these difficult to see, simply change the representation in the 'Display' tab; you can select a variety of different shapes and change the particle colour. These parameters can be keyframed if you wish, or if you are using the X-Particles control system, you can change them with an Action. This can help make it easier to understand what the particles are doing when setting up a complex system.

You can turn off the editor display if you want to: in the 'Display' tab just uncheck the 'Show Particles' switch or set the 'Editor Display' to 'None'. Note that this does not affect sprites or generated objects, just the editor display of particles. If you don't want to see the default emitter shape, uncheck 'Draw Emitter' in the 'Display' tab.

If you find that you always want your particles to appear as cyan spheres (for example) you can set these defaults in the [X-Particles Preferences](#). The settings there will then be used as the default options for all future emitters and scenes.

Generating objects

Up until now your particles cannot be rendered – it's just an editor display. To get something to render, you can do several things:

- create an object to be generated (e.g. a sphere): add a Generator object to the scene and make the sphere a child of the generator object. In the Generator, drag the emitter into the Emitter field; that's all that is needed
- or add a Sprite object to the scene, drag the emitter into the Emitter field, and select the desired options in the Sprite object
- or use a Skinner object to generate a mesh
- or use the [X-Particles material](#) to render the particles
- or use the Hair renderer to render the particles without generating geometry (see the [Hints and Tips](#) page for an explanation of how to do this)

For details on using the Generator object, please see the [Generator Object](#) page. Details of the Sprite object can be found on the [Sprite Object](#) page.

Sprites

In X-Particles, sprites are small objects (actually Cinema 4D primitives) or lights, which are a convenient way to generate simple geometric objects. They have the advantages that they are small, lightweight objects which can be readily controlled via the X-Particles control system, including changing the type of generated sprite and their attached materials. They can also be used with the sprite shader, which enables age-dependent texture effects.

For details on using the Sprite object, please see the [Sprite Object](#) page.

The control system

Now that you have got the basics, you might want to go to the page ['The X-Particles control system'](#) as this will give you vital information on using the particle controls in this plugin.

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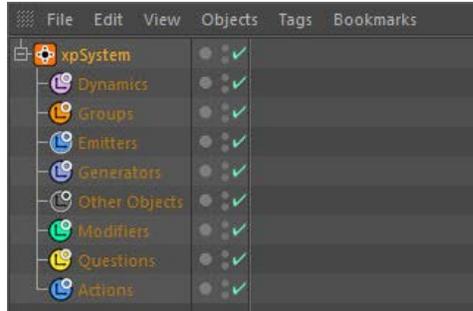
The X-Particles control system

This is the heart of X-Particles and the reason it was written in the first place. It is intended to make control of the system more powerful than the standard Cinema 4D emitter without the complexity of a heavily Xpresso-based system like Thinking Particles. This section is an overview of how the control system works, but for full details of each object, please see the Reference section in this manual.

The X-Particles control objects

The control system comprises a number of objects. Two of these, the System object and the Action object, can be accessed from the X-Particles menu. The other object is the Question object but these can only be created from an emitter (in the emitter's Questions tab).

To see how this works, add a System object to the scene. When a System object has been added, the Object Manager looks like this:



You can see several objects in the scene. As well as the System object itself, there are eight special null objects called Dynamics, Groups, Emitters, Generators, Other Objects, Modifiers, Questions, and Actions as child objects of the System object.

The named null objects are there purely to keep the Object Manager tidy. You are NOT required to put your groups, emitters, generators, modifiers, questions, and actions into these nulls! If you add such objects by using the System object, they will automatically be put into the nulls for you. If you add the objects from the main plugin menu you can drop them in the special nulls yourself if you wish, or leave them elsewhere if you don't want to use the nulls.

You can use the individual object menus on the System object to add additional objects at any time, but you will need to move them into whatever link field or include list the setup requires. This may sound a little confusing at first, but it will become easier as you try the example scenes provided.

Note also that you can add multiple emitters to the scene, then use the same, or different, Questions and Actions for the different emitters. Different Questions can use the same Actions, which keeps the system flexible and avoids unnecessary duplication of objects.

You can also have more than one System object. By doing that, you can have multiple but completely separate systems in one scene, each with its own Questions, Actions, and if you wish, modifiers.

For the moment, just do the following:

- in the System object, click and hold on the 'Generator Objects' button; from the drop-down list, select 'Emitter', and an Emitter is created and automatically dropped into the 'Emitters' null
- back in the System object, click and hold on the 'Other Actions' button; from the drop-down list, select 'Editor Display Only' and an Action object of that type is created and automatically dropped into the 'Actions' null
- in the new Action object, check the 'Change Editor Display' switch and change the particle colour to a colour of your choice (and the shape, if you like)
- in the Emitter, go to the Questions tab and click 'Add Question'; a Question object is created and automatically dropped into the 'Questions' null
- in the object manager, drag and drop the editor display Action you created into the 'Actions' list of the Question object
- finally, in the Question object, change the 'Frames' parameter to 1 second (this is 30 frames if your frame rate is 30 frames per second, or 25 frames if it is 25 frames per second)

Play the animation. You see that when each particle is over 30 frames old, it changes colour from the default green to the colour you chose. Changing these parameters, although they only affect the editor display, can be enormously helpful when setting up a complex system, since you can see which particles are being affected by an action and when.

How does it all work?

What X-Particles does is this: at each frame, every generated particle is tested against the question in the Question object. By default, the question is whether the particle age exceeds a certain time (the default setting is 3 seconds). If that question is true (i.e. the particle is indeed more than 3 seconds old) control is passed to each Action object in turn in the Actions list of the Question. You may only need one Question and one Action in your setup, but you can have as many as you like, and each Question may contain multiple Actions.

If there is no Action in the Actions list of the Question, nothing will happen. Likewise, if the Question or Action is disabled (has a red cross against it) in the object manager, nothing will happen. Also, for any Question to be tested, it must be present in the Questions list of one or more emitters.

When the Question is active and the question is passed by a particle, it will then carry out all the Actions associated with it. Each Action will be carried out in turn. In the example above, all we did is change the colour of the particle in the editor, but there are a lot more possible actions than that.

For this simple setup all you see is a change in the particles in the editor. However, you can create more than one Question for each emitter; to make the emitter test the new Question, you must add it to the Questions list of the emitter. But how does X-Particles test these different Questions? And in what order does it do it? Details of this are provided in the reference section of the [Question object](#).

That concludes this brief overview of the X-Particles control system.

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Data mapping in X-Particles 3.5

Data Mapping in X-Particles 3.5

Data mapping was introduced in X-Particles 3.5, dated November 30th 2015.

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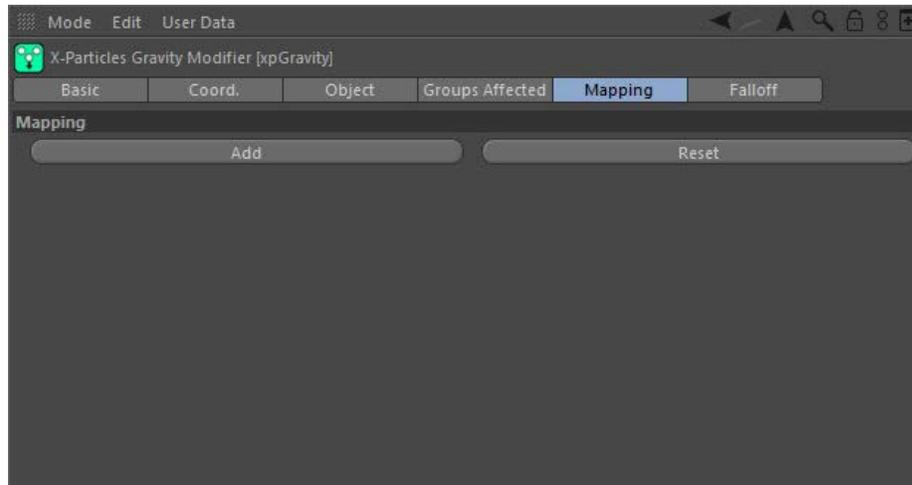
What is Data Mapping?

Put briefly, data mapping allows you to 'map' a parameter in a modifier or other object to an element of particle data or some other data value, such as the document time. This means you can adjust a parameter in accordance with the chosen data value.

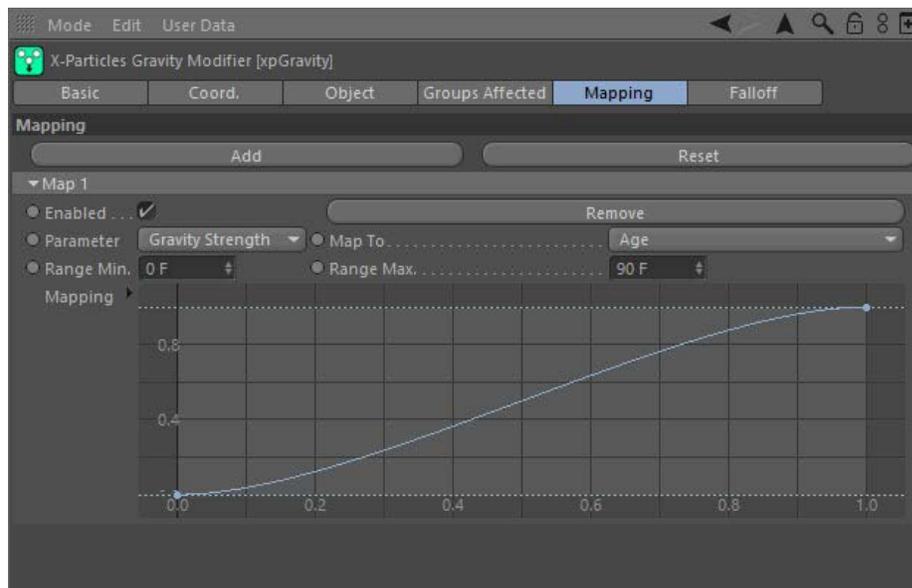
Example

An example will make this clearer. Suppose you have an emitter which emits particles with a range of mass values – say a mass of 5 with a variation of +/- 4. You would like the particles with the greater mass to be more affected by a gravity modifier than the ones with less mass.

You can do this by mapping the gravity strength value in the modifier to the particle mass. To do this, go to the modifier's Mapping tab:



As you can see, the tab is empty by default. To add a map, click the large 'Add Map' button. The interface now looks like this:



The 'Parameter' drop-down menu is the modifier parameter you would like to map – in this case, the 'Gravity Strength' value. In fact in the Gravity modifier, that is the only parameter you can map, but some modifiers have many more than that. The actual parameters are, of course, unique to each modifier.

The 'Data' drop-down contains a list of data items you can map the gravity strength to; this list is the same for all modifiers. In this case, we want to map the gravity strength to the particle mass, so select 'Mass' from this list:

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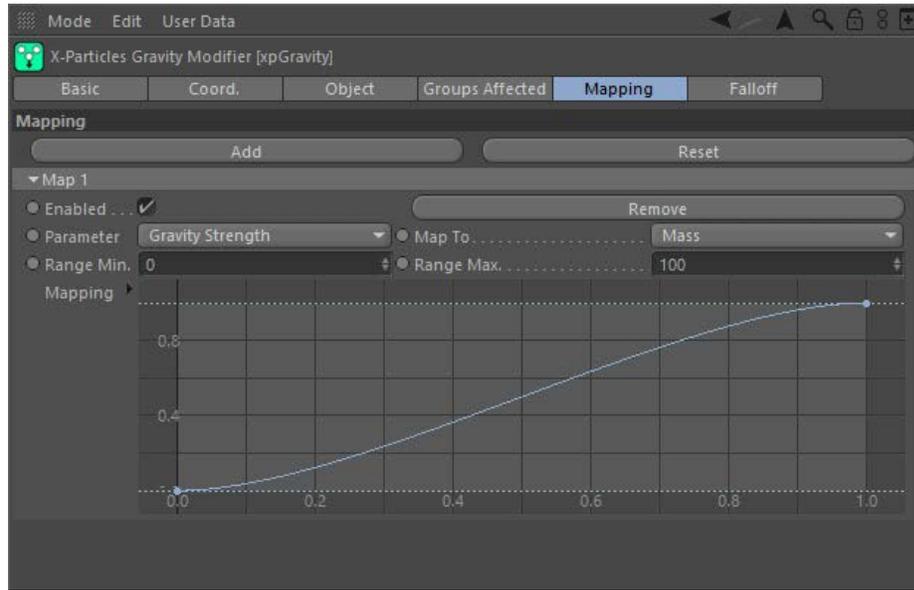
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You also have two settings – 'Range Min.' and 'Range Max.'. These are the limits of the data values over which the spline control below will map the parameter to the data. Leave these alone for the moment.

Underneath you have a spline control which actually maps the strength to the mass. How it works is very simple: any particle with a data value (mass, in this case) which is the same as or lower than the 'Range Min.' setting is mapped to the left hand end of the spline. Since the minimum value is zero, this means that for any particle with a mass of zero (or less, but that's not in fact possible for particle mass) will have a gravity strength applied to it of zero – that is, it won't be affected by gravity.

For any particle with mass of 100 or above (since that is the value of the 'Range Max.' setting) will have the maximum gravity strength applied to it. In the Gravity modifier the default strength value is 981, so that will be applied to all particles with a mass of 100 or more.

Any particles with a mass between these two values will have a gravity strength applied depending on the value from the spline control. So if the mass happens to be 50, which is halfway between the minimum and maximum settings, the gravity strength will be multiplied by the spline value from 50% along the spline X-axis, which in this case will be about 0.5, giving a strength of $981 \times 0.5 = 490$ (approximately).

You can see that by altering the spline you can get very different effects. The default spline would mean that very light particles would have little or no gravity applied to them but maximum gravity would be applied to very heavy particles. Which is what we want – or is it?

Play the animation and look at what happens. You can see that gravity has very little effect on any of the particles, regardless of mass, which is not what we are expecting or what we want. This is because we haven't set the range correctly. The particles have a mass range of 1 to 9 (5 +/- 4) but the mapped range is 0 to 100. So all the particles will take a spline value from near the left hand end of the spline, resulting in very low values. To correct this, set the 'Range Min.' to 1 and the 'Range Max.' to 9, then play the scene again. Now it looks much better.

Try altering the spline to give different effects. For example, note that particles with a mass of 1 will have zero gravity applied. We might want even those particles to be affected to some extent; to do that, drag the left hand spline point up a little so that the returned value is never zero. To make light particles affected but not heavy ones, simply mirror the spline so that the left hand point is at the top and the right hand point is zero.

You can map parameters to a range of different particle or other data values. The best way to find out what data mapping can do is to experiment – you will find that it opens up a large range of possibilities.

Hints and tips for using data mapping successfully

1. Set the range correctly

Always be sure to set the range correctly. This is absolutely critical. An incorrect range will not produce the results you expect, so if things don't seem to be working check the range. As a general rule, you should set the Minimum value to be the lowest value you expect the data to reach, and the Maximum to be the highest expected value. With experience you can alter the ranges to suit the desired result, but be aware that you may not see exactly what you expect.

Note that not all data items have a range - for example, the particle lifespan is a fixed value, so a range is not applicable.

2. Not all modifier parameters can be mapped

Mappable values are those which have a continuously variable value, like the 'Gravity Strength' in the above example. These can be integers, floating-point numbers, or time values. However, on-off switches or drop-down menus cannot be mapped. In some cases, a value which looks as if it should be mappable is not. This is usually because the parameter is fixed for a particle as soon as it enters the modifier's field of effect, so changing the parameter value after that happens will have no effect.

3. Not all modifiers have a mapping tab

If they don't, it is because none of the parameters in that modifier can be mapped.

4. Mapped parameters cannot be increased in value

Whatever parameter is being mapped, note that the value cannot be increased above the value set in the modifier or other object. For example, if the 'Gravity Strength' value in a Gravity modifier is set at 500 units, the data mapping can only return a maximum gravity strength of 500 – it can never return a value of 501 or 600 or higher.

5. No negative values

The data mapping can never return negative values (unless the modifier setting itself was negative). That is, if the 'Gravity Strength' value in a Gravity modifier is set at 500 units, the data mapping can only return a value of 0 to 500; it cannot return a value of -200, for example. However, if the value in the modifier was set to -200, then the data mapping can return a value ranging from 0 to -200.

6. Time variables

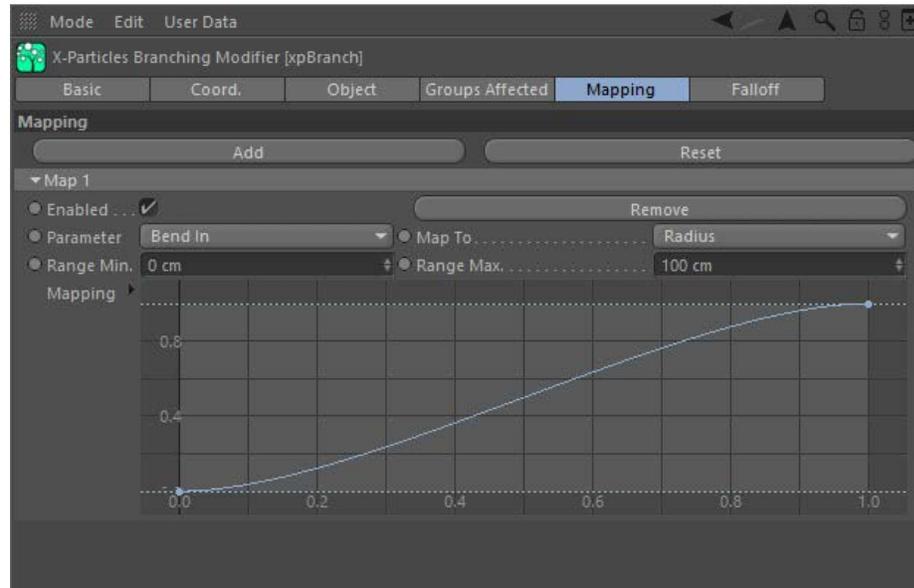
These can be very confusing when mapped. Suppose a parameter in a modifier is a time when something should happen - to repeat an action

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every so many frames, for example. Now imagine that this value is set to 30 frames, and it is mapped to any data item with a spline like this (the Branch modifier is shown here with the 'Bend In' time parameter mapped to particle radius):



At the left hand end of the spline, when the radius is very small, the value returned by the spline is zero, so the time parameter value is mapped using that spline value, giving it a time of zero (effectively, this means the action will usually take place immediately). So with a low value from the spline, things happen *sooner* than they would be expected to. This can be really confusing, because instinctively you expect a lower value from the spline to make things happen less frequently - but in fact, they will happen *more* frequently. If you find this confusing, the answer is to reverse the spline so it has the maximum value at the left hand end; then larger values on the spline will result in the time parameter approaching its maximum.

7. Not all mapped parameters will always have an effect

Suppose there is a parameter in a modifier which is only available to you under certain conditions - in other conditions the parameter may be greyed out or not be visible at all. Such parameters can still be mapped, but the mapping won't do anything because the parameter being mapped is not actually used. You should be aware of this if you map a parameter and it doesn't seem to do anything - always check to see that the parameter itself is actually used!

Reference

Add

Click this button to add a new map.

Reset

To remove all maps from the modifier, click this button. You will be asked to confirm that you want to do this.

Within each map, the following controls are available:

Enabled

Uncheck this switch to disable the map. This is useful if you want to try out several different maps, because it makes it easy to set up the maps with differing parameters and then switch between them. Or you can try maps in combination and enable or disable maps to see the effect of each one.

Remove

Click this button to permanently remove the map.

Parameter

The parameter to be mapped. This drop-down list contains all the parameters of the modifier which can be mapped. A parameter which is not in this list cannot be mapped.

Map To

The data item to map the parameter to. The available items are:

Data item	Data type	Range units
Age	Particle age.	Time
Color Brightness	Particle color brightness.	0 - 100%
Distance Traveled	Total distance travelled by the particle.	Scene units
Fire	Particle fire value.	Floating-point number
Fuel	Particle fuel value.	Floating-point number
Lifespan	Particle lifespan.	Time
		Floating-point

Mass	Particle mass.	number
Radius	Particle radius.	Scene units
Scene Time	Current time in the document.	Time
Smoke	Particle smoke value.	Floating-point number
Speed	Particle speed.	Scene units
Temperature	Particle temperature value.	Floating-point number
Vertex Weight	If the particle was emitted from a vertex of a polygon object, using a vertex map, the vertex weight of that vertex.	0 - 100%
Time in Modifier	The time the particle has been in the modifier's field of effect. Not available for all modifiers.	Time

Range Min., Range Max.

The ranges used to map the parameter to the data item. The units of the range will vary depending on the 'Map To' parameter; the units for each data type are shown in the above table.

Mapping

The spline used to map the parameter to the data item.

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FLIP and Volumetric Rendering

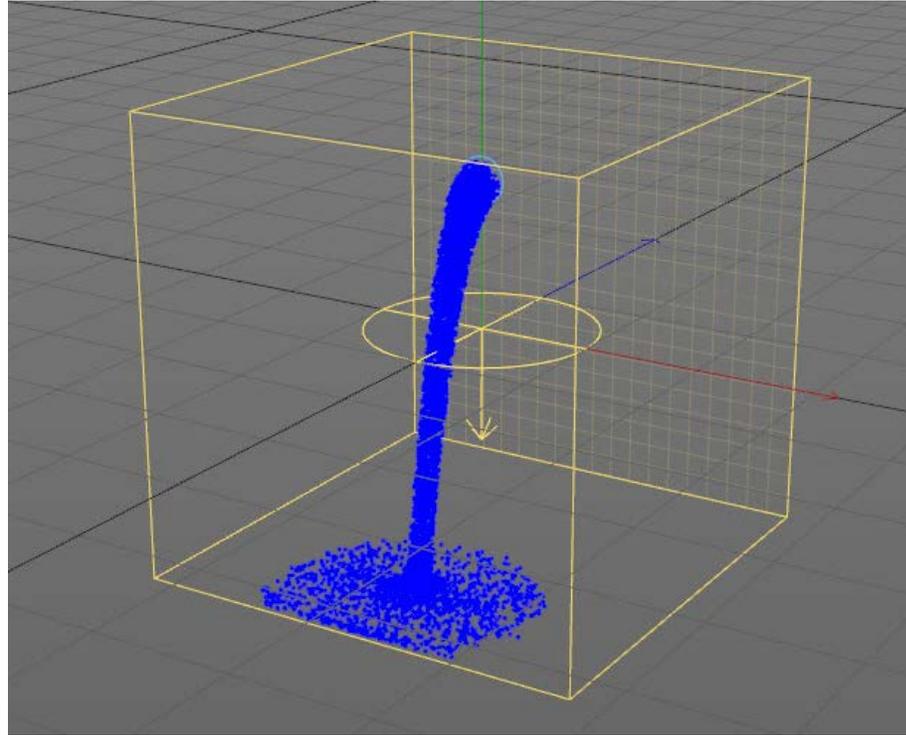
Overview

X-Particles 3 contains a new FLIP (Fluid Implicit Particle) system for the simulation of fluids, fire and smoke. The SPH fluid system from version 2.5 is still present and can be found in the xpFluidSPH object. Documentation for the [SPH fluid object](#) is provided separately.

The FLIP solver is handled by the xpDomain object. It is important to remember that unlike the other components of X-Particles, and unlike the SPH fluid object, the domain only works within the space that it encloses. Particles or objects outside the domain are unaffected by it.

Fluids

Using the domain for fluids is very simple. After creating a Domain object, add an emitter and ensure it is within the domain. You might also want to add something like a Gravity modifier to ensure the liquid flows downwards. Play the animation and you will see something like this:



You can see that the particles stay within the domain bounds by bouncing off the walls (this is because all the walls are in place - they will flow out if a wall is not present. See the [Domain object](#) for details.)

That's all there is to it. You can alter the other properties in the domain, especially Vorticity and Viscosity, then render the particles either with an X-Particles Material or by using the Skinner to generate a mesh. You can use other modifiers to influence the flow: Wind, Turbulence and Drag all produce nice effects. You can add objects to the scene and use the Collider tag to create an 'obstacle' (FLIP systems don't have collider objects, they have obstacles the particles will flow round) or the Avoid modifier for slightly different results.

FLIP fluids are very fast and powerful, the main disadvantage being that they are confined to the boundaries of the domain.

Fire and Smoke

To generate these effects, select 'Gaseous' as the type of domain. You will need a source for the fire/smoke, which can be an emitter if you like, but can be an object instead. If you use an object no separate emitter is required.

Using an Emitter

Add an emitter to the scene, inside the domain, and attach a Domain Tag to it. This indicates that the emitter is to be used as a source of the fire or smoke.

You can leave the particle display on if you like, but it usually helps to turn it off in the emitter's Display tag.

If you run the simulation, nothing will seem to happen. To get some results you need to do two things. First, in the emitter's Extended Data tab, you should set the temperature and smoke values. Try a temperature of 75 and smoke of 20. Secondly, in order to see what is happening you must use one of the display modes in the domain object's Display tab. Since we have added temperature and smoke, either of those would be appropriate. Optionally, you could also add a Gaseous modifier to make the smoke rise. If you don't do that the smoke will stay more or less where it is. Having done all that, with the smoke display you might see this:

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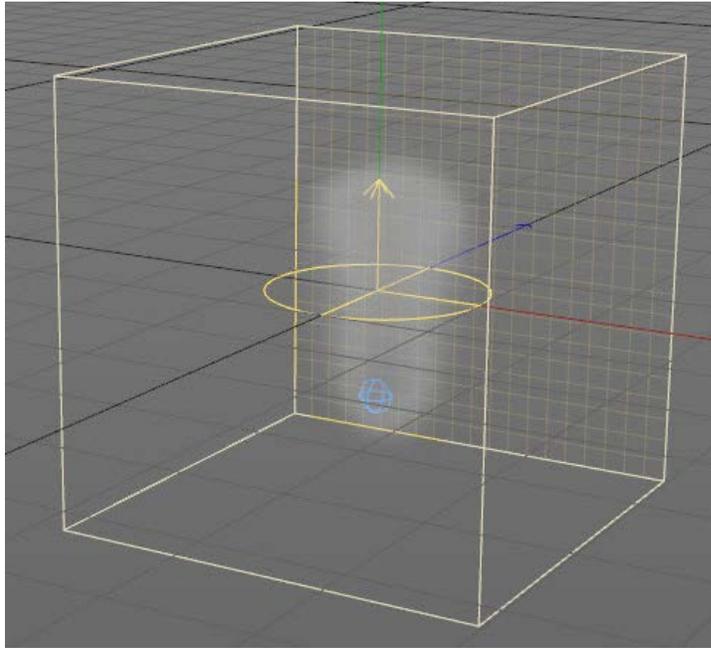
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Once again you can add the usual modifiers to the system, such as Wind. Note that you may need to turn up the values in the modifiers very high in order to see significant effects.

Using an object

Instead of an emitter, add an object such as a Sphere to the scene, and attach a Domain Tag. The source of the simulation is now the object, and you don't need an emitter - the domain will create an internal one for its own use.

The rest of the setup is the same as for an emitter. However, the temperature, etc. is now controlled by the domain tag, so in the tag set the various parameters to the same as in the emitter. Playing the animation will generate a similar (though not quite identical) result.

Using an Emitter with an object

In Gaseous mode the domain uses its own internal emitter to generate the 'air' particles for the simulation. This is easy and convenient, but you have no access to those particles and cannot change their parameters. If you need to do that, set the domain type to 'Particles (Gas)'. Now you have to supply an emitter which you drag into the 'Particles' field. Note that this emitter's emission mode is set automatically to 'Controlled Only'. We recommend you do not change that setting.

The simulation will behave in the same way but now you can alter the emitter's parameters.

Rendering the result

To render the smoke, fire etc., create an X-Particles Gaseous Material and apply it to the domain object. With the default settings in the material, and after adding some fire to the domain tag on the sphere, this sort of effect may be seen:



Of course, much better results can be obtained but this is to demonstrate how simple it is to set up and render fire and smoke using the FLIP system in X-Particles.

Further information

For more information about the FLIP system you can see the following pages:

- [Domain Object](#)
- [Domain Tag](#)
- [Gaseous Modifier](#)
- [Vorticity Modifier](#)
- [Gaseous Material](#)

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In addition to the FLP system, the X-Particles Material can render particles volumetrically to give smoke-like effects without the overhead of the domain.

To do this, apply the material to an emitter and in the material turn on 'Volumetric' in the volumetric tab. You can alter the colour, transparency, etc. in the usual way.

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The collision engine

This page gives some more details about how collisions are handled within X-Particles. You may find it helpful to read this when selecting collision options in the emitter and collider tag.

- [Basic use](#)
- [Objects particles can collide with](#)
- [The effect of particle radius](#)
- [Spawned particle direction](#)
- [Particle-particle collision](#)

The collision engine in versions 2 and 3 of X-Particles is much faster and more accurate than in version 1. Among other things, the risk of particle leakage through a surface is very small, and you can use the collision engine to move particles over a surface they collide with.

Basic use

Collisions in X-Particles are divided into two types:

- collisions between particles and scene objects
- collisions between particles emitted from the same or another emitter ([particle-particle collisions](#))

You can select either or both of these, so you can have both types of collision enabled, both disabled, or only one of them enabled. They are handled quite separately.

Collisions between particles and scene object

To detect collisions, you need to do the following things:

- select the object(s) you want the particles to collide with and add a [Collider tag](#) to each one
- change any of the settings in the [Collider tag](#), as required (the defaults are fine to start with)
- adjust the particle 'Radius' setting in the emitter if required

Then just play the animation and adjust the emitter and/or tag settings as needed.

Objects particles can collide with

Particles can only collide with polygon objects. They will collide with ordinary polygon objects, Cinema 4D primitive objects, Extrude and other C4D generator objects. They will not collide with splines, or generators such as Array or Cloner objects. If you want to collide with objects like that, you must first make them editable, or do a Current State to Object command on the generator and put the collider tag on the resulting polygon object (which you can make invisible if needed). Remember also to do Connect and Delete on the polygon object if necessary, because generators such as the Cloner will produce several different polygon objects when made editable.

If you want to collide with an object in a Subdivision Surfaces (SDS) object, place the tag on the SDS object, not the child object of the SDS object. If you put the tag on the child object, you will still get collisions but with the original surface, not the smoothed surface generated by the SDS object.

Very importantly, an object which is invisible in the scene can still be used as a collider object. So you can make the converted object invisible to both editor and renderer, and it will appear as if the particles are colliding with the original object.

The effect of particle radius

Collision engines such as that found in Cinema 4D's Dynamics are based on polygon to polygon intersections - collisions between the polygons of the objects are detected. This is mathematically intensive and time-consuming, and is therefore impractical (and usually unnecessary) for particle systems potentially involving thousands or millions of particles.

In the X-Particles collision engine, each particle is, in effect, surrounded by an invisible sphere, the size of which is determined by the Radius setting in the emitter. The collision engine looks for the intersection of this sphere with the object surface. This is necessary because the particle itself is of infinitely small size. If the engine tried to detect an intersection of the exact particle location with a polygon, some collisions would be missed and particle 'leakage' would occur. You can test this by setting the particle radius to zero, which will cause significant leakage of particles on collision.

The particle radius is initially set at an arbitrary value of 1 screen unit. This gives good accuracy when determining the intersection of the particle with the surface, but there is a possible risk of leakage. If you do get particles leaking through the surface, try increasing the radius value. You may also need to increase the radius if each particle is associated with a large generated object and you wish to prevent interpenetration of the particle object with the scene object.

Using Dynamics

The collision engine in X-Particles is fine for bouncing particles off screen objects and/or other particles. For more precise collisions involving small numbers of particles, you can consider using Cinema 4D's inbuilt Dynamics system instead. Details of how to use X-Particles with dynamics can be found [on this page](#).

Spawned particle direction

If you spawn particles on collision, you can choose between various settings for the direction of the spawned particles. Some are quite clear, but the two which can be confused are 'Source Particle' and 'Face Normal'. Figure 1 shows the difference between the two.

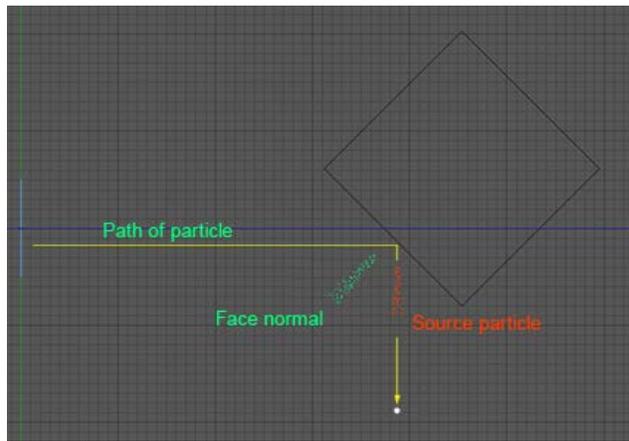


Figure 1.

Source particle

When a particle hits an object, it bounces off at an angle which depends on the angle at which the particle hit the face of the object. When 'Source particle' is chosen as the direction, the spawned particles travel along the same direction as the source particle - subject to any variation added by the Spread setting in the [Collider tag](#).

Face normal

In contrast, in this mode the spawned particles travel in a different direction to the source particle. Instead, they travel along the direction of the normal of the face which was hit by the source particle. This can be visibly different from the source particle's new direction.

Which method to choose?

At first glance it seems obvious that the Source particle direction would be preferred. But what happens when a bullet hits a stone wall? Do the fragments of stone which are produced travel in any direction, or predominantly along the direction of the ricocheting bullet, or directly away from the wall? (I don't know the answer to that question, by the way!) But this is a case when its up to you to choose which is best for your scene. Try them both, play with the Spread setting (and also add in some bounce variation in the collider tag and maybe some speed and lifespan variation in the spawning emitter), and see which looks best to you.

Particle-particle collisions

You can also detect collisions between the particles themselves (those emitted from the same emitter). You DO NOT need a Collider tag for this. Instead, you will need to add a [Particle-Particle Collisions object](#) to the scene. Please see that page in the manual for details.

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You can use the Dynamics engine first introduced in Cinema 4D R12 with X-Particles. To do so, you must:

- add a Generator object or a Sprite object to the scene and link it to an emitter (you must generate objects for Dynamics to work, the engine will not work on bare particles)
- if using a Generator object, add an object to be generated; if using Sprites, select the type of sprite you want - note that this will not work if you generate lights, since they have no geometry
- set up Dynamics tags on the objects you want particles to collide with in the usual way
- add a Dynamics tag to the Sprite or Generator object, NOT to the object to be generated - this is important!
- set the required options in the Dynamics tag
- finally, in the Dynamics tag, Collision tab, set 'Individual Elements' to 'Top Level' (or any of the options in the drop-down other than 'Off') - if you don't do this you won't get any dynamics effects

Now your particles and their objects can be used with the inbuilt Dynamics system.

You should be aware that Cinema's Dynamics will take control of the generated object away from X-Particles. The particles themselves remain under the control of the emitter, but the objects may be completely divorced from their source particle. Unfortunately there is nothing we can do about this, as the Cinema 4D SDK does not provide any functions for controlling dynamics or accessing the dynamics data.

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Using Presets

X-Particles can save and reload presets of most of the objects in the plugin. This page describes the preset handling system in X-Particles 3. This system is independent of the MAXON content browser, which is not used. All presets are individual Cinema 4D files which can be exchanged with other users if desired.

Saving and loading presets

If an object can save and load a preset of itself, you will see these buttons in the main tab of the object:

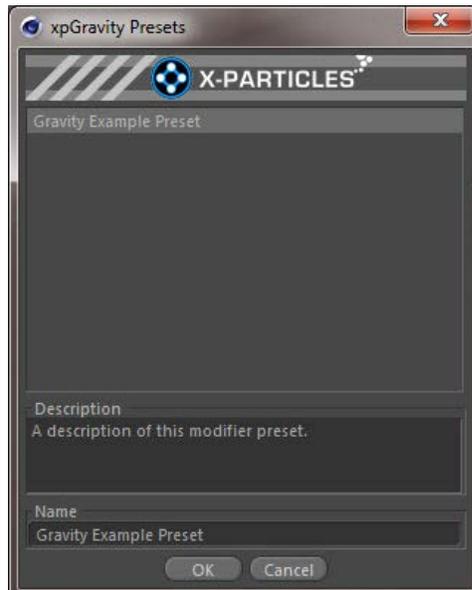


If you click on 'Save Preset...' by default you will see this dialog (this example is using a Gravity modifier):



In this case, this is for Gravity modifier presets (you can see this in the title bar of the dialog box). So far, there are no presets, so the list is empty. You can enter an optional description in the 'Description' box and the name of the saved file in the 'Name' box. Don't add an extension to the name, just the main file name. Then click OK - or hit Enter - to save it. If a preset with that name already exists, you will be asked if you want to overwrite it.

To load this preset, create a Gravity modifier and click 'Load Preset...'. You will now see this dialog box:



Now you can see the list of available presets - just one so far. Click on the desired preset in the list and the description you entered previously will appear in the 'Description' field (you can't change the description from this dialog). Click OK or hit Enter to load it. The preset will now replace the existing modifier with its own settings, subject to the caveats and limitations explained below.

If there are no presets for a particular object, instead of the above dialog box you will simply be informed that no presets were found.

Note that X-Particles will not let you load a preset into the wrong kind of object (e.g. you can't load a Gravity modifier preset into an Attractor modifier, for example!).

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If you don't like the preset dialog, you can use the standard file selector provided by the operating system. To do this, hold down the ALT key (Opt on the Mac) when clicking the save or load buttons. The file selector will appear showing files in the preset folder. If you have presets stored elsewhere you can navigate there and load the preset. Of course, with the standard file selector you won't see the preset description.

Using a popup list

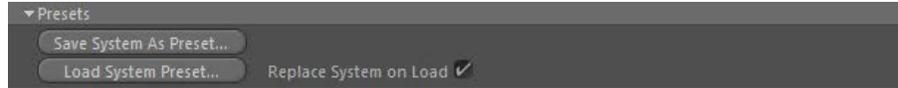
If you prefer, when loading a preset (not when saving) you can hold down the Control key when clicking 'Load Preset...' and get a simple popup list instead. This image shows the stored Vortex modifier presets:



Again, you won't see any descriptions, just the name. But you may find it quicker if you already know which preset you want.

Saving System object hierarchies

If you have a System object in your scene, you can save the entire System object hierarchy as a preset. In the System object you will find a Presets section with two buttons:



Clicking these buttons will save or load an entire system hierarchy, complete with all its objects. Note that objects outside the System object will NOT be saved so if you have an important object that should form part of the system (an object an emitter is emitting from, for example) ensure that this is a child of the System object before you save it.

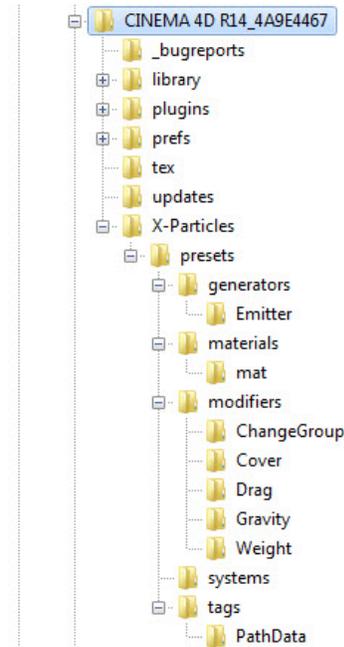
Loading and saving System object presets are done in the same way as any other preset.

If the switch 'Replace System on Load' is checked, the old System object and all its hierarchy of objects will be removed, and replaced by the loaded preset. However, if it is unchecked, the new system is loaded as a new hierarchy; the old system object and its child objects are preserved and not changed in any way.

Files and locations

The preset files are all standard Cinema 4D files, so you can load them as independent files if you wish, by using Cinema's File menu in the usual way. It's usually more convenient to load them with the 'Load Preset...' buttons, but you don't have to.

Where are these files stored? The user preferences folder is used for this purpose. Within that folder, X-Particles creates a directory tree that looks something like this:



You can see that the top-level folder is named 'X-Particles', then a sub-folder named 'presets' and finally as many additional folders as required to hold presets of different objects. These folders are not created until required, so in this example there are no folders for most object types. These will be created when needed.

Third-party presets

If you obtain a preset from someone else, you can either load it via the file selector from wherever you stored it, or copy it into the correct folder for that type of preset. If the folder doesn't exist you can either create it manually (if you know what name it must have) or just load the preset as an ordinary Cinema 4D file, then save it as a preset, which will create the folder.

Limitations

There are some limitations and things to be aware of when using the presets. These are:

Linked objects

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With XP objects (modifiers, emitters, generators, etc.) saving a preset saves a complete snapshot of the object, together with any linked objects and materials. When you reload the preset, the preset object completely replaces the existing one. So for example, if you had an emitter which was emitting from an object, and the preset was a simple rectangle emitter, the result after the preset is loaded is that it is now a rectangle emitter. You will need to reconnect the emitter to the object if necessary.

This also means that, if for example you save a Trail object with an emitter linked to it, the emitter will also be saved. Reloading that preset from the 'Load Preset...' button of a Trail object will recreate the emitter, so you may find you have an extra emitter in your scene. To avoid this, it is recommended that you remove any linked objects from an object before saving a preset, unless you really want to save the linked object as well.

Conversely, if the preset object is linked to some other object, that link will be broken when the preset is loaded. E.g. if a Generator uses an emitter, and you load a preset into the emitter, the Generator will have to be reconnected to the emitter manually after the preset is loaded, because the original emitter no longer exists.

Tags

Tags are saved without preserving any linked objects, only the tag settings are preserved. This is because a tag is normally attached to an object, but the tag preset when it was saved will have been attached to some completely different object to the one you are loading the preset from. For the preset to work correctly the tag has to be free of any links to any object that will not exist in the scene when it is reloaded. If you load a tag preset through Cinema's File menu, you will see that the tag has been attached to a null object which is discarded when the preset is loaded by the preset handler.

Shaders

Shaders cannot be saved as presets in this version of the preset system. There are various reasons for this but just remember that you cannot save a shader preset.

The XP Material and Gaseous Material

The XP and Gaseous materials can be saved as a presets and if they have any shaders in any of the link fields, these are preserved when the preset is loaded.

There is one thing to be aware of. If you save a preset of any kind where one or more objects has an XP material assigned to it, the material will also be saved as part of the preset. However, if you reload that preset in the future and try to render the scene, you may find that the material from the preset will not render. This is because in order to render the material there must be an X-Particles post-effect in the render settings. When you create an XP material this post-effect is added automatically, but this is not the case if an XP material is loaded from another document. If this happens, simply go into the render settings, click 'Effect...' and choose 'X-Particles' from the list of post-effects.

Assets

Very importantly, assets are not saved with a preset. If the object uses a bitmap the bitmap is not saved and if you load the preset into another scene you will get a 'missing texture' error if you render the scene. You will need to remove the link to the bitmap or link to it manually. For this reason we recommend removing links to bitmaps before saving presets.

Caches

Cache files are not saved. If a System hierarchy preset is saved, any Cache object and Cache tags are removed from the System before it is saved; if an object preset is saved, any Cache tags are removed from it before saving. The reason of course is that you really don't want to save a preset which might contain several hundred megabytes of cached data...

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Writing Python for X-Particles

This is not a guide to writing Python - you have to learn that yourself - but how to get Python scripts working with X-Particles.

When you create a Python modifier in X-Particles, you have a basic script that looks like this:

```
import c4d, xparticles
#Welcome to the world of Python

def InitModify():
    return True

def FreeModify():
    return True

def ModifyParticle():
    return True

def Draw():
    return True
```

This is the skeleton of your script. The key is the function 'ModifyParticle()'. What this does is simply iterate through every live particle. You can apply changes to those particles by getting or setting the particle data. Of course, you can also call any other Cinema 4D Python functions that you might need.

Global variables

Some global variables are available to use within your scripts, these are:

doc - the document containing the modifier

op - the modifier object itself

emitterObject - the emitter object (c4d.BaseObject)

emitter - the X-Particles emitter (xparticles.Emitter)

particle - the first particle in the particle array, only within Modify()

falloff - the falloff of the modifier evaluated at the particles position, only within ModifyParticle()

An example may help to clarify this.

Example 1

In this example, we will change the colour of the particle to red. It's a very simple script which looks like this:

```
import c4d, xparticles
#Welcome to the world of Python

def ModifyParticle():
    particle.SetColor(c4d.Vector(1, 0, 0))
    return True

def Draw():
    return True
```

This routine is called for every particle in the field of effect of the modifier, and turns the particle colour to red. If the modifier falloff was set to 'Infinite', this would happen immediately the particles were created, so they would look red from the start.

If you now change the falloff to 'Box', and move the box away from the emitter, the particles change colour whenever they enter the falloff (the actual value of the falloff has no meaning in this modifier). Of course, once they are red, they stay red unless you change them in some other way.

Note: for ModifyParticle(), remember that the script is only called when a particle is in the field of effect of the modifier. That will be always, if the falloff is set to Infinite, but for other shapes, the function is only called when the particle is in the modifier field. Also, particles will only be affected if they themselves are in the field of the modifier.

ModifyParticle() is the simplest way to use the modifier and the one you will probably use most often. The alternative is to use another function - Modify(). All this does is get the first particle in the emitter and executes the Modify() function on it.

So what use is that? Well, you can still iterate through all the particles if you have the first one. Example 2 shows how this works.

Example 2

This example will use the Modify() function to change the colour of all particles with an index in the particle array between 500 and 1000 to red (the very first particle has index 0):

```
import c4d, xparticles
#Welcome to the world of Python
```

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```
def Modify():
    px = particle
    while px is not None:
        ind = px.GetIndex()
        if ind > 500 and ind < 1000:
            px.SetColor(c4d.Vector(1,0,0))
        px = px.GetNext()
    return True
```

```
def Draw():
    return True
```

This function checks the particle index and only changes the colour of those between 500 and 1000.

Note that Modify() works all the time - whether or not a particle is in the field of the modifier - and similarly it works on all particles.

Why use Modify() instead of ModifyParticle()? Due to the Python overhead, Modify() is about twice as fast compared to ModifyParticle(), which is important if you are dealing with large numbers of particles. It also gives finer control over the particles whereas ModifyParticle() just iterates through all of them whether you want to or not. With Modify(), you can just iterate through a small subset if that's all you need to do.

Important: you cannot use both ModifyParticle() AND Modify() functions in your script. If you do, ModifyParticle() takes precedence and Modify() will never be used.

Adding your own custom data

You aren't restricted to using the (large) set of data an X-Particle carries! You can add your own and use that. To do this you have four functions:

- AddCustomData()
- SetCustomData()
- GetCustomData()
- FindCustomData()

To use these, you would first see if the particle had the custom data item, by using FindCustomData(). If it does, you can use GetCustomData() to retrieve its value, or SetCustomData() to change its value. If the custom data item does not exist you can add it using AddCustomData(). This example may help to make this clear.

Example 3

In this example, we will create a custom data item and print it to the console:

```
import c4d, xparticles
#Welcome to the world of Python

def ModifyParticle():
    index = particle.FindCustomData(0, "hello")
    if index is not None:
        print index
        mydata = particle.GetCustomData(index)
        print mydata
    else:
        particle.AddCustomData(0, "hello", 1234)
    return True

def Draw():
    return True
```

Each custom data item has a name, in this case "hello". FindCustomData() checks to see if this data item exists, and if it does, returns the particle index. The index is then printed to the console. GetCustomData is then used to retrieve the data value using the particle index, and that value is then printed (which would be '1234' in this case). If desired, the data value could be altered using SetCustomData(index, value).

If the data item does not exist, it is added using AddCustomData, which is provided with the identifying name and an initial value.

Questions

In addition to the Python modifier, there is also a Python Question. This lets you test whatever aspect of the particle you need and trigger an action if required. To set up a Python question, create a Question object then select 'Python Script' from the 'Parameter to Test' dropdown menu. You have a default script like this:

```
import c4d, xparticles
#Welcome to the world of Python

def question():
    return True
```

In this case, the function you need is called 'question()' and it MUST return either True or False. You would return True if the particle passes the question and False if it does not.

Example 4

Suppose we want to test if the particle index is between 10 and 20, and trigger an action for every particle which passes:

```
import c4d, xparticles
#Welcome to the world of Python

def question():
    if particle.GetIndex() >=10 and particle.GetIndex() <= 20:
```

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Other:

- Online updater
- Load Palette

```
return True
else:
    return False
```

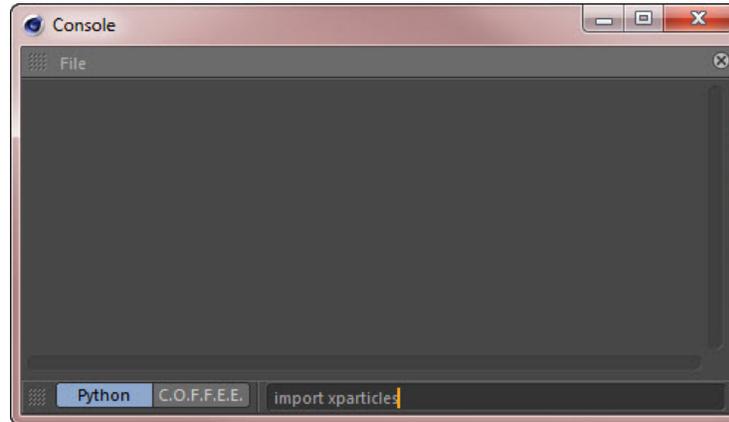
As you can see, the question returns True for all particles with an index between 10 and 20 inclusive. An action will be triggered for all such particles; this can be any action you like, just as for any other question. You can also use Sub-Questions and have a script in the Question and a different one in the Sub-Question if you like.

Remember that for Questions, unlike Modifiers, one particle is passed to the question at a time, and that particle will be tested against the question until it passes.

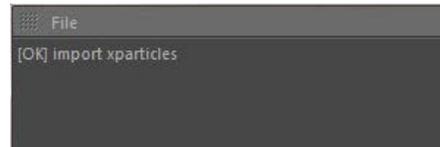
The Python API

To see the full API, you can do this:

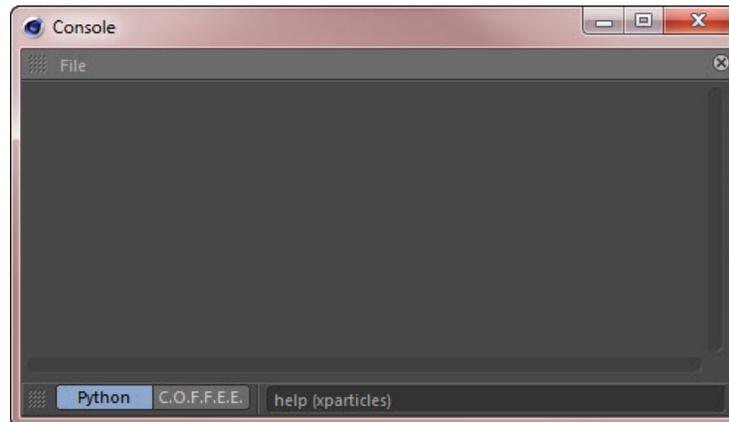
1. Open the console and select 'Python' in the bottom bar.
2. In the bottom bar, type 'import xparticles' (without the apostrophes):



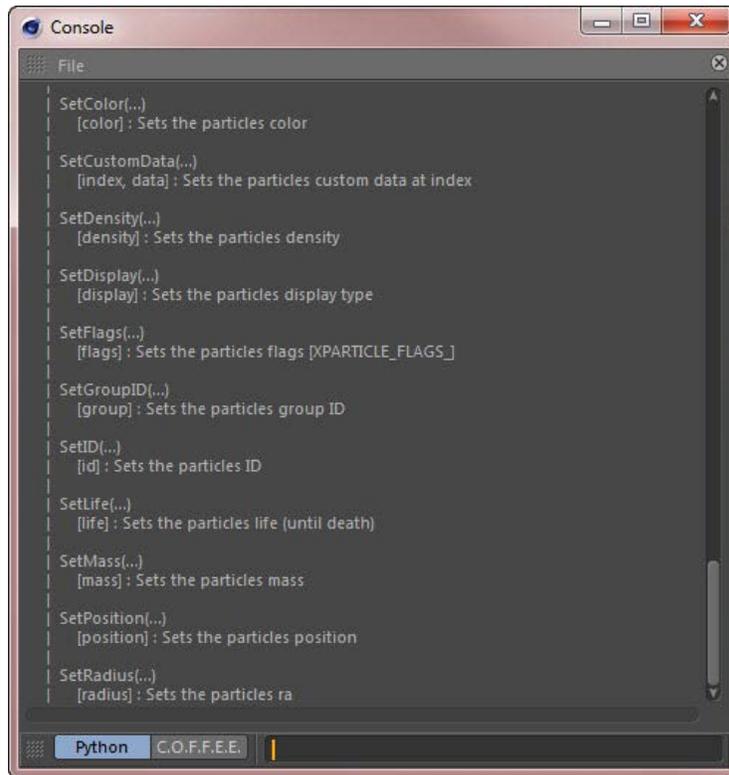
3. You should see this:



4. In the bottom bar, type 'help (xparticles)':



5. You then see this (only a part is shown):



This lists all the available functions. If you right-click in the console, then select 'Copy All' you can copy all the text and paste it into a text editor of your choice for future reference.

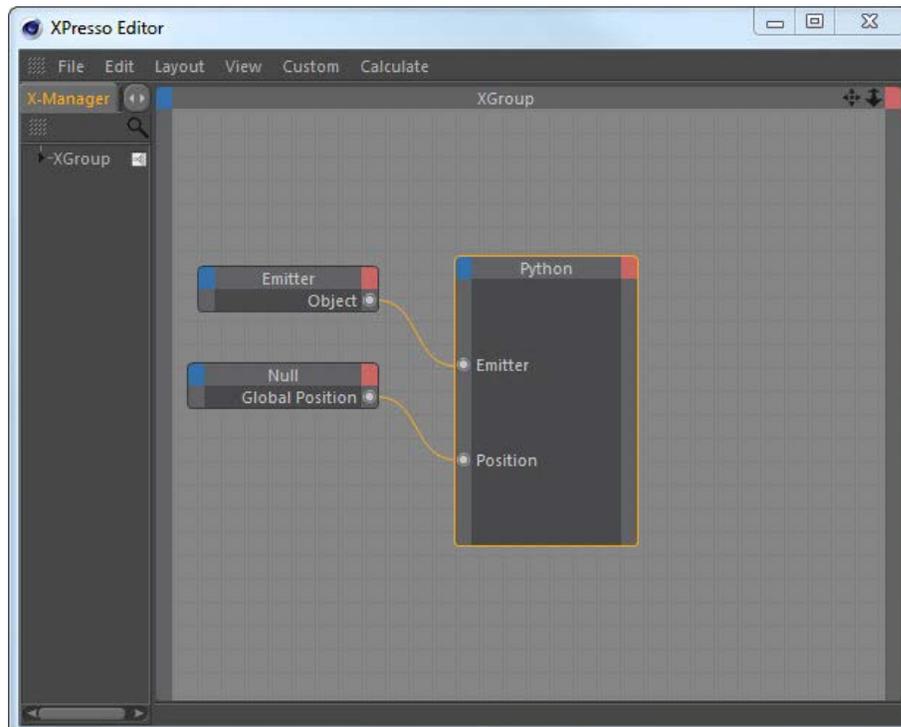
API Reference

The full API reference can be found on the [API reference page](#), but please note that it does change and this manual may not show the most up-to-date version. The most recent API can be seen in the console as shown above.

Using the Xpresso Python node

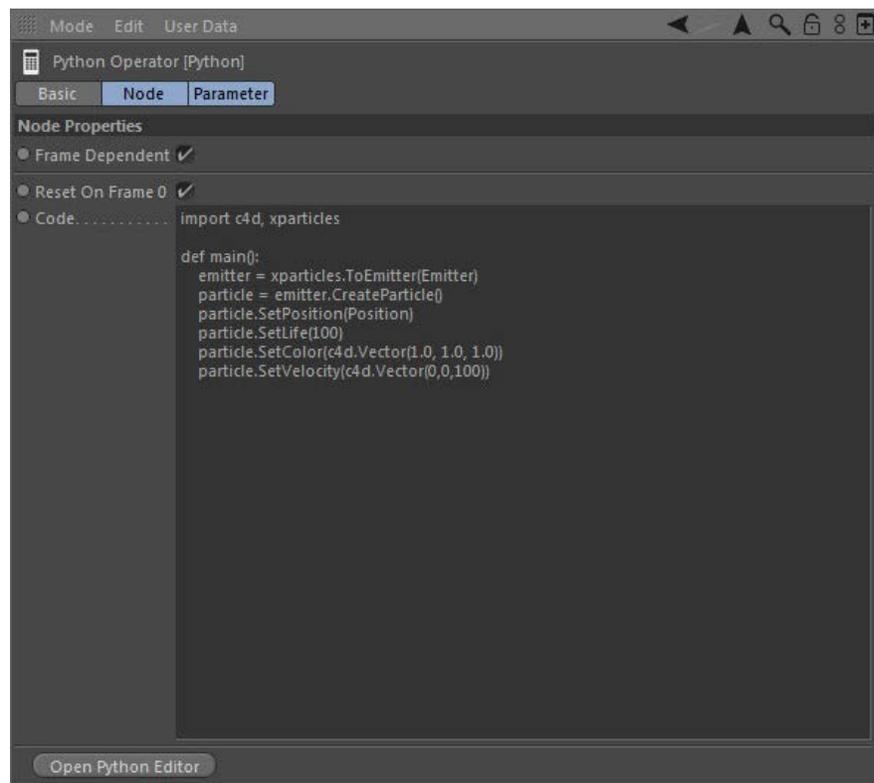
You can also use the Python node which is part of Xpresso to control X-Particles. For example, you can control an emitter completely and determine when it emits a particle and its starting position, velocity, etc.

The Xpresso setup would look like this:



Here, the emitter object has been dragged into the Xpresso editor, linked to a Link import of the Python node, and its birthrate set to zero - so it will not emit any particles. A null object has also been dragged in and its global position linked to a Vector import on the Python node.

The Python code looks like this:



All this does is cause the emitter to create a particle, set its position to that of the null object, then set some basic parameters such as lifespan, color, and velocity. Each frame the emitter will now emit one particle with these parameters.

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Using X-Particles over a network

Proxy server support

X-Particles includes support for proxy servers. To enable this, create a plain text file named 'proxy.ini' in the X-Particles folder. The file must contain the information needed to access the proxy server. The content of the file must look like this:

```
[settings]
port=1234
domain=192.168.1.2
username=user
password=pass
```

Of course, you would replace the port, domain, username, and password with those applicable to your proxy server. Once this is done X-Particles will use the proxy for connection to the net.

Password encryption

If you would prefer that the proxy server password is not saved in plain text in the proxy.ini file, then when you create the file, leave the password field empty. X-Particles will prompt you for the password and will encrypt it then save it into the proxy.ini file.

Net Render

X-Particles is compatible with Cinema's Net Render. The plugin will load in both the server and client versions of Net Render. It will work in both the server and as many clients as you wish without requiring a licence. This means you can develop scenes using X-Particles on your own machines (for which you will require a licence, of course) then give the scene to a render farm for rendering. The farm will not need to buy any licences if it uses Net Render.

Due to the complexity of some scenes with X-Particles we strongly recommend caching the scene first if using Net Render.

Team Render

X-Particles can also be rendered using Team Render in Cinema 4D R15 and up, but in all cases X-Particles should be cached before using Team Render.

Command-line renderer

Some farms use the command-line renderer instead of Net Render. This normally requires that the farm buy one licence. However, we are happy to donate a full licence to legitimate render farms so that users of X-Particles can use these farms without additional expense.

Licence Server

X-Particles no longer uses MAXON's Licence Server as this causes too many problems for users and for our support team. We now use our own licensing system independent of Licence Server.

Known issues

One problem with rendering over a network is that erroneous results may be obtained if using machines with very different specifications as part of the network, due to hardware difference between the machines. This becomes more noticeable as more calculations have to be carried out; the Cover/Fill modifier and Volume Shader are particularly calculation-intensive, as are collisions. One workaround therefore is to use machines of a similar specification in your network.

The solution to this issue is to cache the particles. The X-Particles [caching system](#) has been designed to be flexible and easy to use, in particular when rendering over a network.

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Xpresso nodes

In X-Particles 3 the number of nodes has been reduced in that the modifier and emitter nodes are no longer available. This is because most of the Xpresso nodes in v2.5 were simply wrappers for existing objects such as modifiers. They offered no additional functionality that you could not get by dragging the object into the Xpresso editor. With the emitter, the reverse was true: the emitter node only had a subset of the emitter object.

For this reason, and because few people used the nodes anyway, the modifier nodes and the emitter node are no longer present in X-Particles 3. The existing data get/set nodes are still present, plus some additional nodes to get/set other data. The question node has also been greatly expanded.

Adding X-Particles nodes

To add any of these nodes, open the Xpresso editor in the usual way. Right-click in the editor, then go to 'New Node' and you will see a new entry - 'X-Particles'. Open up that menu and there are three sub-menus:

- General: contains the Question node
- Iterator: contains the Trail Points and XP Iterator nodes
- Data: contains nodes to get and set particle and other data directly

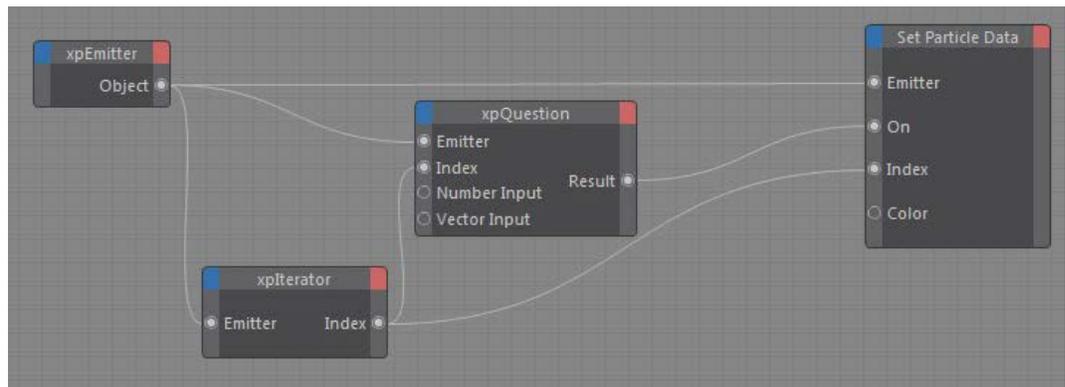
Using the XP Iterator and Trail points iterator nodes

XP Iterator

This node will iterate through all the particles emitted from an emitter and output their index values in the particle array, one at a time. This allows you to test whether a particle meets certain criteria, and if it does, do something with it - such as allow a modifier to act on it, for example.

Example

A simple example will help to explain how this node works. Suppose you want change the colour of particles that are 30 frames old or more. This screenshot shows the nodes to add and the connections to make. Pay particular attention to the inports of the Set Particle Data node:



The only thing you need to change is in the Question node. Make sure that the 'Parameter to Test' is set to 'Particle Age' and that 'Mode' is set to '>=' (equal to or greater than). These are in fact the default settings. Finally, change the 'Number Input' to 30 (i.e. 30 frames).

When you play the animation, the particles will change colour to whatever colour you chose in the Set Particle Data node.

How does it work? Each frame, the Iterator node feeds each particle in turn to the Question node, which tests the age of each particle to check if the age is ≥ 30 frames. The result, which is either true or false, is sent to the 'On' port of the Set Particle Data node. If it is true, the set data node changes the colour of the particle; if false, the colour is unchanged. The actual particle to be changed is again fed to the Set Particle Data node by the Iterator node.

Trail Points Iterator

The XP Iterator iterates through all the particles emitted from an emitter. The Trail points iterator also does this but instead of outputting each particle index in turn it outputs the corresponding point in the spline generated by a Trail object. If the emitter is not linked to a Trail object, so no splines are produced, this produces an undefined result.

Using the X-Particles Question node

This node reproduces the Question object, but is also a very convenient shortcut to test a number of particle data parameters which might otherwise require a complex Xpresso setup to achieve. Using the node requires the following:

- an Emitter linked to its Emitter inport or dragged into the Emitter link field in the node's attribute manager
- a particle index - data from this particle will be tested, such as its age, speed, etc.; normally you would link the output of an XP Iterator node to the Index inport of the Question node, but you can test individual specific particles if you wish
- the parameter to test, such as age, speed, distance to an object - these are the same as the [Question object](#)
- the test mode - this will vary between different parameters but include such things as equal to, greater than, etc.
- the value to test against; this is discussed more fully below

The test value

Numeric values

In most cases you will be testing a numeric value. For example, when testing a particle's age, the test value is an integer (number of frames); when testing speed, it is a floating-point (Real) value, but you don't need to worry about this - the Question node will always convert the input into the form it needs. In all cases when testing a number, the number to be tested must be found in the 'Number Input' inport.

In addition, for testing whether a number falls within a particular range, you will need to add the 'Number Minimum' and 'Number Maximum' inports and set these to the desired values.

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In some cases the parameter to test is a vector - for example, particle position or scale. In this case you must use the 'Vector Input' and 'Vector Range' ports, not the numeric ones.

Other question types

With other questions, what is being tested is not a number at all. It could be:

- a colour - use the 'Color' and 'Color Range' ports for testing colours;
- a particle group, if testing particle membership of a group; create as many 'Group' inports in the Question node as required and link Group objects to those ports
- an object, such as a camera, light, or other scene object (e.g. in questions such as distance to object, illumination, etc.); in this case, add the Question node 'Test object' port and link the appropriate object to that port
- a Boolean (True or False input); add the Boolean inport and you can link any Xpresso expression that outputs a Boolean into the port
- whether a particle is within a modifier's falloff; this is the only question for which the 'Weighting' inport is used, and it has the same meaning as in the same question in the [Question object](#)

Using the Data nodes

There are ten data nodes, six of which get particle data and three set it (there is no useful data that can be set in the Trail object Branch modifier). It is vital to understand that these nodes do NOT get or set data from the respective objects. What they do is access the individual particle data directly. (This is what you would do with Actions of various kinds if you were using the X-Particles objects instead of the nodes.)

The Get Data nodes

To use these nodes, link an emitter to the node's Emitter inport. You also need to provide a particle index. You can set this directly for individual particles, but usually you would link an XP Iterator to the node's Index inport.

The node will then send the particle data to its various outports. Whether or not useful information is available will depend on what the object is doing. For example, you will not get useful data regarding light parameters from a Sprite object if the Sprite is generating something other than lights.

Most output values are self-explanatory, but there are some which are not found in the various objects and modifiers. These are:

Get Particle Data node

- Count: the total number of particles emitted by this emitter (this is not specific to any one particle, unlike most other data)
- Group number: the number of the group the particle belongs to
- Type: the editor representation of this particle, e.g. Dots, Lines, etc.; this is a numeric value and the list of possible values is given at the end of this page
- Direction: a vector giving the particle's direction; note that the vector is normalised
- Speed: the particle's speed in scene units per second
- Vertex strength: only used with the [Particle Deformer](#). It returns the vertex weight of the point linked to this particle.

Get Generator Data node

- 'Attached object index' refers to the index of the object in the 'Objects to attach' list of an [Object link](#) tag.
- 'Completed morphs' is a counter for how many times the particle has completed a morph from one generated object to another. You can use this to take action when a particle has completed a specific number of morphs.

Get Sprite Data node

- 'Text' is the actual text string associated with this particle if the Sprite object is in Text mode

Get Trail Data node

- Growth time: this is a countdown value and is the number of frames to go before the trail is complete
- Length: the opposite of 'Growth time', this counts up until the trail is complete
- Point count: the number of points in the spline associated with this particle (this may or may not be the same as 'Length', depending on the 'Frame Sampling' value in the Trail object)
- Sample time: the value of the 'Frame sampling' setting in the Trail object

Note: the 'Max. Points' data item in previous versions of X-Particles has been removed from this node as changes to memory management have made it redundant. It will now always return zero.

Get Branch Data node

- the length of the branch controlled by this particle, expressed in frames
- the branch level (for use with multiple sub-branch levels - see the [Branching modifier](#) for details)
- the maximum length of the branch, expressed in frames
- the number of branches associated with this particle

Get Physical Data node

- the particle physical data, such as mass, temperature, smoke, etc.

The Set Data nodes

To use these nodes, link an emitter to the node's Emitter inport. You also need to provide a particle index. You can set this directly for individual particles, but usually you would link an XP Iterator to the node's Index inport. A third inport is created automatically: this is the 'On' port and you can use this to connect the output of a Question node, so that data is only changed for particles which pass the question.

The input ports are for the most part identical to the outports of the 'Get Data' nodes described above. There are a small number of data items which can be read but not set, and these are therefore missing from the Set Data nodes.

In some cases the value to be set is an integer value which in the object equivalent of the node is shown in a drop-down menu. For example, the sprite type (cube, sphere, etc.) is given in a drop-down menu in the Sprite object, but in the Set/Get Sprite Data nodes, an integer is input or output. To see the integer value which corresponds to the menu, please refer to this table:

Node	Parameter	Possible values
		Dots = 0 Ticks = 1 Squares = 2 Sphere = 3 None = 4

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Particle	Editor type	Lines = 5 Circle = 6 Circle (Filled) = 7 Box = 8 Box (Filled) = 9 Axes = 10 Pyramid = 11 Arrow = 12 Arrow (Filled) = 13 Plane = 14 Plane (Filled) = 15
Sprite	Sprite type	Cube = 0 Placard = 1 Cross = 2 Sphere = 3 Cone = 4 Pyramid = 5 Disc = 6 3-Plane = 7 Light = 8 Points = 9, Text = 10, Cylinder = 11, Capsule = 12, Point cloud = 13, Rubble = 14

Using a list of Groups

Many X-Particles objects make use of a list to hold particle groups. To add groups to a group list, create an Xpresso Constant node and set to type to In/Exclusion. Now you can drag the required groups into the node's list box, and link the constant node to whichever object requires a list, e.g. the 'Groups to Use' parameter in the emitter.

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The Action Object

Action objects represent independent processes which are carried out on particles or other X-Particles objects when the conditions in a Question object are satisfied. They have no on-screen presence, either in the editor or at render time.

You can add an Action object to the scene in several ways:

- by selecting a System object and in that object selecting an Action from the drop-down menus in the 'Actions' section; this will add an Action object to the scene, but will not link it to any Question object
- by doing the same thing from the '**Actions' folder** which is a child of the System object;
- by clicking the 'Add Action' button in a Question object; this will add an Action object to the scene and will automatically link it to that Question object
- by selecting the 'Action' menu entry from the 'Other Objects' sub-menu of the X-Particles menu in Cinema 4D; this will add an Action object to the scene but you will have to link it to a Question object yourself if required
- by clicking an 'Add Action' button which is present in several modifiers and other objects

Important: Action objects have no effect on any particles until they are added to the Actions list of a Question object (or in some cases a modifier or other object). Note that more than one Question can make use of the same Action if desired simply by dragging the Action into each Question object you want to carry out this Action.

When you have an Action object you can set various parameters in it. One action - the 'Editor Display Only' action - is always available, even if you select another action type. With this, you can alter the particle display in the editor, which can be helpful to see which particles are being affected by the Action and when they are affected (you can see when an Action occurs by changing the particle colour, for example).

You can change the Action at any time by first choosing the general type of Action from the 'Action Type' menu and then choosing the desired Action from the secondary menu below the 'Action Type' menu.

Note that you can turn off an Action at any time by disabling it in the Object Manager (so the green tick turns to a red cross), or by disabling any Question objects or modifiers which use the Action.

It is **most strongly recommended** that you rename the Action objects you create to reflect what they do. In a complex setup you might have numerous Actions, and picking the correct one to change its parameters can be difficult. To help you a little, the icon in the Object Manager against each Action object will change depending on the type of Action selected, but a meaningful name is even more helpful.

Changes in X-Particles 3

Prior to X-Particles 3, those actions which controlled a modifier could also change the linked modifier's settings. However, this wasn't very useful as it only occurred at the start of the scene, so the change could simply have been made in the modifier interface itself. In addition this caused extra user interface clutter and was potentially confusing, so for these reasons it is no longer possible to change modifier settings from an Action. This has simplified to a considerable degree the interface of almost all actions.

Actions and Groups

In previous versions of X-Particles the actions which controlled modifiers could only change the particle groups that the modifier would affect, and only then at the start of the scene. In X-Particles 3, actions have their own group list and will only affect particles in those groups. But what if a modifier also has a groups list with groups in it? What will be the result of affecting the same or different groups in the action and the modifier?

Suppose you have a scene with two groups, an action, and a modifier which is turned on by the action. The various possible results are shown in the table:

Action Groups	Modifier Groups	Result
No groups in the list	No groups in the list	All particles are affected by the modifier
Group 1 in the list	No group in the list	Only particles in group 1 are affected by the modifier
Group 1 in the list	Group 1 in the list	Only particles in group 1 are affected by the modifier
Group 1 in the list	Group 2 in the list	No particles at all are affected by the modifier (because although the action activates the particles in group 1 to be affected by the modifier, the modifier itself will only affect group 2 particles - which have not been activated)
All groups in the list	Group 2 in the list	Only particles in group 2 are affected by the modifier (because the modifier will only affect group 2 particles)

To avoid confusion we recommend that if controlling modifiers with actions, and you want to use groups to select which particles are affected, you put the groups into either the modifier or the action, but not both.

How Actions work

Many, but not all, Actions work by changing the effect of a particle modifier, rather than acting directly on the particles themselves. For example, a 'Change Gravity Modifier' action will alter a linked Gravity modifier by altering its effect on a particle so that the modifier either affects a particle or does not. Actions which only turn a modifier on or off for a particle are found in the 'Control Modifier Actions' menu.

Other Actions work by directly changing a particle's parameters in some way, such as the 'Unstick from Source Object' action. There are only a few Actions which only affect a particle's parameters and these are found in the 'Other Actions' menu.

Some Actions can do both - a direct change when convenient or control a modifier if desired. These are found in the 'Direct Actions' menu.

Finally, some Actions work on another XP object rather than a particle. These are found in the 'Object Actions' menu.

Remember that all Actions which work through a modifier do so on a per-particle basis - that is, they influence individual particles rather than all particles at once.

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If you want to control a modifier with an Action, you must first set the modifier to 'Action-Controlled'. If it is set to 'Independent' the action will have no effect on it and the modifier will work as a standalone modifier just like the modifiers supplied with Cinema 4D.

It is important to understand how Actions affect modifiers. As already stated, an Action-Controlled modifier will not work on all particles from an emitter, but just those which have been flagged by the Action to be acted on by the modifier. The Action does this by altering the particle, in effect making it susceptible to that specific modifier.

You can specify that a modifier only works on certain particles, though. You can ignore a modifier for all particles from a particular emitter by dragging the modifier to be ignored into the emitter's modifier exclusion list. Or, you can arrange it so that the falloff of a modifier only affects the particles you want it to.

Available Action types

X-Particles 3 ships with 51 different Actions. These actions are grouped into five types as follows:

- An action to change the editor display (which is also available in the interface of all other actions).
- Object Actions: these actions affect X-Particles objects to change the object settings. They may also change certain particle data (e.g. the Change Trails action).
- Control Modifier Actions: these actions only control a modifier, usually only to the extent of activating or deactivating it for a particular particle.
- Change Parameter Actions: these actions have a dual role. They can change particle data directly, such as the speed or radius. But they can also control an associated modifier in the same way as the Control Modifier actions.
- Other Actions: a group of miscellaneous that don't seem to fit anywhere else!

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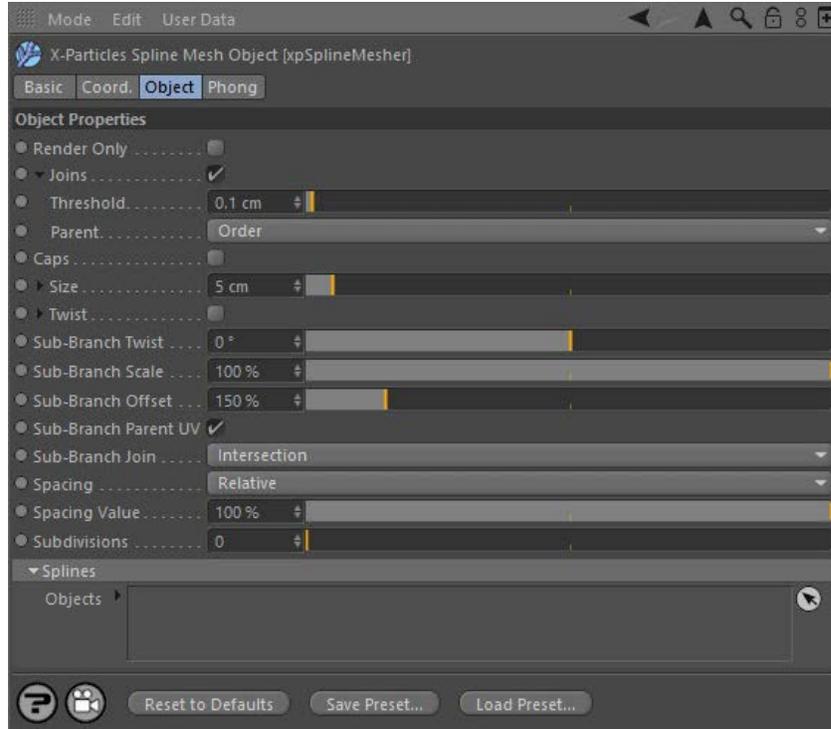
Spline Mesh Object

This is a mesher which will take any spline and generate a mesh from it, similar to the Sweep object. It can use the data generated by a Branch Modifier, to produce a single mesh from a multi-segment spline. But you can also use it in place of a Sweep with an X-Particles Trail object or any Cinema 4D spline.

The output of the [Elektrix object](#) is also a spline and can be meshed with the Spline Mesher.

Interface

The object's interface looks like this:



For the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Render Only

If this switch is checked, meshing will only take place at render time, not during editing. This can speed up the viewport significantly.

Joins

These settings control the joining of spline segments to make a single mesh. Check the switch to generate the joins.

The other settings are available by clicking the little black arrow to the left of the word 'Joins'.

Threshold

This is the minimum distance between spline segments for a join to take place. If a segment is farther away than the threshold, no join will be produced.

Parent

If you think of a branching structure, each join has a parent segment (the one the branch is from) and a child segment (the branch itself). This setting controls how the parent is selected. The drop-down has two options:

Order

Joins are generated between segments in order of the segments in the spline. The parent is the segment with the lower index in the list of segments. This is the option which works best with the X-Particles Trail object when the Branching modifier has been used.

Longest

The parent is the longer of the two segments. Using option with other multi-segment splines may result in a more natural appearance.

Caps

If this switch is checked, the mesh will have end caps.

Size

This is the radius of the generated mesh. Further control can be obtained by clicking the little black arrow to the left of the word 'Size'. This will show a spline used to scale the mesh size:

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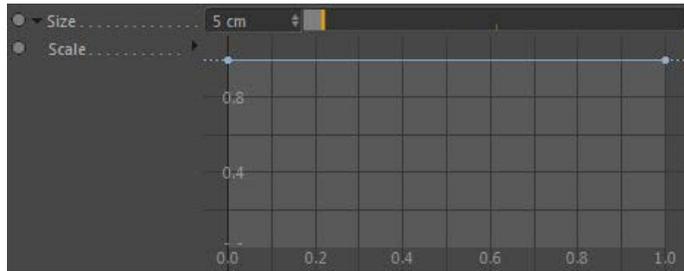
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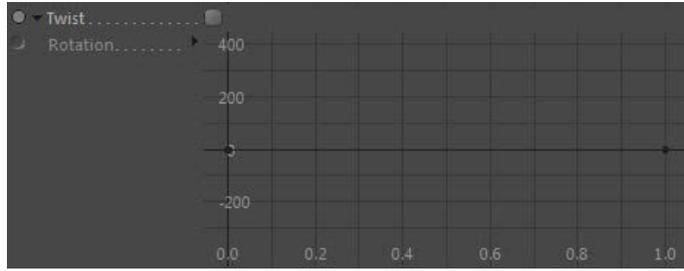
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This is a percentage scale; it can be used (for example) to taper the ends of the branch.

Twist

This option can be used to twist the entire mesh. Each branch will be twisted along its length. In order to set the amount of twist, first enable twisting by checking this switch, then click the little black arrow to the left of the word 'Twist'. This will show a spline used to set the rotation amount:



Sub-Branch Twist

This setting does not twist the branch itself, it rotates the entire branch around the join with its parent. Unlike the twist setting, which affects all branches in the structure, only branches from another branch are affected.

Sub-Branch Scale

This control allows you to scale the radius of branches which are sub-branches from another branch. The branch length is not altered. It is a percentage scale, so if (for example) it is set to 50%, the initial 'stem' will be unchanged; any branches from the stem will be reduced in radius by half; any branches from those branches will be scaled down by half again; and so on.

Sub-Branch Offset

This is an offset value for the start of the branch mesh from the join. If this is too low you may see artefacts in the mesh at the join point. Increasing this value will relax the mesh and allow a better result. Much of the time you will not need to alter this setting.

Sub-Branch Parent UV

When this switch is checked, then where a sub-branch joins another (parent) branch it will generate the UVs starting with the UVs from the parent branch. This is used to help textures continue along the parent branch down sub-branches.

Sub-Branch Join

This drop-down controls how a sub-branch is joined to the parent branch. It has three options:

Intersection

The join takes place where the sub-branch spline intersects the parent branch geometry.

First Point

The join occurs from the sub-branch's first point.

Offset Position

The sub-branch joins from the polygon that is closest to the offset position along the sub-branch. The offset position is given in the 'Join Offset' setting.

Join Offset

This is the offset along the sub-branch to pick the closest parent branch polygon to join to. Only available if 'Sub-Branch Join' is set to 'Offset Position'.

Spacing

These controls govern the spacing of polygons in the generated mesh. You can use them to generate denser or lighter meshes, depending on requirements. Lighter meshes are more easily handled in the viewport but the shape may become distorted if there aren't enough polygons to maintain it. Denser meshes are smoother and tend to have better joins.

The drop-down has four options:

As Spline

The mesher will use the spacing of vertices in the spline to control the polygon spacing. This cannot be changed.

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This option enables a control named 'Samples'. The polygon spacing is determined by taking a number of samples along the spline. It differs from the 'Absolute' and 'Relative' options because short branches will be divided into the same number of polygons as large ones.

Increase the value in 'Samples' for a denser mesh or decrease it for a lighter one.

Absolute

This option enables a control named 'Spacing Distance'. This is a distance setting controlling how far the polygons are apart. As it is an absolute distance, shorter branches will have fewer polygons than long ones.

Increase this value for a lighter mesh or decrease it for a denser one.

Relative

This option enables a control named 'Spacing Value'. It works in the same way as 'Absolute' but using a percentage scale instead.

Subdivisions

You can drop the mesher into an SDS object if you wish, but the 'Subdivisions' control will do the same thing. Increase it to give a rounded, rather than a square, mesh. A setting of 2 is the same as the SDS object with its default settings.

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Drop the splines you want to mesh into this list box.

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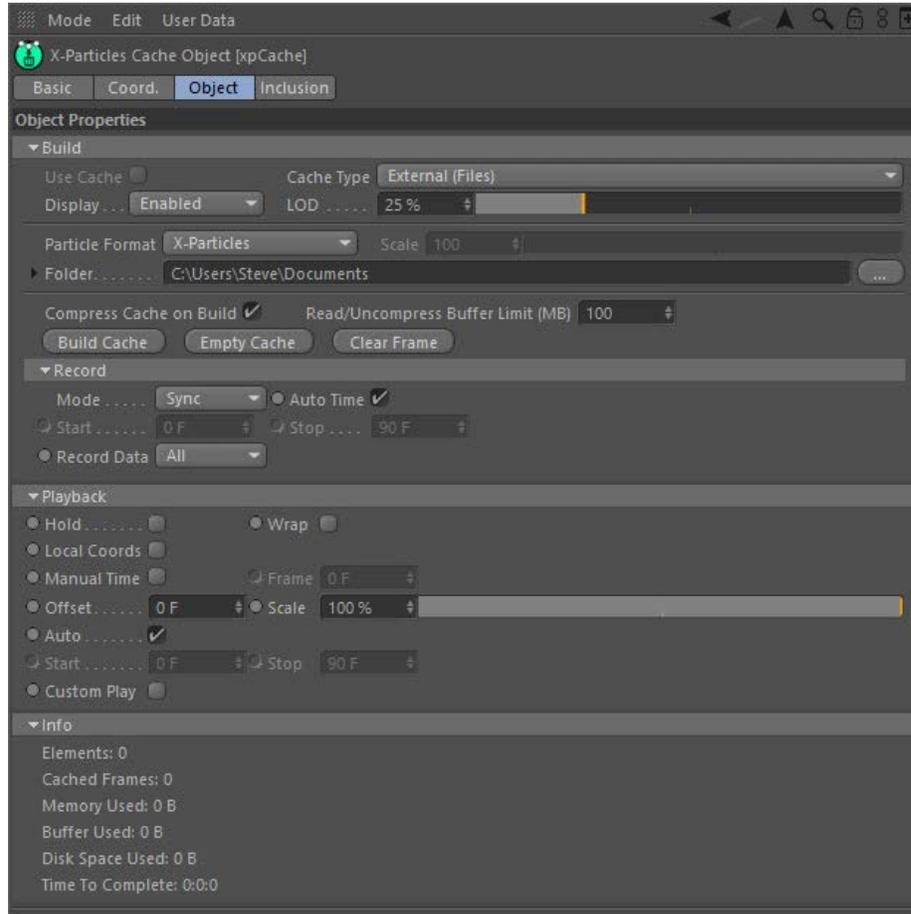
The Cache object is used to cache the X-Particles system.

In version 2.5, the cache data is held in tags on each object which has been cached. This makes it a simple matter to exclude objects from caching if desired. Since multiple [cache tags](#) can exist on each object, you can set up multiple caches and switch between them. See [Multiple caches](#) below for more details.

Before using the Cache object, please see the [Workflow notes](#) below.

Interface

The object's interface looks like this:



Object tab

Use Cache

When checked, the objects in the scene will use cached particle data, if available. This switch is checked automatically whenever the cache is built or when a scene with saved cache data is loaded.

If this switch is unchecked, the cache is not used even if it is held in memory. You can go back to using the cache by checking this button again. This switch is not available if no cache has been built or loaded from disk. It is enabled as soon as you load a scene file with saved cache data or you build the cache. If you have multiple caches in the scene, you can switch between them by checking/unchecking this switch in each object.

Cache Type

This is a very important control which affects the way the cached data is stored. The drop-down has two choices:

External (Files)

With this option selected, cached data is saved to disk as a series of files.

Internal (Memory)

Here, the cached data is stored in memory and saved with the scene file.

You have two choices when saving a cached scene. The default is external: cached data is saved to disk as relatively small files, one per frame for each cached object. The file name used is a combination of the object name (so we recommend renaming objects from a simple 'xpEmitter', for example) plus a number in sequence for each file, which will be '000001' for the first frame to be cached, and a three- or four-letter extension for the object type. The files are saved to the folder given in the 'Folder' field.

Important: since each cache file is named using the object name as a root, each object to be cached MUST have a unique name. If there are objects in the same name in your scene, the Cache object will not allow you to cache the scene until they all have unique names. For more details, please see [Duplicate names](#) below.

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The alternative is internal: all cached data is saved to memory then when the scene file is saved, the cached data is saved with it.

The default setting is external, and for any kind of long or complex scene with multiple X-Particles objects, we recommend this method. One advantage is that the scene file is not increased in size by what can be hundreds or even thousands of megabytes. If such a large scene is cached internally, it may result in a huge scene file which may take several minutes to load and save. Another advantage of using separate files is that the cache data can be imported into another scene, or data from other sources such as RealFlow can be imported into an X-Particles emitter. For more details, please see the [Workflow notes](#) below.

Internal caching is a little more convenient - you can give a single file to a friend or co-worker without having to send all the cache files as well - but is recommended only for short, test scenes with few objects.

Display

With this setting you can control the screen display when the cache is being built (not on playback). This can speed up the caching process if you have a lot of particles, because the emitter doesn't have to spend time drawing them. There are four options:

Enabled

The display appears as normal.

No Particles

No particles are drawn but any generated objects associated with them are shown.

Reduced

Selecting this option displays a level of detail (LOD) control. Reduce this value to reduce the number of particles displayed. Note that any generated objects associated with the particles are shown in full.

Disabled

No particles or geometry is displayed.

LOD

Only used when 'Display' is set to 'Reduced'. Reduce this value to reduce the number of particles displayed. Note that any generated objects associated with the particles are shown in full.

Particle Format

If caching to external files, X-Particles can save the particle data in either its own native format, or in a variety of other formats so you can export the data to other applications such as RealFlow if desired. It is also possible for the cache object to import RealFlow BIN files, but see the note below for important information about this.

The Cache object can also export in RealFlow 2013 file format, but be aware that this format is not always supported by other software yet.

Important!

When caching to files the object name is used to name the files. For this reason, if there are multiple objects of the same type in the scene it is **crucial** that they have unique names! The same applies to the RealFlow BIN files when loading a cache, the cache object will look for filenames starting with the emitter name (be it RealFlow BIN or XP cache files). So if reading or writing cache files (or RealFlow BIN) the emitter name is vital to it working consistently. X-Particles will do its best to stop duplicate names from being used: see ['Duplicate names'](#) for more details.

Folder

The folder on disk where the emitter data files are stored. If this field is empty a warning message is displayed and no caching will take place.

The following parameters are made visible by clicking the small black arrow to the left of the word 'Folder':

Alt Folder

This parameter allows you to enter an alternative folder for reading cache files. For example, if sending files to a render farm this can be set to the folder to use on the render farm, or if using a mixture of Windows and OSX rendering nodes this can be set to give the correct path for either Windows or OSX (i.e. for the opposite OS to the one given in 'Folder'). This is required since the way folder paths are constructed is different in the two operating systems.

Ext Separator

Here you can specify the separator to be used when building cached file names. The default is an underscore so this will result in file names such as xpEmitter_000001.xpc, xpEmitter_000002.xpc, etc.

Show Cache Log

If checked, the Cache object will output progress and details of the cache reading to the CINEMA 4D console. It is useful for checking why a particular rendering node may fail.

Show Cache Errors

If checked, does the same as 'Show Cache Log' above but only outputs if an error occurs (such as the cache folder not found).

Use Folders

If this switch is checked, the cache files for each cached object within the scene will be within a separate sub-folder of the directory given in 'Folder'. If it is unchecked all the cache files for all objects will be stored in the folder given in the 'Folder' setting.

Cache Files as Assets

If checked, any cache files will be saved as assets when using Save Project with Assets from the Cinema 4D File menu. This can be useful to gather all cache files into a project, but in doing so Cinema will put all the cache files into the project root which will slow down cache reading.

Important: if you are using Team Render and have enabled this switch, be sure to turn on the 'Copy Tag Data' switch in all cache tags. Please see the [Cache Tag](#) for further details.

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- [Change Spin](#)
- [Change Sprites](#)
- [Control Morphing](#)
- [Control Spawning](#)
- [Explode Particles](#)
- [Freeze Particles](#)
- --- Other Actions ---
- [Editor Display Only](#)
- [Stop Following Spline](#)
- [Unlink TP](#)
- [Unstick from Source Object](#)

Other:

- [Online updater](#)
- [Load Palette](#)

Skip Render Pre-Roll

If this switch is checked, X-Particles does not read the cache for all frames before the starting render frame. This greatly speeds up rendering to the Picture Viewer and render nodes, but if other objects and/or expressions depend on the particles (or on any cached data) this may affect the animation (the pre-roll frames will essentially have no particles).

Search Texture Paths

If this is checked, then if the specified cache folder isn't found the cache folder name is searched for within the texture paths. This can slow down cache reading if you have many texture paths defined.

Scale

This parameter is only available when saving to files with an external format. It scale up or down the particle position and velocity data. It is required because other applications which can use exported XP data (or when importing data from them) have much smaller world scales than Cinema 4D.

Compress Cache on Build

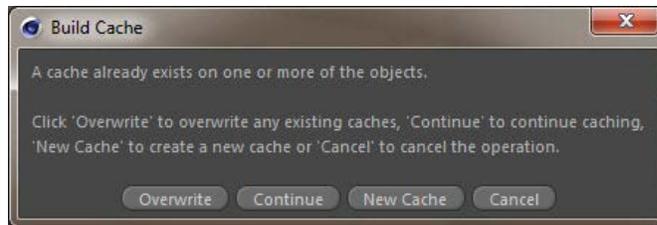
The cached data is compressed during caching to save on memory/space. With large numbers of particles that can add a noticeable speed penalty both on caching and playback.

Read/Uncompress Buffer Limit (MB)

The maximum size in megabytes for the buffer used to hold cache data in its uncompressed state.

Build Cache

Click this button to build the cache (see '[Building the cache](#)' below for more details). If a cache already exists, or if any object has a cache tag, the following dialog box will appear:



The four possible options are:

Overwrite

This will delete the existing cache and create a new one.

Continue

If a scene was only partially cached, 'Continue' will continue to cache any frames not cached so far rather than recache the whole simulation.

New Cache

This will preserve the existing cache and create another one. You can then choose which cache to use by checking or unchecking the 'Enable Cache' switch in each [cache tag](#).

Cancel

This will cancel the caching operation.

Empty Cache

Clicking this button will delete the cache from memory and free up the memory used. You will be asked to confirm this if the cache is already held in memory. It does NOT delete cache data from disk. To delete the saved data, simply save the modified scene file with the empty cache, overwriting the old one.

To use the cache again, you will either have to click the 'Build Cache' button, or reload the scene from disk if you didn't save the scene after emptying the cache.

Clear Frame

Once a cache is built you can clear the cached data for the current frame by clicking this button. You will be asked to confirm that you want to do this.

Record Settings

These settings control which data is recorded when the cache is built.

Mode

This drop-down controls when the cache is built. It has three options:

Sync

The cache is built when the 'Build Cache' button is clicked.

Playback

The cache is built during playback. You can halt playback at any time and switch back to 'Sync' mode; the cache will not be deleted but will only be filled up to the point where you halted playback.

There is one restriction to be aware of in 'Playback' mode. The list of objects to be cached is created when you change the 'Mode' drop-down to

'Playback' (it has to be done this way, because the 'Build Cache' button is no longer available). Therefore, if you switch to Playback mode, and *then* add another object, expecting it to be cached, it won't be. You can tell this because the new object will not have a Cache tag. To rebuild the list of objects, change 'Mode' back to 'Sync', and then change it back to 'Playback'. Note that you may see a duplicate names warning at this point if one or more objects to be cached have the same name.

Auto Time

If checked, the entire scene is cached.

Start

Only available if 'Auto Time' is unchecked. Caching will start at the specified time.

Stop

Only available if 'Auto Time' is unchecked. Caching will stop at the specified time.

Record Data

This drop-down controls the data to be recorded. It has three options:

Basic

Only basic data is recorded. For particles this means the particle velocity (direction and speed).

All

All particle data is recorded. This can result in much larger cache files.

Custom

Selecting this option will enable a new group of settings headed 'Particle Data':



From this you can select which data you want recorded. For example, if you only want to record particle color as well as velocity, check the 'Color' switch. This avoids the use of additional memory which would result if 'All' was selected.

Playback settings

Hold

If checked, then at the end of the cached frames the last cached frame is kept (particles just stop and freeze). Otherwise (if unchecked) the particles will start to be evaluated as if they were not cached.

Wrap

If checked, the cache frames repeat (wrap) around and start playing again once past the last cached frame.

Local Coords

When this option is enabled the cache data is transformed to be local to the object (where possible, this does not affect Wet Maps). For example, this enables you to move an emitter and have the cached particles follow the emitters position.

Manual Time and Frame

If checked, you can set the cached frame to use. For example, this enabled you to keyframe the playback of the cache. Set the frame in the 'Frame' setting.

Offset

This setting offsets the cache time. For example, setting a negative frame will start playing the cache further into the cached frames.

Scale

This setting can be used to scale the cache time, so 200% will make the cache play twice as fast.

Important: this will not work with the trails, only particle caches can scale like this. If you use this with trails, and a Scale value of less than 50%, you will see gaps between the particles and the end of the trail.

Auto

If checked, the cache takes the playback time from the document's time (minimum to maximum).

Start and Stop

These settings are only used if 'Auto' is unchecked. They are used to set when to start/stop using the cache.

Custom Play

By default, all data recorded in the cache is used when playing back a cached scene. If this switch is checked, the options in the 'Particle Data' section become available:



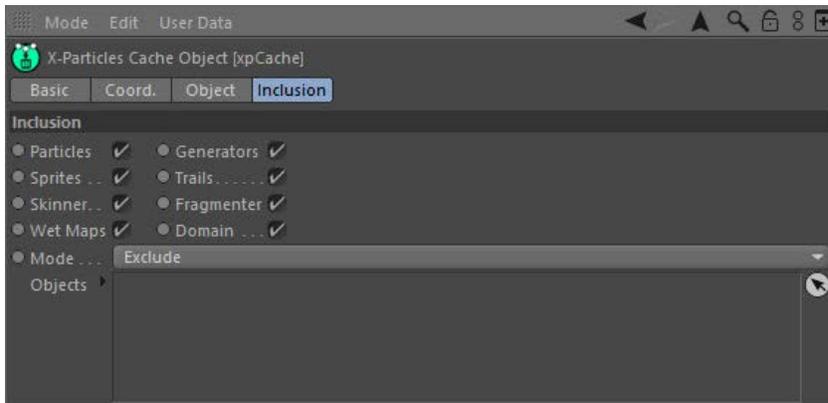
By checking the required switches you can alter what data is used on playback. So if you recorded particle colour, for example, unchecking 'Color' will not retrieve the particle colour from the cache.

Info

Information about the cache is displayed here detailing the memory use and disk space used by the cache.

Inclusion tab

Within this tab you can select the types of data to cache and define what objects to include/exclude.



Particles, Sprites, Skinner, Wet Maps, Generators, Trails, Fragmenter, and Domain

Check or uncheck these switches to determine which X-Particles objects are cached.

Mode

If this is set to 'Exclude' drag any XP objects which should NOT be cached into the 'Objects' list.

When set to 'Include' drag any XP objects which SHOULD be cached into the 'Objects' list. No other objects will then be cached.

Using the Cache object

Caching has several advantages:

- it allows you to scrub backwards and forwards in the timeline
- you can run an animation once then play it back using the cache, which is much quicker for a complex animation
- the cache is saved to disk with the scene file and reloaded when you load the scene file again
- when rendering over a network, using the cache prevents discontinuity in the rendered frames from different machines, as all the machines will use the same cached data

All X-Particles 'generator' objects in the scene can be cached. These are the Emitter, Generator, Sprite, Skinner, Fragmenter and Trail objects. Wet Maps can also be cached; see the Inclusion tab for the available objects which can be cached.

By default when you cache a scene all of these objects are cached but you can select only certain objects to be cached by using the options in the Inclusion tab.

The Cache object icon

The Cache object icon in the Object Manager can have one of three colours to show you the state of the cache at any time. These colours are:

- Green - the default colour, indicating that the cache has not been built yet (or not loaded from a scene file with saved cache data)
- Orange - the cache is being built or it has been built but is not being used (the 'Use Cache' switch is unchecked)
- Red - the cache has been built and is in use

The Cache tag

Each cached object will have a Cache tag. For details, please see the [Cache tag](#) manual page. The tag actually holds the cache data, so if you delete it, the cache for that object is gone.

Note that the Cache tag icon uses the same colors as the Cache object icon (see above).

Workflow notes

The usual workflow is firstly to fill the cache by clicking the 'Build Cache' button. Once the cache is filled, the 'Use Cache' switch becomes available, and is automatically turned on (checked). Turning this switch on will force the cacheable objects in the scene to use the cache as the source of particle data.

If you chose the default external caching, the cache data is automatically saved to disk even if you decide not to save the scene file. These cache files are saved to disk when the cache is built, not when the Cinema 4D scene file is saved. With internal caching, once you are happy with the cached animation you can save the scene to disk, which will save the cached data along with it. Note that this can result in a very large scene file!

To save cache data to disk you must specify a folder before you cache the scene. During caching the cache data is saved to files within the

folder. To change the folder, you must change it and then cache the scene again.

Saving the scene file

If you have cached your scene to external files, you should save the scene file before closing it. The cached data has already been saved, but if you don't save the scene file, when you reload it the cache will be empty because the Cache object did not 'know' there was a cache to load.

If this happens to you, you don't have to recache the scene. In the Cache object, change the 'Folder' to point to some other folder where there isn't any cache data - the exact location doesn't matter. Then change 'Folder' again, this time to the actual location where your cache data is stored. This will force the Cache object to reload its data. Alternatively, delete the existing Cache object, create a new one, and point 'Folder' to the cache data folder.

Importing an existing cache

To import an existing cache such as a RealFlow BIN cache into a new scene, first add an emitter to the scene and rename it to be the same as the common prefix in the cache filename. For example, an X-Particles cache file for frame 0 which was created using an emitter named TestEmitter, will have the name 'TestEmitter_000001.xpc'. To import this cache into a new scene, create an emitter, rename it to 'TestEmitter', create a Cache object, and then specify the folder where the files are located in the 'Folder' field. The cache will automatically be loaded and a cache tag applied to the emitter.

Building the cache

To build the cache, simply click the 'Build Cache' button. If you have previously filled the cache, a dialog box with several options will appear: see the **'Build Cache'** button above for details.

The Cache object will cache each cacheable object in the scene, for each frame in the scene, assuming that object type is checked in the 'Inclusion' tab. (Note: objects which are disabled in the object manager will not be cached.) A small dialog box showing the progress of the cache building will appear.

If you only have a short scene with a small number of particles and a few objects to cache this box may only be visible for a few seconds. For longer or more complex scenes, you can stop the cache building by clicking the 'Cancel' button in the dialog box. Of course, if you do that not all of the scene will be cached and when you play the scene back it will stop at the frame where you cancelled the cache building.

When complete the Cache object will display some information about the cache, such the total memory/disk space used, and the number of frames cached.

The Cache object icon will turn red once the cache has been built, to show you that the cache has been built and is in use. Each object that has been cached will also have a **cache tag**, and this will also be red if the cache has been filled, or blue if it has been emptied.

Excluding objects from the cache

If you want to prevent certain objects from being cached, you can drag them into the list in the Inclusion tab. If the list is set to 'Exclude' all objects in the list will be excluded from caching. If it is set to 'Include' then only those objects in the list will be cached.

Emptying the cache

If you want to stop using the cache, you can simply uncheck the 'Use Cache' button. This will turn the Cache object icon yellow, to indicate that the cache is available but not being used. You can check the 'Use Cache' switch to use the cache again.

To delete the cache from memory and free up the memory used, click the 'Empty Cache' button. You will be asked to confirm that you want to do this. Note that this will not delete stored cache data on disk until you save the scene file. Once the cache has been emptied, the Cache object icon will turn green.

You can also delete cache data by simple deleting the appropriate cache tag. Once all tags are deleted the cache object icon will turn green.

Issues to note

Rendering cached scenes with Team Render/NET Render or the Command Line Renderer

In such cases it is advised to have a Folder which is available to all clients, setting the Alt folder where needed (if sending to a different system with different paths, or mixed OS render nodes).

Team Render Server **does not support** using the Cache Files as Assets parameter and will result in incorrect frames if that switch is checked. Team Rendering to the Picture Viewer can be done with Cache Files as Assets checked provided the 'Alt' folder is set to the project root (this can be done by setting the Alt Folder to './').

Project settings frame rate vs. render settings frame rate

You can set a frame rate in two different places in Cinema - the project settings and the render settings. If these are different, you may get confusing results.

As an example, say you set the frames per second in the project settings to 25, and the scene length to 200 frames. When you build the cache, X-Particles will cache 201 frames (0 to 200 inclusive). That's as expected. However, the default frame rate in the render settings is 30. If you opt to render all the frames by choosing 'All frames' from 'Frame range', then render to the picture viewer, Cinema will render 241 (not 201) frames. This changes how fast the playback appears to be and at the end of the cached frames what happens depends on the cache options (see the 'Hold' switch above).

Just be aware of this issue and to avoid it make sure you set the frame rate to be the same in both groups of settings.

Duplicate names

If you choose external files for the cache type, the cache files are named using the object name as the root. Clearly, if you have objects with identical names, this won't work - the files from one object will overwrite the files from the other object with the same name. For this reason, X-Particles will not let you cache a scene to files if there are objects to be cached with identical names (there is no problem with objects which aren't cached, of course).

You can either rename the objects and then cache the scene, or change to internal memory caching, where the objects' names are not used.

Scenes with some objects cached and some not cached

If a cacheable object is disabled in the Object manager it will not be cached. You should be aware that a scene in which some objects are not cached is fine for development and testing purposes but may lead to problems for the final render.

Consider a scene in which you have two emitters, the second of which is disabled. When you build the cache the first emitter is cached but the second emitter is not. You then enable the second emitter again. Now you have a scene in which one object is cached and the other is not. When the Cache object 'Use Cache' switch is checked, each object is instructed to use its cached data. But the second emitter doesn't have any cached data to work with, so will work normally - that is, as if it was not cached.

Why would this cause a problem? For one thing, if you then save the file, thinking it is all cached, in fact you are only saving cache data for one of the emitters. This might - or might not - cause a problem, particularly if rendering over a network.

More importantly, try repeating this exercise with a Sprite object linked to the disabled emitter. No sprites are generated because there are no particles. Now re-enable the emitter. You would expect the emitter to work normally (which it does, even if you can't see the drawn particles) but the Sprite object does not work. This is because the Cache object has told it to use its cache... but it doesn't have one, since it had no particle data to use when caching took place.

If you get into this kind of puzzle, the easiest solution is to empty the cache and rebuild it.

Multiple caches in the scene

You can add more than one cache object to the scene, when the cache is built each created cache tag is linked back to the cache object that created it. Alternatively you can use one cache object but allow it to create a new cache rather than overwrite the existing one.

When playing back, the objects use the first enabled cache tag. This enables you to simply disable or reorder the cache tags to choose which of your multiple cache are in use.

To make a particular cache object manage the cache data on an object, you must change the 'Cache Object' field in the object's Cache Tag. See the [Cache Tag](#) for more details.

Deleting a Cache object from the scene

Suppose you have a scene with an Emitter and a Cache object. You have cached the scene and are using the cache. Then you delete the Cache object. What happens?

Well, not much. It's important to remember that the work of building and emptying a cache, or loading from or saving to disk, is all done by the individual objects - emitters, generators, etc. The Cache object is there to act as an overall manager of the object caches. If there was no Cache object, you would have to build and enable caches in each individual object - time consuming and prone to missing some of them out.

So in the above scenario, deleting the Cache object does not delete the cached data. To do that you need to delete the cache tags from each of the objects.

Caching a scene with X-Particles and Dynamics

If you have a scene with both X-Particles and Dynamics, and you want to cache both, we recommend that you cache X-Particles first, then Dynamics. The other way round may (or may not) lead to problems in that X-Particles may not be able to control the particles at all if the dynamics are cached first. In some cases this may not work correctly and you may need to cache Dynamics first, then X-Particles.

Caching Thinking Particles

If you cache an emitter which generates Thinking Particles, there are certain issues to be aware of.

When using the cache, Thinking Particles are recreated each frame from the cached X-Particle data. This leads to a problem: because of the difference in priorities between Thinking Particles and the X-Particles emitter, the Thinking Particles behave a little oddly - try caching an emitter which generates TP and play it back, then stop it at some point. You will see what happens as the Thinking Particles seem to 'jump back' a little.. To stop this, turn on the 'Ignore particle speed when cached' switch in the Thinking Particles section of the Emitter.

This will stop the odd behaviour and is all you need to do in most cases. An exception is when using Pyrocluster. Pyrocluster requires the particle speed for its internal calculations, so if the speed is not available, Pyrocluster will not render correctly. To avoid this, turn off 'Ignore particle speed when cached' and turn on 'Ensure matching coordinates'. The cache will then work correctly with TP and Pyrocluster.

Other points

Please also be aware of the following points:

- once you have loaded and are using a cache, any changes you make to the emitter and other generator objects are ignored - for example, if you change the particle speed, you won't see any change until you turn the cache off or re-build it
- a cache may take up a LOT of memory - the more particles you have, the more cacheable objects you have, and the longer the scene, the more memory is used
- cached scene files on disk may be very large and take a few seconds to load or save

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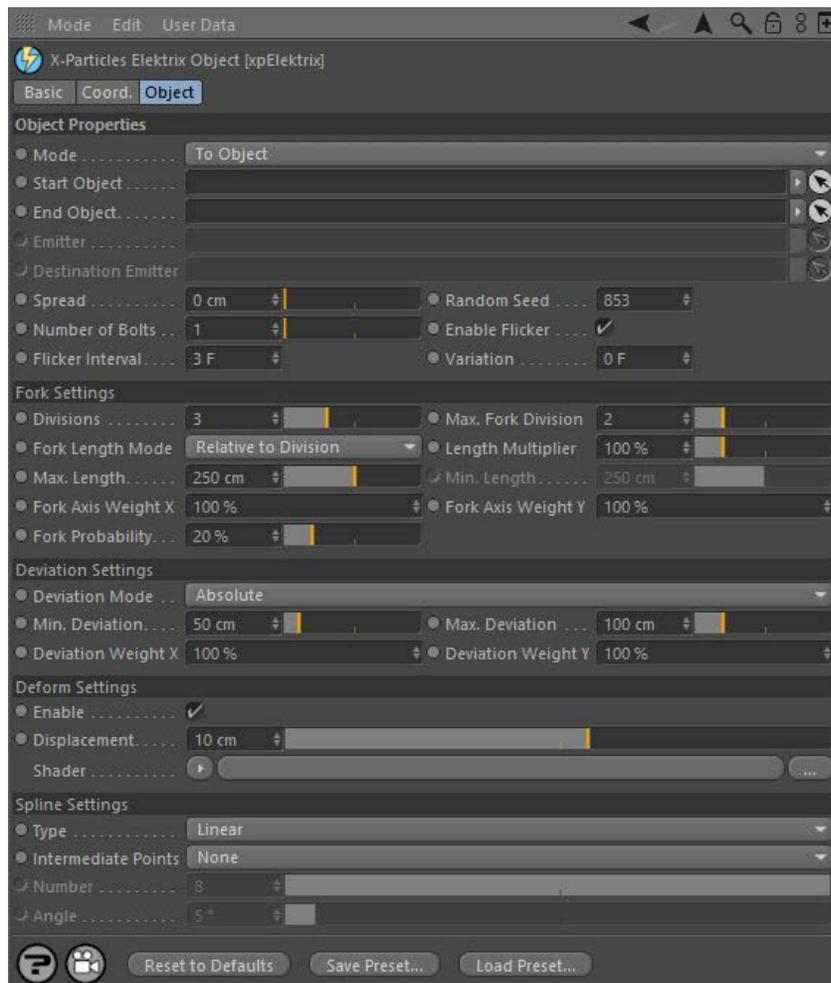
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Elektrix Object

This is a special object in X-Particles 3 which creates 'lightning bolt' style effects. Unlike other X-Particles objects, it can be used with or without a particle emitter.

Interface

The object's interface looks like this:



For the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Mode

The Elektrix object has four modes of operation:

To Object

With this mode you do not need a particle emitter. Instead the bolt is drawn between two objects. These can be any object, including lights or null objects. The bolt is drawn from the axis position of the 'Start Object' to the axis position of the 'End Object'.

Spherical

Again, this does not require an emitter. The bolt is drawn from the 'Start Object' axis position to a randomly-chosen position on an invisible sphere surrounding the 'Start Object'. The length of the bolt is governed by the 'Bolt Length' and 'Variation' settings.

To Particles

In this mode a bolt is drawn from the the 'Start Object' axis position to each particle emitted from an emitter.

Particle To Particle

Here, bolts are drawn from particles in one emitter to the corresponding particle in the 'Destination Emitter'. By 'corresponding' we mean that bolts are drawn between particle 1 in the first emitter to particle 1 in the second, and so on. It is your responsibility to make sure that the destination emitter has enough particles to match those emitted from the first emitter.

Start Object

The object the bolt originates from in all but 'Particle To Particle' mode. Drag the object to be used into this field.

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End Object

The object the bolt ends at in 'To Object' mode. Drag the object to be used into this field.

Emitter

The source emitter used in 'To Particle' and 'Particle To Particle' modes. Drag an X-Particles emitter into this field.

Destination Emitter

The emitter providing the 'destination' particles in 'Particle To Particle' mode. Drag an X-Particles emitter into this field. It cannot be the same as the first emitter; the object will not generate bolts if it is.

Spread

This is only used in 'To Object' mode. If it is set to zero, the end position of all the bolts will be at the axis position of the 'End Object'. Increasing this value will randomly spread the end position around the axis position of the 'End Object', within this distance value.

Random Seed

This is the seed used when generating the bolts. If you don't like the result, try changing this value.

Number of Bolts

Only used in 'To Object' and 'Spherical' modes, as in the other modes the number of bolts is determined by the number of particles. It controls the number of bolts which are generated.

Enable Flicker

If checked, each bolt will randomly flick to another shape at intervals determined by the 'Flicker Interval' setting. If you don't want this to happen, uncheck this switch.

Flicker Interval and Variation

The time between shape changes in each bolt. Variation can be added with the 'Variation' setting to prevent too regular a result. Only available if 'Enable Flicker' is checked.

Divisions

This controls the subdivision of the bolt. A value of zero simply generates a straight line between the two points. When set to 1, the bolt will be divided in two somewhere along its length, causing a bend in the bolt (see 'Deviation Mode' below). Increasing the count to 2 will divide each half of the bolt in two again. Each time the number of divisions increases, the number of segments in the bolt is doubled. The bolt will remain the same general overall shape, but the detail will increase significantly. A value of 4 - 6 is fine for most purposes.

Note that each time a division occurs a new point is generated in the spline which the object creates. At high division levels and with many bolts this can result in a lot of points!

Max. Fork Division

As well as dividing the bolt segments in two at each division, the object can also produce forks or branches from the point of division. If you have 6 divisions you may end up with a lot of little forks, so this setting halts forking at the level of division in this setting. A value of 3 is usually sufficient. A value of zero will prevent all forking.

Note that this value can never exceed the value in 'Divisions'.

Fork Length Mode

Note that this setting refers to the length of any forks in the bolt, not the length of the bolt itself.

How long should a fork be? The default is that when a fork is generated, it is the length of the distance between the point it is generated from and the next point in the spline. As the bolt proceeds through the number of iterations (divisions) in the object, the distance between spline points gets shorter and shorter. The result is a few long forks and a larger number of small forks.

The alternative mode is that the fork has an absolute length in scene units. In this mode all the forks have a variable length between a maximum and minimum value.

This drop-down allows you to choose the mode to use.

Relative to Division

This is the default mode where the fork length depends on the division level at which it is generated.

Absolute

The alternative mode, in which the length is an absolute value in scene units.

Length Multiplier

Regardless of length mode, this value is used to multiply the fork length. All forks will then show a uniform increase or decrease in length. Note that, in 'Relative to Division' mode the length will still be clamped at a maximum value as shown in the 'Max. Length' setting.

Max. Length

In 'Relative to Division' mode, this setting ensures that the fork length never exceeds this value. If the fork length is lower than this value, it is unaffected.

In 'Absolute' mode, this is the upper limit of the length of the fork and is used in conjunction with the 'Min. Length' setting to determine the actual length.

Min. Length

Used only in 'Absolute' mode, this is the lower limit of the length of the fork. It is used together with the 'Max. Length' setting.

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When the fork is generated it deviates from its parent along the X and Y axes local to the object. If both values are set to 100% the fork may deviate away at any angle. If you set the Y value (for example) to 0%, the fork will only deviate along the local X axis.

For the most part you can leave these values at the default of 100% for a truly random deviation.

Fork Probability

This is the probability that a fork will occur at a division point. You can alter the value here to increase or reduce the chance of forking. Generally, smaller numbers produce better results.

Bolt Length and Variation

These two settings are only available in 'Spherical' mode and control the length of the bolt. Variation can be added to the length with the 'Variation' setting.

Deviation Mode

This drop-down controls the amount of deviation of each point in the bolt - that is, it controls the amount of 'bending' at each division point. It has two settings:

Absolute

The amount of deviation is an absolute value in scene units.

Proportionate to Length

In this mode the amount of deviation is a proportion of the bolt length. The reason for this is that if the bolt length is small, the amount of deviation in 'Absolute' mode may be very disproportionate to the bolt length. This mode will adjust the deviation according to the length of the bolt, ensuring a more consistent appearance if the bolt length changes, for example in either of the particle modes.

Min. Deviation, Max. Deviation

The amount of deviation or bending at each division point. These are either in scene units ('Absolute' mode) or as a percentage of the bolt length ('Proportionate to Length' mode).

Deviation Weight X and Deviation Weight Y

When the fork deviates from its parent it does so along the X and Y axes local to the object. If both of these values are set to 100% the fork may deviate away at any angle. If you set the Y value (for example) to 0%, the fork will only deviate along the local X axis.

For the most part you can leave these values at the default of 100% for a truly random deviation.

Deform Settings

These settings allow you to add additional deformation to the bolt with a shader. Best results are obtained with an animated Noise shader but any shader can be used.

Enable

If checked, the shader will deform the bolt.

Displacement

This is the 'strength' of the deformation. Larger values will result in larger deformation. If it is too large you may see artefacts such as forks becoming detached from their parent branch.

Shader

Add a shader to this link field. A Noise shader is recommended as this can be animated and produce interesting effects.

Spline Settings

This is a subset of the usual spline settings seen in Cinema 4D. Please refer to the C4D documentation for details. Cubic splines with Natural intermediate points can be used to produce curved bolts rather than spiky ones!

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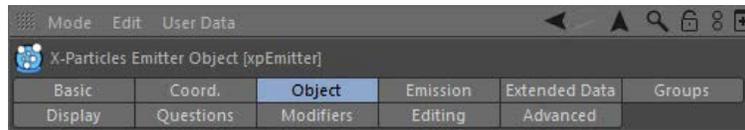
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Emitter Object



In X-Particles 3 the emitter has once again undergone major changes with an increase in functionality. For this reason, the manual page for the emitter is split into several different pages. These are:

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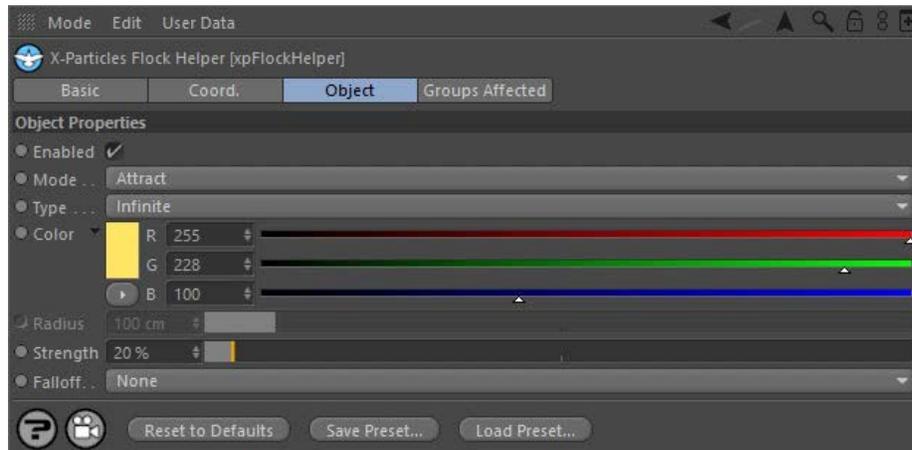
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Flock Helper Object

This object adds additional functionality to the flocking system in X-Particles. To use it requires a Flocking modifier. Add the Flock Helper to the scene and make it a child object of the Flocking modifier. You can have as many Flock Helpers as required.

Interface

The object's interface looks like this:



For the 'Groups Affected' tab, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

General Parameters

Enabled

If this button is unchecked, the object will be disabled (inactive).

Groups Affected

Drag the particle Group object(s) you want to be affected by the Flock Helper into the 'Groups Affected' list. If the list contains at least one group, groups not in the list will not be affected. But if no groups are in the list, all groups are affected.

Mode

This drop-down selects the main mode of operation. It has three settings:

Attract

The helper will attract the particles to itself. The object icon in the object manager is blue in this mode.

Repel

The helper will push particles away from itself. The object icon in the object manager is orange in this mode.

Chase

The helper will actively chase particles. See below for more details on how to use this mode. The object icon in the object manager is red in this mode.

Type

This drop-down controls the scope of the object (note: 'Attract' and 'Repel' modes only - in 'Chase' mode the scope is always limited). It has two options:

Infinite

The helper is active across the entire scene.

Limited

The helper is only active within a spherical region defined by the 'Radius' parameter.

Color

The on-screen colour of the object. You can change the colour to distinguish between different helpers.

Radius

This setting is always available in 'Chase' mode but only in the other two modes if 'Type' is set to 'Limited'. It defines the radius of the sphere of influence around the object.

Strength

The overall strength of the effect.

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This drop-down controls the falloff of the strength of the helper object. It is only available for 'Attract' and 'Repel' modes. It has three options but not all are always available.

None

There is no falloff and helper strength is constant across the scene.

Inverse Square ('Infinite' mode only)

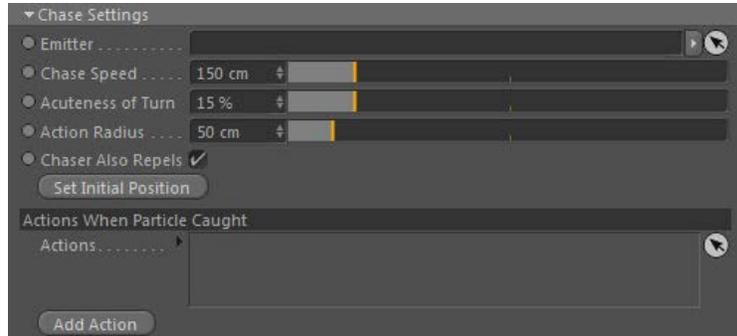
The strength diminishes rapidly as the distance from the helper increases. You may need to start with a very high strength value for the helper to have any effect.

Linear ('Limited' mode only)

The strength falls off in a linear fashion. You may need to start with a moderately high strength value for the helper to have any effect.

Parameters in 'Chase' mode

In this mode the helper will actively pursue particles. As a result it works rather differently to the other modes. Additional settings are available as seen here:



Emitter

Drag the emitter whose particles are to be chased into this link field.

Chase Speed

The speed with which the helper moves. If it is less than the particle speed it may never catch them!

Acuteness of Turn

When turning to chase the particles, this is the sharpness of that turn. Low values produce wide, looping turns but if set too low, the helper may never catch the particles.

Action Radius

This is denoted by a red sphere inside the main object. When a particle enters this sphere any actions in the 'Actions' list will be triggered for that particle. This value cannot be higher than the 'Radius' value.

Chaser Also Repels

If checked, this switch will cause the chaser to repel particles as well - so if you want your flock to try to avoid the chaser, check this switch.

Set Initial Position

The chaser will move during playback to follow the particles. When you rewind the scene to the start, it will move back to its initial starting position. If you want your chaser to start in a specific position, move the chaser to that position manually and click this button. On scene rewind the chaser will move back to that position.

Actions When Particle Caught

When the chaser catches a particle, it will trigger any Actions in the 'Actions' list. For example, you could add an action to kill the caught particle.

Actions

The Actions to be executed when the particle is caught.

Add Action

Clicking this button will add an Action to the scene and drop it into the 'Actions' list.

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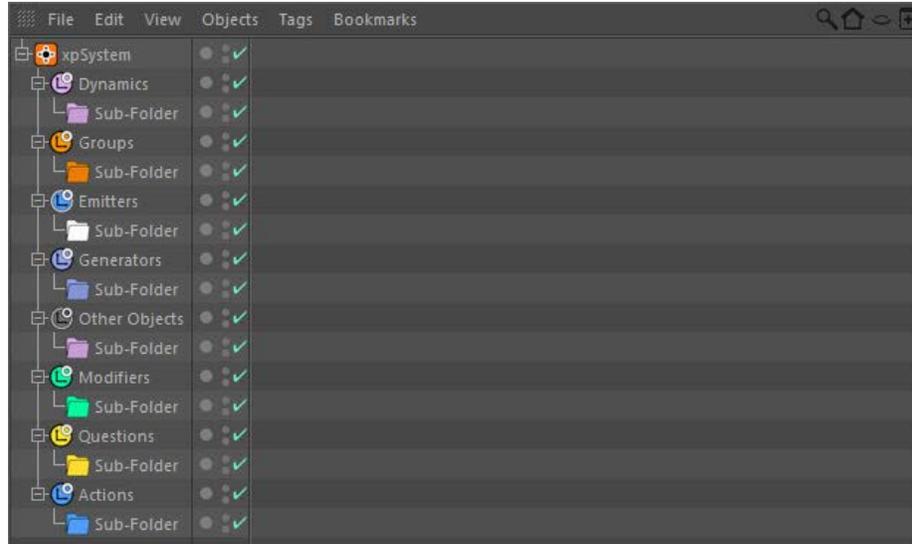
Folders and Sub-Folders

Large scenes with many actions, modifiers, questions, etc. can become very confusing. To keep things tidy, the System object adds several 'folder' objects which are really just null objects with a specific icon. These are intended to group together the various objects in an X-Particles scene.

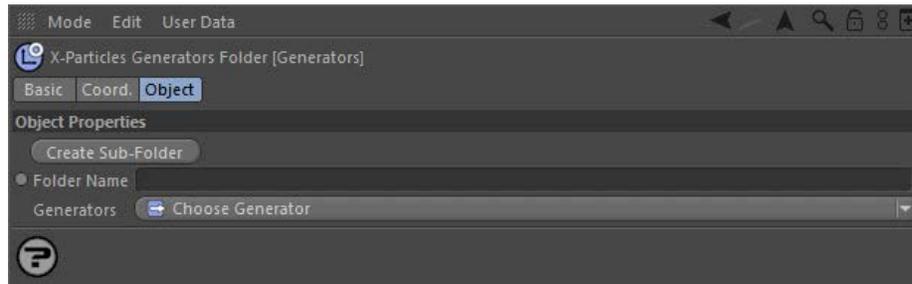
These section headers are discussed in the [System Object page](#). Each folder can add one or more sub-folders as child objects of itself. This is so that, if you have multiple actions or modifiers of a particular type, you can drop them in their own sub-folder to make them easier to find.

Interface

The folders and sub-folders look like this:

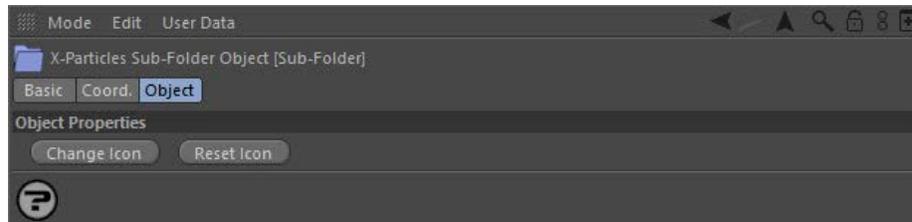


To add a sub-folder, click the 'Create Sub-Folder' button in the folder object. For example, in the Generators folder:



This will create a subfolder of the correct type as a child of the Generators folder. You can set the name of the sub-folder in the 'Folder Name' field before you create it, or change it afterwards in the object manager in the usual way. You can create as many sub-folders as you need.

Each sub-folder type has its own coloured icon. If you want to, you can change the icon to something more distinctive. To do this, click the 'Change Icon' button in the sub-folder interface:



This will bring up a standard file selector box. The replacement icon MUST be a 32x32 graphic loaded from disk. Any other image will simply result in a blank space where the icon should be. To change the icon back to its default, click the 'Reset Icon' button.

Adding X-Particles Objects

Most folders can add relevant X-Particles objects to the scene in exactly the same way as the [System object](#) does. Some have the same drop-down menus found in the System object, some (such as the Emitters folder) only have a button to add that specific object. The exception is the Questions folder, since Question objects can only be added from an emitter.

To add one of these objects, click the small arrow to the right of each button in case of a drop-down, which will bring up a list from which you can select the desired object.

Note: by default the Object Manager will make the new object the current one. If you prefer to remain in the System object rather than jumping to the new object, hold down the Control key when clicking a button to add an object.

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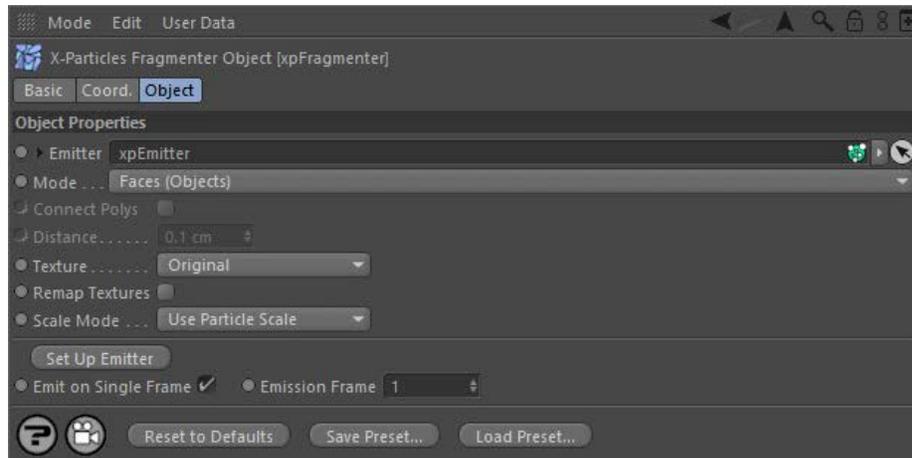
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Fragmenter Object

The Fragmenter object performs two functions: it allows you to generate individual polygons from the faces of a polygon object used as an emitter source (which can give the appearance of a fragmenting object) or it can be used move existing objects in the 3D world using the particle engine.

Interface

This is the Fragmenter object's interface:



For the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

The Fragmenter has two modes with different parameters:

[Faces \(Polys\) and Faces \(Objects\) mode](#)

[Objects mode](#)

Emitter

In all modes, the Fragmenter requires an Emitter to work with. Drag an emitter into this field to make the other parameters available.

Mode

This drop-down has three settings:

[Faces \(Objects\)](#)

A one-polygon object will be generated from each face of the source object used in the emitter from which a particle is generated. This mode generates multiple objects and can slow down playback, but each object can be individually scaled and rotated if required.

[Faces \(Polys\)](#)

A single object is generated with each polygon corresponding to a face in the source object used in the emitter. This is much faster to play back in the editor but the faces cannot be scaled or rotated individually. The appearance of the generated faces is the same as in 'Faces (Objects)' mode.

[Objects](#)

This is the other mode of the Fragmenter. It does not generate any new objects but allows existing objects to be moved around the 3D world using the X-Particles particle engine, modifiers, etc.

Faces (Objects) and Faces (Polys) modes

Please note: in these modes, the source object used by the emitter should not be scaled using the object's Attribute Manager. You can of course resize the object manually or use the Coordinates Manager to resize it, but do not alter the scale from the default in the Attribute Manager. This is because doing so will change the object's matrix and create problems such as incorrect polygon placing and rotation.

[Connect Polys](#)

Only available in Faces (Polys) mode, this setting causes the polygons to be connected if they are within range of each other. The range is given in the 'Distance' setting.

[Distance](#)

Polygons closer together than this value will be connected (only in 'Faces (Polys)' mode and if 'Connect Polys' is checked).

[Texture](#)

The generated faces can be assigned a texture with this setting. This setting is only available when 'Mode' is set to 'Faces (Objects)'.

Important: the texture to be applied MUST be applied to the Fragmenter object. It can be the same as any texture applied to the source object, but it must be copied to the Fragmenter.

The drop-down has three settings:

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Original

The generated faces will each receive a copy of the texture applied to the Fragmenter. By default each face will receive a complete copy of the bitmap or shader applied to the Fragmenter. However, if 'Remap Textures' is checked, each face receives the same portion of the texture that was displayed by the corresponding face on the source object.

Note that the texture must be UV-mapped for this to work correctly. Other projections may not be successful.

Random/Multishader

If no texture is applied to the Fragmenter object and this option is chosen, each face will receive a randomly-generated colour. If a texture containing a Mograph Multishader is applied to the Fragmenter, each face will receive one of the shaders in the Multishader.

Note that if the texture applied to the Fragmenter is anything other than a Multishader, then this mode has no effect (e.g. a bitmap would behave the same as if the 'Original' setting was chosen).

Use Particle Color

If no texture is applied to the Fragmenter object and this option is chosen, each face will receive the colour of the particle which generated it.

Note that if **any** texture is applied to the Fragmenter, then this mode has no effect (e.g. a bitmap would behave the same as if the 'Original' setting was chosen). For this mode to work successfully, no texture must be applied to the Fragmenter.

Remap Textures

This switch is used when in 'Faces (Objects)' or 'Faces (Polys)' modes. See the 'Original' setting above for more details.

Note: the source object MUST be a polygon object for remapping to work. Primitive objects, C4D generator objects, cloners, etc. will not work. It must be an editable polygon object.

Scale Mode

This drop-down allows you to select how the generated faces will be scaled. It is not available if 'Mode' is set to 'Objects'.

The drop-down has two options:

Use Particle Scale

The scale of the particle will be used to scale the geometry. By default particles have a scale of 1, so with this option the generated polygons will have the same size as those of the source object, unless the particle scale is changed.

Use Particle Radius

This option will scale the polygon size up or down to match the particle radius. You will probably need to set a fairly large radius to see the generated faces if you select this mode.

Set up Emitter

To set up the emitter to work correctly with the Fragmenter, you need to make several changes to the emitter settings. For reference, these are as follows:

Faces (Objects) and Faces (Polys) modes

1. Set the emitter to emit from an object and drag the object to use into the 'Object' field. This cannot be a spline object or anything which doesn't have any polygons.
2. Set the emitter to emit from 'Polygon Center'. No other mode will work.

That's all you need to do. However, you can optionally also make these changes:

3. Turn on 'One Particle per Source Element'. This will generate one and only one particle for each polygon in the source object, each frame.
4. Set the emitter to emit on one frame only (if 'Emit on Single Frame' is checked). In conjunction with 'One Particle per Source Element' in the Emitter this will cause the Fragmenter to generate one new polygon for each face in the original object.

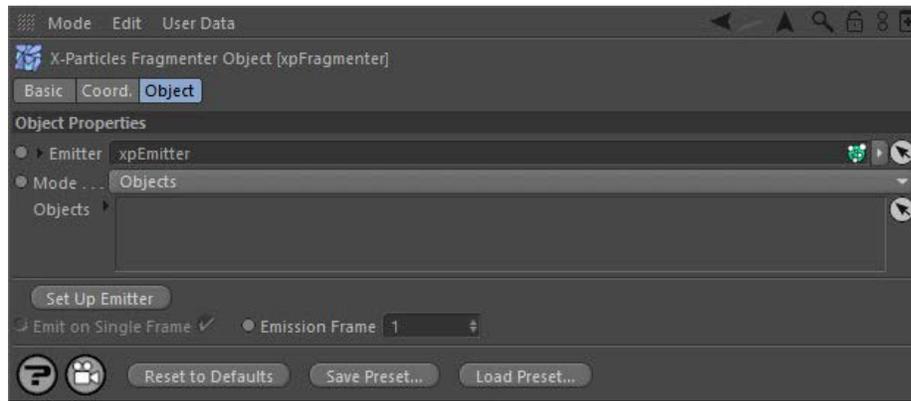
If you click the 'Set up Emitter' button then assuming you have dropped an emitter into the 'Emitter' link field, the Fragmenter will automatically set up steps 2, 3, and 4 above for you. The only one you have to do manually is step 1, since the Fragmenter has no way of knowing which object you want to use.

Emit on Single Frame and Emission Frame

If 'Emit on Single Frame' is checked, which it is by default, clicking the 'Set up Emitter' button will carry out step 4 above. If it is checked, then the frame to emit on will be found in the 'Emission Frame' field. You can change this if desired, but the change will only be made in the Emitter if you click 'Set up Emitter' again.

Objects mode

In this mode the interface is slightly different and not all parameters are available:



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Objects

Drag any existing scene objects you want to control with the particle engine into this list. The emitter will generate a particle for each object and the Fragmenter will move the objects to match the particle movement.

In Objects mode, the Fragmenter does not clone objects or generate new ones: it simply moves objects which already exist in the scene. Therefore, it is not possible to emit particles on more than one frame, since that would not make sense.

For this reason, when you set up the emitter to use this mode, or use the 'Set up Emitter' button, the start and end frame emission parameters in the Emitter are disabled. The actual frame on which to emit the particles is controlled entirely by the 'On Frame' parameter in the Emitter's Object tab.

Set up Emitter

In this mode, clicking 'Set up Emitter' will set the emitter into 'Defined Emission' mode using a 'Fragmenter List'. The 'Emit on Single Frame' setting is ignored since in this mode the emitter will never emit more than one particle for each of the objects in the list. The frame on which to emit those particles can be set in the 'Emission Frame' parameter and this will be set in the Emitter's 'On Frame' setting if 'Set up Emitter' is clicked.

You can change the emission frame at any time if desired, but the change will only be made in the Emitter if you click 'Set up Emitter' again. Alternatively, you can directly change the 'On Frame' parameter in the Object tab of the Emitter.

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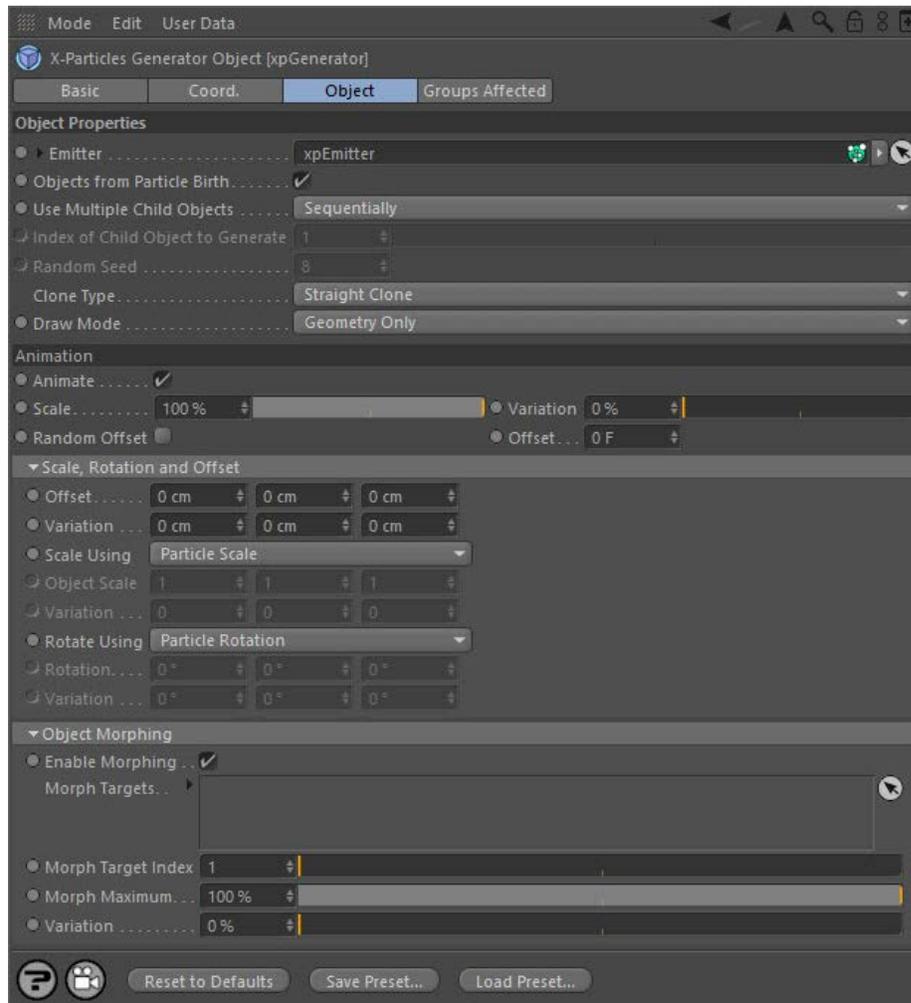
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Generator Object

The Generator object is responsible for generating objects in the scene. This is needed because the Emitter object only generates and manipulates particle data. If you want objects to be associated with those particles, you will need to add a Generator object. The object interface looks like this:



- [Emitter and objects](#)
- [Object morphing settings](#)

For the 'Groups Affected' tab, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

What can be generated?

The Generator will generate almost any kind of object, though some are excluded. For example, it doesn't make much sense to generate multiple Sky objects, so X-Particles won't let you do that. Nor will it generate objects such as particle modifiers, since these have no effect on the scene (this is a restriction within Cinema 4D, not X-Particles).

For any valid object create the object and make it a child of the Generator object. Then ensure that 'Draw Mode' is set to 'Geometry Only' or 'Geometry and Particles'. Playing the animation will now generate multiple copies of the child object(s).

Note that if you turn on object generation, but the Generator doesn't have any valid child objects, nothing will be generated at all. You may not even see particles in the editor, depending on the setting in 'Draw Mode'. It's up to you to make sure that there is a valid child object or objects to generate.

What if the generator has more than one child object? There are several options to handle this. For more details, please see the 'Use Multiple Child Objects' section below.

Settings

Emitter and objects

Emitter

For objects to be generated from particles, you must tell the Generator which emitter it will work with. Drag an emitter object into this field to do that. Until you have done so, you will not be able to access any of the other settings in the Generator.

Objects From Particle Birth

If this switch is checked, an object will be generated for each particle as soon as it is created. If it is unchecked, no object will be generated for newly-created particles until this switch is checked again, or until object generation for a particle is turned on by an Action.

You should normally leave this switch checked unless you are sure you want to turn it off.

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Use Multiple Child Objects

This setting determines how the generator will deal with more than one child object. The drop-down menu has five settings:

- **Sequentially** [default setting]: for each particle the Generator will generate one of its child objects in turn. In other words, if you have a Generator with three child objects - a cube, a sphere, and a cone - the first particle will generate a cube, the second a sphere, the third a cone, the fourth a cube again, and so on.
- **Randomly**: for each particle the Generator will choose one of the child objects at random.
- **First Child Only**: the Generator will ignore other child objects and just generate the first valid child.
- **Choose by Index**: in this mode, you can choose which child object is to be generated. The first valid child is given the index of 1, the second is 2, and so on. This may not appear to be a very useful mode, but the great advantage is that you can change the object generated with an Action, so when a particle satisfies the required criteria it can be made to generate a different object.
- **Assign by Group**: child objects are assigned to each particle according to the particle's group. For example, group 1 particles are associated with the first child object of the generator, group 2 particles with the second child object, etc.

Index of Child Object to Generate

This is only available if you select 'Choose by index' from the 'Use multiple child objects' drop-down. It's up to you to make sure the index is valid. If the Generator only has two child object and you enter a '3' here, nothing will be generated.

Random Seed

The seed value for the random selection of objects when you select 'Randomly' from 'Use Multiple Child Objects'.

Clone Type

This drop-down lets you choose how the clones of the child objects are generated. 'Straight Clone' generates full copies, as if you duplicated the object in the object manager. 'Instances' generates Cinema 4D instances, while 'Render Instances' generates, well, render instances. Details of instances and render instances can be found in the Cinema 4D documentation.

Note that there is a small issue if you select render instances. In this case the source object which will be cloned will remain visible in the scene and will be rendered. This is due to internal workings of Cinema 4D. A simple workaround is to position the source object off screen in such a position that it will never appear in the rendered image.

Draw Mode

This determines what the Generator shows in the editor and at render time. It has four settings:

Geometry Only

This will turn off the editor display of the particles. This is because it can be distracting to see the particles and objects in the editor at the same time, especially in wireframe views.

Particles Only

Geometry will not be displayed and only the particles are shown. This is very useful if you are caching a scene which generates a lot of geometry. Because Cinema is quite slow in drawing multiple objects on screen, caching a lot of particles with geometry is also slow, as the geometry is shown in the editor. You can use this setting to generate the cache, then reset the drop-down menu to one that produces geometry before you render the cached scene.

Geometry and Particles

Both objects and particles are displayed.

Geometry on Render Only

With this setting, geometry will not be generated in the editor (so speeding up the viewport) but will automatically be generated when rendering to the picture viewer. This is a convenience setting so you don't have to remember to switch object generation on and off when creating a scene or rendering it.

Caution: if you select this option, then cache the scene, no geometry will be rendered in the picture viewer. This is because the generator will be cached when it is not producing any geometry, so nothing will be rendered. There are two solutions to this:

- don't cache the generator (turn generators off in the cache object's 'Inclusion' tab, or drop the generator into the 'Exclude' list)
- use an option other than 'Geometry on Render Only'

Animation

Animate

Suppose you are generating a sphere whose radius is keyframed to increase from 0 to 100 over a number of frames. If 'Animate' is checked, when a new sphere is generated its initial radius will be 0 and will increase to 100 as the particle gets older. If 'Animate' is off, then for a new sphere generated at (for example) frame 30, it will have the radius of the original sphere at 30 frames. Normally you would leave this switch on but it can be turned off if desired.

Note: for this to work the object must be animated using PLA animation. Using deformers or expressions such as the Pose Morph tag will not work. This is a limitation of Cinema 4D itself, not of X-Particles.

Scale and Variation

The Scale value determines how fast the object will be animated. For example, if you have an animated bird flapping its wings, a scale of 200% will cause the wings to flap twice as fast as normal. If you add some variation, the objects will be animated at different speeds.

Random Offset and Offset

By default, all animated objects will be animated from the same point in the scene. What this means is that all objects will appear to have the same animation - so birds will all flap their wings in unison, for example. That might be what you want, and if so, you can adjust the starting point by altering the 'Offset' value. Often, however, you will want the objects to be animated from different starting points from each other, which gives a more natural effect. To do this, check the 'Random Offset' switch.

Scale, Rotation and Offset

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By default the generated object is given the same position as its source particle. If desired, you can offset the object from the particle using these two parameters.

Scale Using

The size of the generated objects can be set in one of four ways from this drop-down:

Particle Scale

The scale of the particle will be used to scale the geometry. By default particles have a scale of 1, so with this option the generated object will have the same size as the source object, unless the particle scale is changed.

Particle Radius

This option will scale the object size up or down to match the particle radius.

Source Object Scale

The generated object will have the same scale as the source object regardless of the particle scale.

Set Scale

With this option you can set the generated object's scale from the Generator object. Values are given in the 'Object Scale' setting and variation can be added with the 'Variation' setting.

Object Scale and Variation

These are used when the 'Scale Using' parameter is set to 'Set Scale'.

Rotate Using

This drop-down determines how the generated object is rotated. It has three options:

Particle Rotation

The object rotation is set to the rotation of the particle (note: particle rotations MUST be enabled in the emitter for this to work).

Set Rotation

The object rotation can be set from the Generator object using the 'Rotation' and 'Variation' fields.

Source Object Rotation

The generated object will have the same rotation as the source object regardless of the particle rotation.

Offset Particle Rotation

With this setting, the object rotation is set to the rotation of the particle, plus an offset given in the 'Rotation' and 'Variation' fields. (Note: particle rotations MUST be enabled in the emitter for this to work.)

Rotation and Variation

These fields are used when 'Rotate Using' is set to 'Set Rotation' or 'Offset Particle Rotation'.

Object morphing

The settings in this section are used to control object morphing. For full details of how they are used, see the ['Morphing objects'](#) page.

Enable Morphing

Uncheck this switch to disable morphing.

Morph Targets

Drag into this list any objects you wish to use as morph targets. Each object MUST also be a child object of the Generator object.

Morph Target Index

The index of the object in the list you wish to morph to. This starts at 1 (the first object in the list). It is up to you to make sure that the index is a sensible one. If you set it to '3' and there are only two morph targets in the list, no morphing will occur.

Morph Maximum

This is the amount of morphing that will take place. Normally this is set to 100% - that is, a complete morph from the initial object to the morph target. But it can be reduced for an incomplete morph if desired.

Variation

This adds some random variation to the 'Morph Maximum' setting so that the generated objects can show different amounts of morphing if desired.

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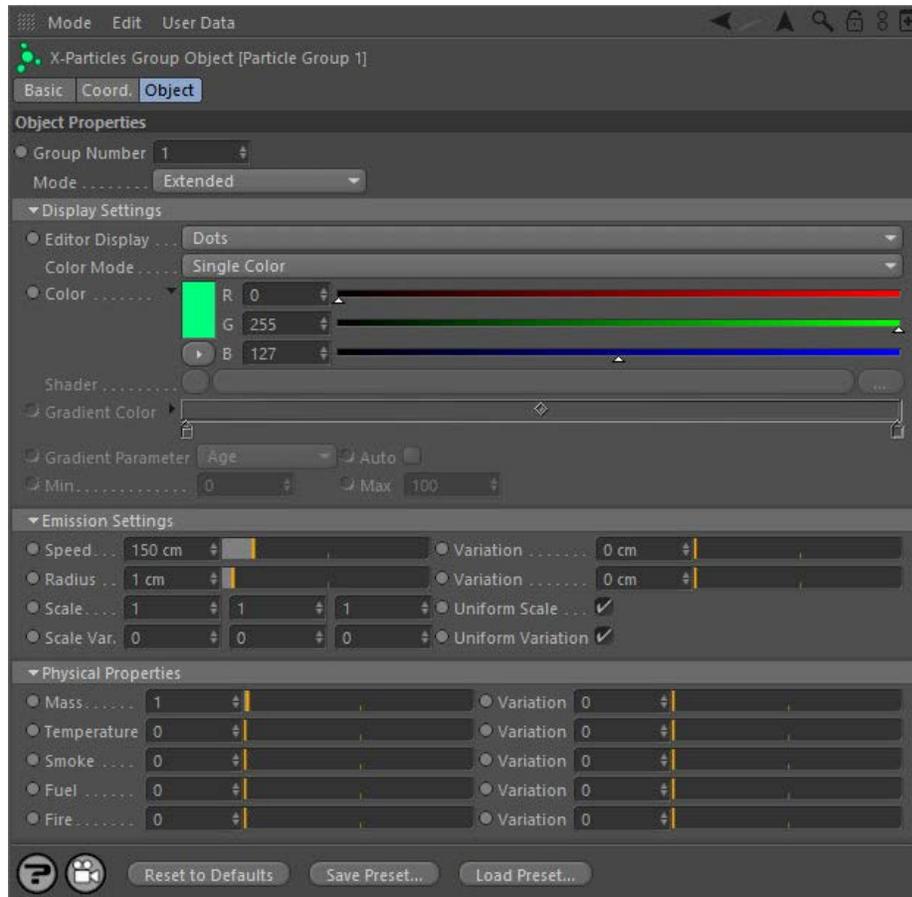
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Group Object

A particle can be assigned to a group. The group can then be used to determine whether scene modifiers or actions affect the particles in that group. You can add as many groups to a scene as you wish but the group must be created before you can assign a particle to it. To create a group, add a Group object to the scene. This can be done using the main plugin menu, or the system object, or in the [Groups](#) tab in the Emitter object.

A Group is not specific to a single emitter. You can have multiple emitters all emitting particles in the same group, if you wish.

This is the Group object's interface:



For the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Settings

Group number

This is a field which shows you the internal number of this Group.

New Feature This number can now be edited by the user, if desired. Most of the time it is recommended that you don't do this, but in some circumstances, such as merging two scenes, you may have two or more groups with the same number. This number is used to identify to a particle which group it is in; if you have two groups with the same number the particle will assume it belongs to the first group it finds with that number.

If you do change it, the actual number isn't important as long as it isn't shared by any other group.

Mode

New Feature Groups can now control many more aspects of an emitted particle than previously. Exactly which parameters are taken from the group, and which from the emitter, are determined by this drop-down, which has three options:

Display Only

Only the display settings are taken from the group object. Emission settings and physical properties are taken from the emitter which emits the group.

Standard

In this mode, the group object controls the display settings and emission settings. Physical properties are taken from the emitter which emits the group.

Extended

Display and emission settings, and physical properties, are taken from the group. The emitter has no effect on any of these parameters.

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This is the same setting as found in the Emitter's 'Display' tab. Please refer to the **Emitter object** for more information.

Note that this and the Color setting make it possible for each group to have its own unique appearance (which does not depend on the group number being unique) without having to use Questions and Actions to accomplish that.

It is not possible to specify the size and transparency of spheres or circles for Group objects, so if you choose 'Spheres' or 'Circle (Filled)' as the display type, the size and transparency are taken from whichever emitter(s) emit particles in this group.

Color Mode

 The Group object now has its own colour gradient and shader link, so it is no longer necessary to use the ones from the emitter as in previous versions. The Group object also controls the parameter used to determine the colour from the gradient when you select the 'Gradient (Parameter)' option.

This drop-down has five options. These are the same as in the Emitter display tab:

Single Color

The particles all have the same colour, from the 'Color' setting.

Random Color

Particles are assigned a randomly-chosen colour.

Gradient (Random)

A random colour is chosen for each particle from the 'Gradient Color' gradient.

Gradient (Parameter)

The particle colour is chosen from the 'Gradient Color' gradient but the colour chosen is determined by the 'Gradient Parameter' drop-down.

Use Shader

In this mode particles are coloured by a shader placed into the 'Shader' link.

Color

The color of the particle in the viewport. This is used in the editor and in the X-Particles material if that is set to use the particle colour. The default is a light green, as in the Emitter.

Note that if you change this setting, the colour of the Group object icon in the object manager will also change to the same colour.

Shader

The shader to use in 'Use Shader' mode.

Gradient Color

This is used in 'Gradient (Random)' and 'Gradient (Parameter)' modes. By default this is a blue to white gradient.

Gradient Parameter

In 'Gradient (Parameter)' mode the colour the particles are given is taken from the 'Gradient Color' but the precise colour is determined by the chosen setting in this drop-down. The parameters available are:

- Age
- Speed
- Radius
- Mass
- Density
- Temperature
- Smoke
- Fire
- Fuel

For example if the parameter is 'Age', new particles are given the colour from the extreme left of the gradient, particles at the end of their lifespan are drawn in the colour from the extreme right of the gradient.

Auto

When this switch is checked, the colour gradient is automatically mapped to the range of values in that property. For example, if 'Speed' is chosen in 'Gradient Parameter', the slowest particles are given the colour at the left edge of the gradient, while the fastest ones are given the colour at the right edge. If this switch is unchecked you can choose the range to map to the gradients using the 'Min' and 'Max' settings.

Min, Max

The minimum and maximum values to use when the 'Auto' switch is unchecked.

Note: this does not work with the 'Age' parameter. Age is always determined automatically.

Emission Settings

These are identical to the parameters of the same names in the Emitter object Emission tab. They are only available in 'Standard' and 'Extended' modes.

Please refer to the [Emitter manual page](#) for more details.

Physical Properties

These are identical to the parameters of the same names in the Emitter object Extended Data tab. They are only available in 'Extended' mode.

Please refer to the [Emitter manual page](#) for more details.

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Using the Particle Group object

To use different particle groups in an emitter, drag the groups you want to use into the 'Groups to Use' list in the emitter. Alternatively, you can click the 'Create and Add Group' button in the emitter 'Groups' tab; this will create a group and automatically add it to the 'Groups to Use' list.

If no groups are present in the list, all particles will be in the default group and will have the colour and shape found in the emitter. If more than one group is in the list, new particles will be assigned randomly or sequentially to one of the groups, depending on the emitter setting.

Note that more than one emitter can use the same group if you wish.

Group numbers

The group number is generated automatically and held internally by the Group object. Each group should always have a unique number compared to the other groups in the scene. The group number is shown in the 'Group Number' field, which is editable should you need to change it. Also, by default the Group object name will be 'Particle Group' followed by the internal group number. Note that the default group, to which particles are assigned if no group is specified, always has the number 0 (zero).

You can change the name to anything you like, the number in the name is not required for the group to function correctly. The number will still be shown in the 'Group Number' field if you change the name.

Changing a group

You can change a particle's group using a [Change Group modifier](#) or [Action](#). When you do this, you are not altering the number of a group. Instead you are moving a particle from one group to another.

Assigning XP materials to groups

The simplest way to render particles is to assign an XP material to the emitter. This will render all particle groups emitted by that emitter, using the same material. However, you can assign different materials to each group. Doing that will override the material on the emitter and render the particles in that group with its specific assigned material.

If you have materials both on the group and on the emitter, and then you disable the group in the object manager (see below), the group's particles will still be rendered but using the material on the emitter. If the emitter does not have a material, disabling the group will cause it not to be rendered. This can be very useful for comparing different material settings.

Disabling/Enabling a group

You will see that in the Cinema 4D object manager a group object has a green tick that will change to a red cross when ticked. Since groups are simply a special kind of null object, disabling a group doesn't do anything. If you are emitting that group from an emitter then disabling the group will not prevent it from being emitted. A group which is dragged into a modifier groups list will still be used even if disabled in the object manager.

However, there is one case in which disabling a group is important. To render particles you can assign an XP material to a group instead of the emitter. If you do that, and you disable the group, that group will not be rendered. If both the group and the emitter have materials assigned to them, the group material is used if the group is enabled but if it is disabled the emitter's material will be used to render the group.

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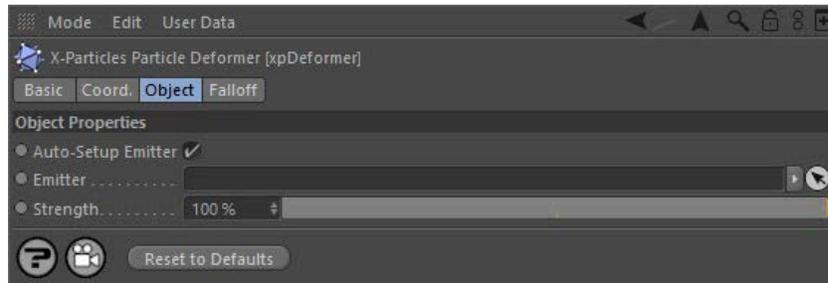
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Particle Deformer

The Particle Deformer links each vertex of an object to a particle. When the particles move, the vertices move with them, deforming the object.

The interface is very simple:



For the 'Falloff' tab and for the 'Reset to Defaults' button, please see the ['Common interface elements'](#) page.

Parameters

Auto-Setup Emitter [default: on]

If this switch is checked, then when an emitter is dragged into the 'Emitter' link field it will automatically be set up to work with the deformer.

Emitter

The vertices of the object will be linked to particles generated by the emitter in this link field. The particles themselves can in theory be emitted from any emitter type. However, the best results are obtained if they are emitted from the object which is going to be deformed. Otherwise the results are...unpredictable.

Strength

The strength of the deformation is given in this parameter. A strength of 0% will result in no deformation. The maximum is 100%, which is full deformation.

Using the deformer

As with any other deformer, the Particle Deformer must be a child of the object to be deformed. Then an emitter must be dragged into the 'Emitter' link field.

Once you have done that, there are a number of steps to set up in the emitter. You must:

1. Set the type of emitter, preferably to Object, and drag the source object into the emitter's Object field. Ideally this should be the object to be deformed, but it doesn't have to be.
2. Set 'Emit From' to 'Points' to generate particles from the object's vertices.
3. Check (turn on) the switch 'Emit One Particle Per Point' in the emitter - this guarantees that one, and only one, particle will be emitted from each vertex in the object each frame (note that this means that the Birthrate setting is ignored since the birthrate now depends on the number of vertices in the object).
4. In the Emission tab, turn off 'Emit all Frames' and set the emitter to emit particles in just one frame. You don't have to do this - it won't affect the deformer - but if you don't you will generate far more particles than you actually need, which may slow down playback.
5. Now set any other emitter parameters, such as speed, initial direction, and so on. Remember that Birthrate is ignored if you turned on 'Emit One Particle Per Point'.

Using a vertex map

One other thing you can do is add a vertex map to the object to be deformed, then drag it into the 'Selection' field in the emitter's object tab. The deformer will use the vertex weights in the map to determine the strength to apply to the deformation for each point.

Note: it is not sufficient to leave the vertex map on the object (there might be multiple such tags). You must specify which one to use by adding it to the 'Selection' field.

Setup is now complete and you can play the animation. The effect will depend on particle speed, direction, the effect of modifiers, etc.

That's quite a lot of steps to go through. Fortunately you can avoid most of them by leaving the switch 'Auto-Setup Emitter' turned on. If this is on, steps 1-4 above are carried out for you when you drag an emitter into the 'Emitter' link field.

Notes

Any polygon object or primitive can be deformed in this way, as can any spline. You can also deform other types of object but those which generate multiple objects - such as the Array or Cloner - won't work. You can deform an object in a Subdivision Surface object but you get much better results by emitting particles from the base mesh rather than the Subdivision Surface object itself.

What can you use this for? We'll leave that to your imagination. Suffice to say it's quite fun to play with, even if its actual usefulness is limited!

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Particle modifiers

The standard particle modifiers in Cinema 4D can all be used with X-Particles. In addition, X-Particles 3 ships with 46 modifiers. Some of these are similar to those supplied with Cinema 4D, though with the difference that they can be controlled with the X-Particles control system. Others are new and have no equivalent in the Cinema 4D particle system.

Using the modifiers

The modifiers can be used in two different modes. In each modifier, the mode is selected with the 'Mode' drop-down, which has two entries.

Independent

In this mode, the modifier works exactly as a standard Cinema 4D modifier. Whether a particle is affected or not depends only on whether it enters the field of effect of the modifier. All modifiers are initially set to this mode when first added to the scene.

Action-Controlled

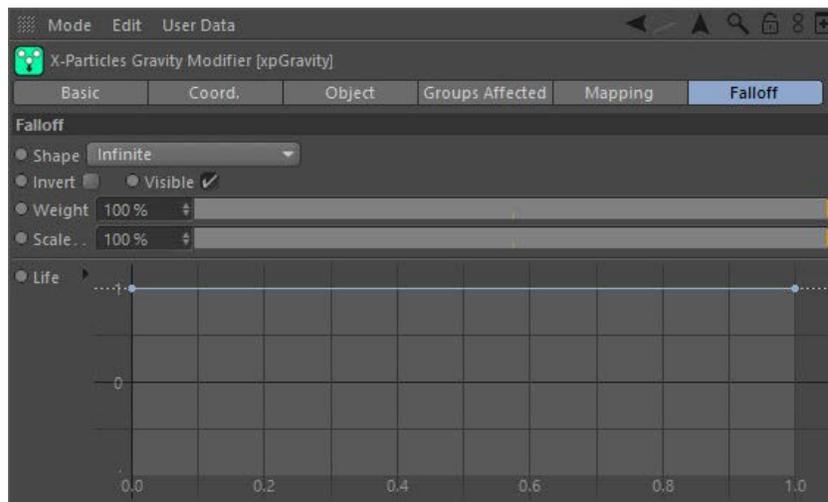
In this mode the modifier will only have an effect if an Action has enabled the modifier for a specific particle. In other words, the modifier will not affect a particle at all unless instructed to do so by an action. So you can have a stream of particles moving through the field of effect of a modifier, and only certain ones being affected, depending on whether a Question was passed which triggered an Action linked to that modifier. However, the effect of the modifier is still dependent on the particle being within its field of effect.

This is a very powerful mode because unlike independent mode it allows specific particles to be affected by the modifier. You can have multiple modifiers of the same type in the scene, and use Actions to ensure that only specific modifiers of that type affect the particles.

For more details on how to control modifiers with Actions, please see the [Action object page](#).

Falloff

Most (not all) modifiers support the conventional Cinema 4D falloffs. Some also support an additional falloff mode in which the effect of the modifier is also influenced by the particle age. In all cases the interface looks like this, as seen in the Gravity modifier:



Deprecated By adjusting the spline the effect of the modifier will vary with particle age. Values from the left of the spline interface are for newly-created particles while on the extreme right particles on the point of death will be affected. The default setting has no effect; if the value is zero the modifier will not act on the particle at all, while if it is negative, the effect will be inverted.

This feature is deprecated in the current version as the new data mapping system replaces it. It will be removed in a future version of X-Particles.

Note that nonsense values are ignored. For example, you cannot set a negative value for the number of particles to be emitted using a spawn modifier!

X-Particles also includes two extra falloffs that can be used with any object in Cinema that can use falloffs. These are the [Noise Falloff](#) and the [Particles Falloff](#).

Enabling/disabling the modifier

All modifiers have one other common control, the 'Enabled' switch. Checking this switch enables the modifier; unchecking it disables it, just as if you clicked the green tick in the object manager to change it to a red cross. It is there for convenience.

Available modifiers

The current modifiers supplied with X-Particles are listed below. They are divided into four groups:

- Controller modifiers: these do something to the particle other than changing the particle motion
- Motion modifiers: this is the largest group and do affect particle movement
- Sprite modifiers: control certain aspects of the sprites generated by the Sprite object
- Generate modifiers: alter generated geometry or add new particles to a scene

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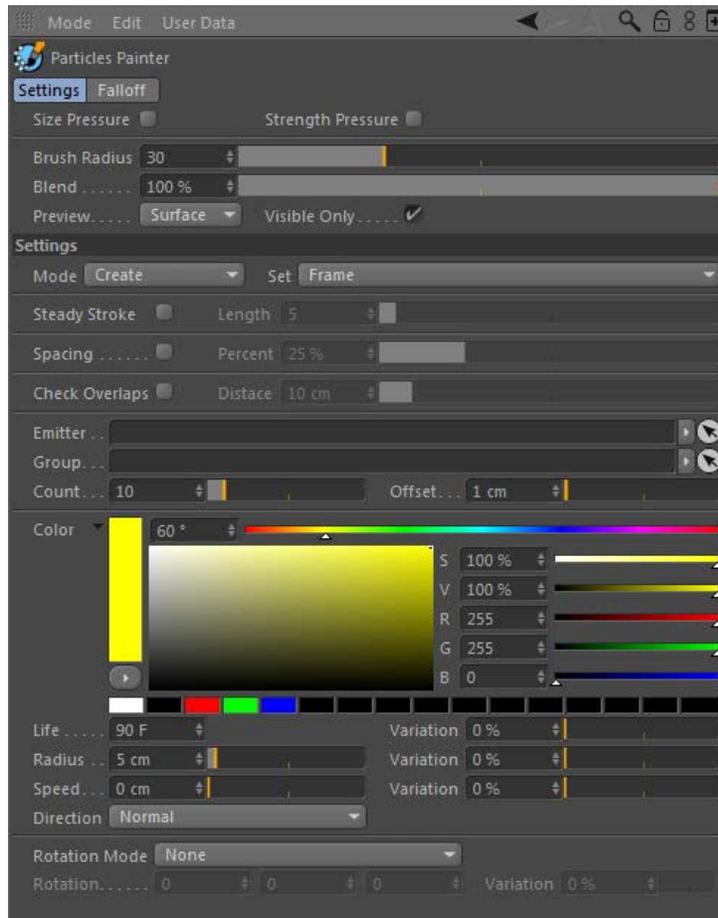
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Particle Paint Tool

With this tool, you can paint particles on the surface of a polygon object (or one which would be a polygon object if collapsed) and then edit their properties.

Interface

The tool's interface looks like this:



Using the Paint tool

To use the tool, select an object in the Object Manager. You can drag an existing emitter into the 'Emitter' field, or if you don't do that, the tool will automatically create a new emitter for you. Note that if a new emitter is created, the 'Spawn Only' switch will be set automatically.

An emitter cannot emit on the first frame of a scene, so you MUST advance the timeline by at least one frame to make the tool functions available. Whatever frame you move to, on playback particles will only be emitted once the timeline reaches that frame. You can paint on multiple different frames if desired.

When you start painting, particles will be created with the parameters in the tool's interface - colour, speed, lifetime, direction, etc. You can also specify the particle group.

Settings tab

Brush Radius

The size of the brush. In Cinema 4D R14 and above you can use the square bracket keys to increase or decrease the brush size (not available in R13).

Blend

This is the strength of the brush, it blends between the painting values (e.g. particle color) and those already in the particles.

Preview

This drop-down has three settings:

None

The brush preview is not visible (but particles can still be painted).

Surface

The brush preview follows the surface of the object.

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Screen

The brush preview is always on the same plane as the screen, so always appears as a circle.

Mode

This drop-down has several settings.

Note: to create new particles the object to paint them on must be selected in the Object Manager. For all other settings, when you are editing existing particles, you MUST select the emitter in the Object Manager. This is essential because at that point you are editing the particle data which is held by the emitter.

Create

This setting allows you to paint new particles. Simply select an object and paint on it to create the particles. The number to create as you paint is given in the 'Count' parameter. When you create new particles, they are given the settings in the Color, Life, Radius, Speed, Direction and Rotation settings.

Holding CTRL during painting with Create will remove any particles created by the paint tool.

Delete Particles

When you paint, existing particles are deleted.

Holding CTRL during painting with Delete Particles will undelete the particles so on the next playback the particles is available again. To see deleted particles you need the **Show Deleted** enabled in the emitter, you will need to replay the animation if the particles are already deleted.

Painting Particle Properties

Holding CTRL during painting any of the particle properties will remove the painted property back to the original particles value.

Paint Life

This will change the lifespan of the particles to the value in the 'Life' setting.

Paint Color

This will change the colour of the particles to the value in the 'Color' setting.

Paint Speed

This will set the speed of the particles to the value in the 'Speed' setting.

Paint Radius

This will set the radius of the particles to the value in the 'Radius' setting.

Paint Rotation

This will set the rotation of the particles to the value in the 'Rotation' setting.

Set

This drop-down has two settings:

Frame

The painted property is set for the current frame so on playback the property (e.g. colour change) will happen at the same frame.

Birth

The painted property is set at the birth of the particle so that it is emitted with the same painted property on playback.

Steady Stroke and Length

If 'Steady Stroke' is checked, the brushing only moves if the mouse moves a greater distance than the 'Length' setting from the current brush position.

Spacing and Percent

If 'Spacing' is checked, the brush painting is spaced out by a percentage of the brush radius. The amount of spacing is found in the 'Percent' field.

Check Overlaps and Distance

If 'Check Overlaps' is checked, then when creating particles the emitter is checked for any existing or painted particles with a distance given in the 'Distance' setting. It will only create a particle if none is found within this distance.

Emitter

The emitter being used to generate the painted particles. An existing emitter can be dragged in here, or if not one is automatically created as soon as you begin to paint new particles.

Group

If you drag an X-Particles Group object into this field, new particles will belong to this group.

Count

The number of new particles to create (clicking the mouse once will create this many particles). It can also be set to a fractional value for finer painting control (for example, less than 1.0)

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Offset

The particles will be created this distance away from the object surface.

Color

The colour of new particles, or the colour used when you are in 'Paint Color' mode.

Life (and Variation)

The lifespan of new particles, or the lifespan used when you are in 'Paint Life' mode.

Radius (and Variation)

The radius of new particles, or the radius used when you are in 'Paint Radius' mode.

Speed (and Variation)

The speed of new particles, or the speed used when you are in 'Paint Speed' mode.

Direction

This drop-down has a number of settings which control the direction of newly-painted particles:

Normal

The particles have the direction of the normal of the surface from which they were emitted.

Random

The particles have a random direction.

World (X+, Y+, Z+, X-, Y-, Z-)

The particles follow the corresponding direction along one of the 3D world axes.

Object (X+, Y+, Z+, X-, Y-, Z-)

The particles follow the corresponding direction along one of the object axes.

Rotation Mode

This drop-down has three settings:

None

The particles are not rotated.

Align Normals

The particles are rotated so that they are aligned with the surface normal. This will cause any geometry linked to the particle to be rotated accordingly.

Custom

The particles are rotated according to the value in the Rotation field. This will cause any geometry linked to the particle to be rotated accordingly.

Rotation (and Variation)

The custom rotation to use when 'Rotation Mode' is set to 'Custom'.

Falloff tab

Falloff

You can modify the Falloff spline to alter the falloff used by the brush. Click the 'Reset' button to reset it to its default shape.

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The Question Object

The Question object determines when to carry out one or more Actions which are present in the Question object's Actions list. It does not produce a visible presence in the editor or at render time.

You can only add a Question object to the scene by clicking the 'Add Question' button in the emitter's Questions tab (which adds the Question to the scene and inserts it into the emitter's Questions list). Once that is done, you can also drag the Question object into the questions list of any other emitter in the scene, if required.

Each question has at least one parameter and sometimes a list of conditions. These conditions would include tests such as whether the particle value is less than or greater than the value you specify. The particle is compared to the value you give, and if the conditions are satisfied the question is said to have 'passed' and any Action or Actions listed in the Question are carried out on the particle. If the conditions are not satisfied the question is said to have 'failed' and the Action is not carried out.

An emitter may have any number of Questions. Each Question object MUST be present in the emitter's Questions list for it to be tested.

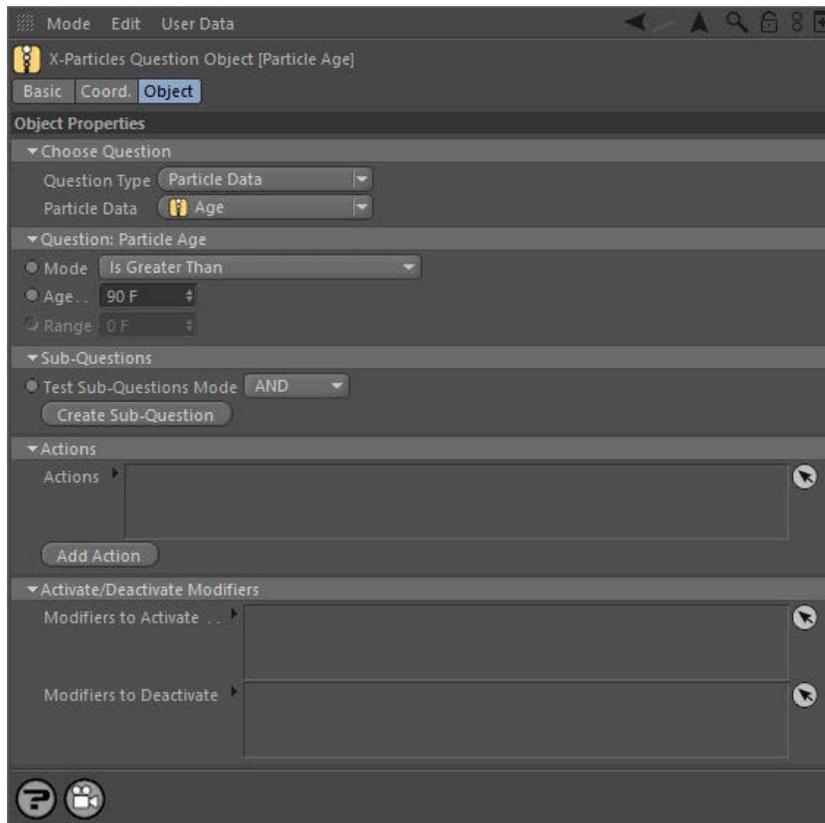
Important: a Question won't do anything at all until you have:

- inserted it into the Questions list of an emitter
- added at least one Action object to the Actions list of the Question, or made use of the modifiers to activate or deactivate lists (see below)

You can use the same Question object in more than one emitter if you wish. Just drag the Question object into the Questions list of each emitter where you want to use that Question.

Question object interface

By default the Question object's interface looks like this:



Parameters

Question Type

There are a large number of possible questions in X-Particles 3, so that a single long list is not practicable. Therefore they have been divided into 6 groups, as follows:

Question Type	Notes
Particle Data	Tests various data items associated with a particle, such as speed, radius, etc.
Particle Position	Tests any aspect of the particle's position in the scene.
Particle Flags	The particle maintains a series of internal flags to indicate that some event has happened. Some of these flags can be tested with these questions.
Geometry	Questions relating to geometry associated with a particle.
Physical Data	The data relating to the FLIP solver can be tested with these questions.
Other	Miscellaneous questions not fitting into another category

To select a question, first choose the category of question from the first drop-down menu. Then you can choose a specific question from the second drop-down menu. This menu will change depending on the selected category.

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Parameter to Test

After you choose the question, you will be shown a variety of parameters to test. Most parameters apply to individual particles but some (such as Current Frame) are scene-wide.

The parameters depend on what kind of question it is so the interface will vary. Each question is described below in the [Question types section](#).

Test Sub-Questions Mode

This is described in the [Sub-Questions section](#) below.

Create Sub-Question

Click this button to add a Sub-Question to the main Question. It will appear as a child object of the Question object.

Actions and Add Action

The Actions which will be carried out if the question is passed can be dragged into the 'Actions' list. You can create an Action object from the X-Particles menu or by clicking the 'Add Action' button, in which case the Action will be created and automatically added to the list.

Modifiers to Activate

In previous versions of X-Particles, if you wanted a Question to activate a modifier for a particle, you would create an Action to do that. In X-Particles 3, if that is all you need to do, then you can drag the modifier to be activated into this list and if the question is passed, the modifier will be activated directly. You can still do it the old way with an Action but this new feature reduces the number of objects and is faster to set up.

Modifiers to Deactivate

The same as for 'Modifiers to Activate' but modifiers in this list will be deactivated.

Multiple questions

If you only have one Question in the emitter, then this section is not relevant. If you have more than one Question, X-Particles can treat them in two different ways, which can be selected by the 'Mode' drop-down list in the Questions tab of the emitter.

To try these modes out, create two Question objects. The first should ask if the particle age is greater than 30 frames, the second if the particle age is greater than 60 frames. Drag both Questions into the emitter's Questions tab list, with the 60-frame Question below the 30-frame Question, and change the mode to 'Strict sequential order'. Then add an Action object to each Question. In the 30-frame Question, make the Action change the particle colour to red; in the 60-frame Question make the Action change the colour to blue.

Play the animation. The particles should change colour from their default (green, unless you changed it) to red when each particle is 30 frames old, and then to blue when the particle is 60 frames old.

Testing each Question once only

In most cases you will probably want to test each question until it passes, then not again. To do this, in the emitter drag the Question object into the list headed 'Test and Pass Once'. (This is where the Question will be placed if you click the 'Add Question' button in the emitter.) This list has two possible modes.

Mode: Strict Sequential Order

This mode is easy to understand. If the selected mode is 'Strict sequential order' then each question is asked in strict sequence. Suppose you have the setup described above, but then add a second question which asks whether the particle age is over 60 frames. You place this question – and this is important – below the first question in the question list.

The second question will not be asked until the first has been passed as true. In other words, the 60-frame question won't be asked of a particle until the 30-second question has been passed. That's fine, and completely logical. But what if you drag the 60-frame question to be above the 30-frame question in the question list? Now the 30-frame question won't even be tested until after the 60-frame question has been tested. In this scenario, what you will see is that the 60-frame Question takes effect when a particle is more than 60 frames old, then in the very next frame the 30-frame question will be asked (and will pass, since the particle is of course more than 30 frames old).

Mode: Bypass Unanswered Questions

Let's go back to the original setup with two Questions, one testing the particle age to be more than 30 frames and the other 60 frames. The 60-frame question is below the 30-frame question in the list.

If you play the animation, you will see exactly the same as in the 'Strict sequential order' mode. Now drag the 60-frame question above the 30-frame question and run the animation again. You see that the particles change to red when each is 30 frames old, but never change to blue. Why?

In this mode, the emitter will test each question in turn until it finds one which passes. In this case the 30-frame Question will pass before the 60-frame question, even though it is below the 60-frame Question in the questions list. But, in the next frame the particle 'knows' that the 30-frame question has passed and will look for the next question in the list. Since there is no next question, the 60-frame question will never be executed; it's been bypassed by the 30-frame question.

Although this sounds complicated, it is in fact the more useful mode of the two and is therefore the default setting.

There is one important lesson from this: always make sure your questions are in the right order and you have selected the correct mode for what you want to do. If they aren't, you WILL get unexpected results!

You can prevent individual questions from being asked by disabling them in the object manager or by removing them from the questions list.

Testing questions repeatedly

As you can see from the emitter interface, there are in fact two lists of questions in the Questions tab of the emitter. The first list is headed 'Test and Pass Once' and includes the Mode setting described above. These questions, regardless of which order they are answered in, will only ever pass once for any particle. This means that the associated Action(s) will only be triggered once by the Question.

Sometimes it is desirable to test the Question in each frame, and trigger the Action(s) whenever it passes. To do this, drag the Question object into the list headed 'Test all Frames' and delete it from the 'Test and Pass Once' list. Now the Question will be tested every frame and will trigger its Action(s) each time it passes.

Sub-questions

[Change Speed](#)

- [Change Spin](#)
- [Change Sprites](#)
- [Control Morphing](#)
- [Control Spawning](#)
- [Explode Particles](#)
- [Freeze Particles](#)
- --- Other Actions ---
- [Editor Display Only](#)
- [Stop Following Spline](#)
- [Unlink TP](#)
- [Unstick from Source Object](#)

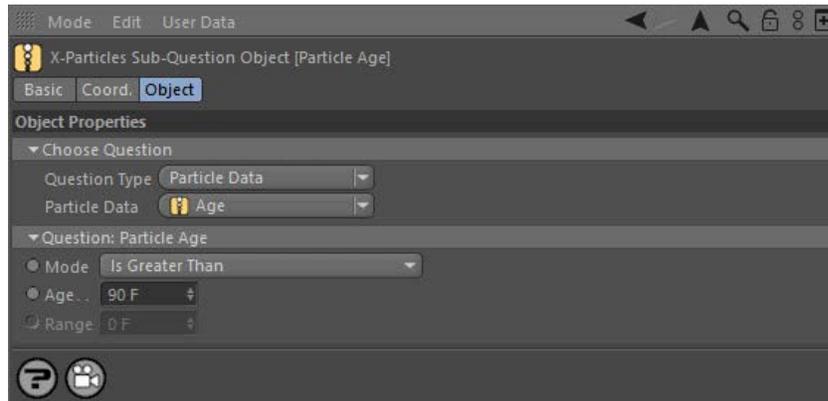
Other:

- [Online updater](#)
- [Load Palette](#)

What if you want to ask two questions at the same time? Suppose you want to carry out an Action if the particle is both more than 60 frames old AND has a speed of more than 200 units/second? You can do this by adding one or more Sub-questions to a Question.

To do this, click the 'Create sub-question' button in the Question object. This will add a Sub-question as a child object of the Question. This is the only way to add a Sub-question; you cannot add one via the Plugins menu or using the System object.

Sub-questions are almost identical to Questions except that you cannot add Action objects to them and you cannot add Sub-questions to a Sub-question. You set up the Sub-question just as you would a Question. The interface is therefore very similar to the Question object:



How sub-questions work

Back in the Question object, there is an option titled 'Test sub-questions mode'. There are two modes:

AND (the default mode)

Both the main Question and all Sub-questions must pass in order to carry out an action (so in the example above a particle would have to be more than 30 frames old and have a speed of more than 200 before the associated Action(s) were carried out)

OR

Either the main Question or any of the Sub-questions must pass in order to carry out an action (so in the example above a particle would either have to be more than 30 frames old or have a speed of more than 200 before the associated Action(s) were carried out)

The use of Sub-Questions can be very useful in deciding if an Action is to be carried out since you can set precise conditions in which the Action can occur.

Question types

There are several types of question which can be tested by the Question object. These are as follows.

- ---- [Particle Data Questions](#) ----
- [Particle Age](#)
- [Particle Color](#)
- [Particle Group](#)
- [Particle Index](#)
- [Particle Radius](#)
- [Particle Rotation](#)
- [Particle Scale](#)
- [Particle Speed](#)
- ---- [Particle Position Questions](#) ----
- [Distance Along Spline](#)
- [Distance to Camera](#)
- [Distance to Object](#)
- [Distance Travelled](#)
- [Illumination](#)
- [In Camera FOV](#)
- [Inside Volume](#)
- [Modifier Falloff](#)
- [Particle Position](#)
- [Vortex Radius](#)
- ---- [Particle Flags Questions](#) ----
- [Particle Collided](#)
- [Has Exploded](#)
- [Particle Frozen](#)
- [Particle Stick Question](#)
- [Snapped \(Inheritance Mod.\)](#)
- [Stuck to Source Object](#)
- ---- [Geometry Questions](#) ----
- [Branching](#)
- [Generated Object](#)
- [Morph Value](#)
- [Particle Trail](#)
- ---- [Physical Data Questions](#) ----
- [Fire](#)
- [Fuel](#)
- [Mass](#)
- [Smoke](#)
- [Temperature](#)
- ---- [Other Questions](#) ----
- [Boolean Input](#)
- [Current Time](#)
- [Particle Count](#)
- [Python Script](#)
- [Random Probability](#)
- [Number of Collisions](#)

Range settings

Many questions have a range setting. This is used to create a range either side of the base value. For example, suppose you want to test particle speed and you set a basic speed value of 200 and a range value of 10. The question tests whether the particle speed is within the range of values from 190 to 210 (i.e. 200 ± 10).

Questions using a range almost always have two modes to use the range: you can select if the parameter being tested falls within the range or falls outside it. The range is not used unless you select one of these options.

Particle Data Questions

Particle Age

This is the default mode. This question tests whether a particle has a certain age. You should note that this does not mean the animation frame of the scene. For example, a particle may be emitted at frame 20 of the scene; if the Question tests whether the particle has an age exceeding (say) 30 frames, then at scene frame 30 this particle will only be 10 frames old ($30 - 20$) and so will not pass the question.

Parameters

There are three parameters for this question:

Mode

The question mode: whether the particle age is less than, equal to, or greater than the specified age; a fourth mode tests whether the particle is within a certain number of frames of death - see below for more details; and two final modes test whether the particle age is within a specified range.

Age

The age of the particle. (Or, if the mode is set to 'Is Within Time of Death' the time before the particle dies.)

Range

The possible range either side of the age value.

Is Within Time of Death

In the Question mode setting, there is an option called 'Is Within Time of Death'. What it does is take the value in the 'Age' parameter and tests whether the particle will die within that many frames (or seconds). How does this work?

Suppose you have an emitter generating particles with a lifespan of 100 frames. At 95 frames old, you'd like the particle to spawn some new particles. This is easy: just add a Question testing for age equals 95 frames and use that to trigger a Spawn action. But what if the particles all have different lifespans because some variation was set in the emitter? Now you don't know what the age of each particle is. Some will spawn too long before death (if they have longer lifespans than 100 frames) while some won't spawn at all (if they have lifespans of under 95 frames). This question mode solves this problem by letting you specify an action to be triggered within a certain number of frames before death. In the above example, you would set this mode and then set the 'Age' value to 5. Now, 5 frames before death, the particle will trigger the action, no matter how long its lifespan is.

A couple of small points: the value in 'Age' now becomes the time before the expected particle death, NOT the age of the particle. If you set it to zero, the action(s) will be carried out at the moment of particle death. Of course, you may not see anything because the particle is now dead, but you can use this to spawn particles when a particle dies, for example. If you set the 'Age' value to the lifespan of the particle, the action(s) will be triggered as soon as the particle is created.

Secondly, this question uses the expected lifespan of the particle. If the particle is killed by another action, modifier, etc., these actions will not be triggered.

Particle Color

This question lets you test a particle's colour.

Parameters

Component to Test

This drop-down selects which of the three colour components (Red, Green, and Blue) are tested, alone or in combination:

- RGB (Brightness)
- Red Only
- Green Only
- Blue Only
- Red and Green
- Red and Blue
- Green and Blue

Mode

The question mode: less than, equals, greater than, is in range or is not in range.

Component Values

The colour you want to test the particle colour against. By default this is mid-grey (RGB 127, 127, 127).

Range

Only available if the mode is one of the range questions. The lower limit of the range is the 'Component Values' colour minus the 'Range' colour, while the upper limit is those two values added together.

Be careful of the colour you select here. The default is black (RGB 0, 0, 0) so with this colour the question is the same as if 'Mode' was set to 'Equals'. If you make this colour mid-grey, and leave the default colour as it is, the question will always pass since then range is then between pure black and pure white.

Particle Group

This question tests whether a particle is, or is not, in a particular group.

Parameters

The two parameters are:

Mode

Whether a particle is in a group or if it is not in a group.

Groups

The list of groups to test; multiple groups can be dropped into this list.

If no group is in the groups list, the question will never pass. If more than one group is in the list and the mode is set to 'Is in Particle Group' the question will pass if the particle is in any of those groups. If the mode is set to 'Is not in Particle Group' the question will only pass if the particle is not in any of the groups.

Particle Index

Each emitted particle has its own unique index value. This question allows an action to be carried on one specific particle, or for any particles whose index falls into a range of values. Note that this is NOT the actual index of the particle in the emitter's particle array, as this can change over time. It is a unique identifier for each particle.

This is not the same as testing the particle count. The particle count question looks at live particles only. In this question, if you specify an index of 100, then the action will affect the particle with that index if one exists. If no particle with that index currently exists, the question will not be passed.

Parameters

There are three parameters for this question:

Mode

The question mode, which can be one of the following:

- Equals: the particle index is equal to the specified index
- Is greater than: the particle index is greater than the specified index
- Is in range: the particle index is between the specified index and the specified index plus the range (e.g. if the index is 10 and the range is 8, the particle must have an index of 10 to 18 to pass the question)
- Is Not in range: the particle index is outside the specified index and the specified index plus the range (e.g. if the index is 10 and the range is 8, the particle must have an index of less than 10 or greater than 18 to pass the question)
- Even-numbered particles: the particle index must be an even number
- Odd-numbered particles: the particle index must be an odd number

Particle Index

The unique index of the particle.

Range

The index range (used for the 'Is in range' or 'Is Not in range' tests - see above).

Particle Radius

This question tests the radius of the particle.

Parameters

There are three parameters for this question:

Mode

The question mode, whether the radius is equal to, smaller than, or greater than, the test value, or is within or outside of the range.

Radius

The radius value to test.

Range

The possible range either side of the radius value.

Particle Rotation

This question lets you test a particle's rotation on any axis.

Parameters

Axis to Test

The rotation axis, either H, P, or B.

Mode

The question mode: less than, equals, greater than, is in range or is not in range.

Rotation Amount

The value to test the particle's rotation against.

Range

This value is subtracted from the 'Rotation Amount' to provide the lower limit of the range, and added to it to give the upper limit.

Particle Scale

This question tests a particle's scale.

Parameters

Axis to Test

The axis to test, alone or in combination:

- XYZ
- X Only
- Y Only
- Z Only
- XY
- XZ
- YZ

Mode

The question mode: less than, equals, greater than, is in range or is not in range.

Component Values

The values to test for each axis. Not all values are used (e.g. if you are testing the scale along the X-axis, only the X component is tested and the others are ignored).

Range

Only available if the mode is one of the range questions. The lower limit of the range is the 'Component Values' setting minus the 'Range' setting, while the upper limit is those two values added together.

Particle Speed

This mode is the same as the particle age mode except that it tests particle speed instead of age. This can be used to change (or remove) particles which are of too high or low a speed.

Parameters

There are three parameters for this question:

Mode

Whether the particle speed is less than, equal to, or greater than the specified speed, or is within or outside of the range.

Speed

The speed of to test in scene units per second.

Range

The possible range either side of the speed value.

Particle Position Questions

Distance Along Spline

This is used in conjunction with the [Follow spline modifier](#).

Parameters

The question has four parameters:

Parameter

The test to make:

- whether the particle has reached the end or start of the spline
- the distance it has travelled along the spline
- or the number of loops the particle has made along the full length of the spline

Mode

For the distance and loops tests only, whether the value should be greater or less than the corresponding test value.

Distance

For the distance test only, the distance to test for in terms of a percentage value of the spline length.

Loops

For the loops test only, the number of loops to test for.

Distance to Camera

This question compares the distance of the particle from the current camera (in scene units) to the value specified in the question. You can use this to carry out an Action (for example, changing generated geometry from a high-poly version to a low-poly version when the particle is sufficiently far away from the camera).

Please note that the distance tested is the particle distance to the camera used in the current render view, not the current editor view (these may, of course, not be the same).

Parameters

There are three parameters for this question:

Mode

Whether the distance is less than, equal to, or greater than the specified distance, or is within or outside of the range.

Distance

The distance from the particle in scene units to the camera.

Range

The possible range either side of the distance value.

When using this question, you would normally use the 'is greater than' test for particles travelling away from the camera, so that the question is passed once the particle gets far enough away. The 'is less than' test is most useful for particles coming towards the camera. If you use the 'is greater than' test for far-away particles coming towards the camera, please note that the test may be passed immediately the particle is released, which is probably not what you intended.

Be very careful when testing for equality as testing for an exact distance may never succeed. If you test for 1500 units and the actual distance is 1500.1, the question will not pass.

Distance to Object

This question compares the distance of the particle from a scene object to the value specified in the question.

Parameters

There are four parameters for this question:

Mode

Whether the distance is less than or greater than the specified distance, or is within or outside of the range.

Object

The object to test (the question will always fail if this link field is empty).

Distance

The distance from the particle in scene units to the object.

Range

The possible range either side of the distance value.

Distance Travelled

This question compares the distance travelled by the particle (in scene units) to the value specified in the question.

Please note that what is tested is the actual distance travelled by the particle, not the distance from its origin to its current position. If a particle was to reverse its course and travel back to its point of origin, the actual distance travelled would be that from the origin to the point at which it changed direction, multiplied by 2.

Parameters

There are three parameters for this question:

Mode

Whether the distance travelled is less than, equal to, or greater than the specified distance, or is within or outside of the range.

Distance

The distance travelled by the particle in scene units.

Range

The possible range either side of the distance value.

Illumination

This question tests whether a particle is illuminated by a light. Note that this only tests if the particle falls within the illumination field of the light. It does NOT take account of any scene objects which may block the light from reaching the particle.

Currently, this question only works with Spot or Omni lights.

Parameters

Mode

Whether the particle is, or is not, illuminated by the light.

Light

The light to test - the question will always fail if this field is empty.

Use Falloff

Whether to take account of any falloff in the light's parameters; if this is unchecked, falloff is ignored.

Illumination Threshold

A threshold value - this is the illumination value of the light falling on the particle. If the threshold value is more than zero, and the test is whether a particle is illuminated, the light falling on the particle, taking the falloff into account if required, must exceed this value. If the test is if a particle is not being illuminated, the light on the particle must be below this value.

In Camera FOV

This question tests if a particle is, or is not, in the field of view of the current camera. Note that this means the camera currently in use, which can be the editor camera or some other camera. In other words, the question will fail unless the particle is in the field of view of a camera AND that camera is the current scene camera.

Parameter

There is only one parameter:

Mode

Whether the particle is in the camera FOV or if it is not be in the FOV.

Inside Volume

This question tests whether a particle is inside or outside the space occupied by an object.

Parameters

There are two parameters:

Mode

This has two options, whether the particle is inside the volume or outside the volume.

Object

The object whose volume is to be tested. This must be a collapsed polygon object or a C4D generator object or an object primitive. Objects in a Mograph Cloner or an Array object will not work. If you need to use one of these objects, drop the Cloner or Array into a Connect object and drop that into this field.

Modifier Falloff

This question tests whether a particle is within a particular modifier's falloff field.

Modifier

Drag the modifier to test into this field.

Parameters

The parameters are:

Mode

The question Mode, which can be one of the following:

- Particle Within Falloff - passes the question if the particle is within the modifier's falloff; will always pass if the falloff is set to Infinite
- Particle Outside Falloff - passes the question if the particle is outside the modifier's falloff; will never pass if the falloff is set to Infinite
- Falloff > - passes if the falloff value is greater than the value given in the 'Low Falloff Value' parameter
- Falloff < - passes if the falloff value is less than the value given in the 'High Falloff Value' parameter
- In Range - passes if the falloff is equal to or greater than the 'Low Falloff Value' AND equal to or less than the 'High Falloff Value'

Low Falloff Value, High Falloff Value

See the 'Mode' parameter above.

Weighting

This is a random factor which affects the chance of a particle passing the question. Suppose the mode is 'Particle Within Falloff' and the Weighting is 100%. The question will always pass if the particle is within the falloff. But if the Weighting is 50%, then the question only has a 50% chance of passing even if the particle is within the falloff. This allows you to introduce some random variation and ensures that each particle does not pass the question at exactly the same point.

Particle Position

This question tests a particle's position, either in relation to the centre of the 3D world or from an object.

Parameters

There are five parameters:

Position Space

The position space, either the centre of the 3D world or the position of an object.

Object

The object, if 'Position Space' is set to 'Object'.

Axis

This is the axis to test the distance along, can be X, Y, or Z. In other words, if set to 'X' the particle distance along the X-axis is tested against zero (if 'Position Space' is set to 'World') or the X-axis position of the object (if 'Position Space' is set to 'Object').

Mode

The question mode - is the particle position less than or greater than the distance in the 'Distance' parameter.

Distance

The distance to test.

Vortex Radius

This question tests the vortex radius of a particle. It requires a Vortex modifier to generate the required data; without one, the question will never pass. You can use this question (for example) to remove particles which have a vortex radius outside specific values.

Parameters

Mode

Whether the vortex radius is less than or greater than the specified distance, or is within or outside of the range.

Radius

The radius to test.

Range

The possible range either side of the Radius value.

Particle Flags Questions

Particle Collided

This question tests whether a particle has recently collided with a scene object. When that happens an internal flag is set in the particle and this question tests for that flag. The question will pass if the flag is set.

Note: this flag is NOT set for particle-particle collisions.

Parameter

Clear Collision Flag

The only parameter is the 'Clear Collision Flag' switch. If this is checked, then when the question is passed the flag is automatically cleared. This is to prevent actions being triggered multiple times even if no further collision has occurred.

The default setting of this parameter is on for Question objects but off for Sub-Question objects. The reason is that if you have a Question with a Sub-Question which is testing for a collision, and the collision flag is set in the particle, it is possible that the Sub-Question could pass (clearing the flag) but the main question could fail. Once the main question does pass, the sub-question cannot then pass because the collision flag has already been cleared!

Has Exploded

This question tests whether a particle has been 'exploded' by an **Explode modifier**. If it has, the question will pass. Note that this internal flag is only set by the Explode modifier, NOT by the Explode action in direct mode.

Parameters

There are no parameters for this question.

Particle Frozen

This question tests whether a particle has been frozen by a **Freeze modifier** or a **Freeze action**.

This question does not test if X-Particles has been halted by a Freeze tag! By definition it cannot do so, since a halted X-Particles will no longer be able to test any questions.

Parameters

There are four parameters:

Operation

This drop-down has two settings:

- Match any: the question will pass if any of the movement, spin, or scale switches are checked
- Match exact: the will only pass if the switches match the frozen parameters exactly.

Frozen Movement, Frozen Spin, Frozen Scale

These switches indicate which aspect of the particle must be frozen to pass the test. For example, a particle whose movement has been frozen but not the spin will pass the test if 'Frozen Movement' is checked but not if 'Frozen Spin' is the only checked switch, since the particle spin has not been frozen.

As an example, assume the Frozen Spin and Frozen Scale switches are checked, but that only the particle's scale has been frozen. This arrangement will pass the question if 'Match Any' is selected since the 'Frozen Scale' switch is set and the scale has been frozen. However, if 'Match Exact' is selected the question will not pass because to pass it both the particle's scale and spin would have to be frozen.

Particle Stick Question

This question is used in conjunction with the **Cover/Fill modifier**. It tests whether a particle has reached its target point on the object to be covered or filled. It can then be used to trigger any Action(s) in the Actions list of the Question.

Parameters

There are no parameters for this question.

Snapped (Inheritance Mod.)

This question tests whether a particle has been snapped to its target position by an [Inheritance modifier](#). If it has, the question will pass. It requires an Inheritance modifier to generate the required data; without one, the question will never pass.

Parameters

There are no parameters for this question.

Stuck to Source Object

When emitted from an object, particles can be stuck to the source object so that they move with it if the object moves. This question tests whether a particle is stuck to its source object.

Parameters

There are no parameters for this question.

Geometry Questions

Branching

This question will only work if the particle is under the influence of a [Branching modifier](#). There are several branching parameters which can be tested.

Parameters

Question Type

This can be one of the following:

- the length of the branch controlled by this particle, expressed in frames
- the branch level (for use with multiple sub-branch levels - see the [Branching modifier](#) for details)
- the maximum length of the branch, expressed in frames
- the number of branches associated with this particle

Mode

The question mode, whether the parameter to be tested is equal to, smaller than, or greater than, the test value.

Value to Test

The value to test against the particle branching data.

Important: in the Branching modifier, the length of a branch can be set either by scene units or by the length of time the branch grows for. The Branching question **always** tests for the length of the branch in terms of the number of frames it has grown for (not in time or in scene units). Once the branch has reached its maximum length the number of frames will not increase (i.e. this is not testing the age of the branch but the number of frames it has grown for until stopping).

Generated Object

This question allows you to test which object is being generated by a Generator or Sprite object.

Parameters

There are four parameters:

Object Type

This can be either the Generator or the Sprite object.

Mode

Whether or not the particle is associated with a generated object.

Object Index

For the Generator only, the index of the object being generated; it is up to you to make sure that the index is a sensible one - if you enter '3' here, and Generator has only two child objects, the question will always fail.

Sprite Type

For the Sprite object only, which type of sprite is being generated; this is the same drop-down list as found in the Sprite object'

Morph Value

This question is used in conjunction with particle morphing, and tests the amount that a particle has been morphed.

Parameters

Mode

It has the following modes:

- Morph at Maximum - this tests if the particle has reached its maximum morph value
- Morph Value Higher Than - tests if the morph amount is greater than the value in the 'Morph Value' setting
- Morph Value Equals - tests if the morph amount equals the value in 'Morph Value' setting
- Morph Value Less Than - tests if the morph amount is greater than the value in the 'Morph Value' setting

Morph Value

In the last three modes, the value to test against is found in this setting.

Particle Trail

This simple question tests whether the particle trail, if there is one, is at one of three possible states.

Parameter

Trail Length

The options are:

- Trail is at Maximum Length
- Trail Has Zero Length
- Trail is Less Than Max. Length (i.e. the length is somewhere between zero and maximum length)

Physical Data Questions

Burn, Fuel, Mass, Smoke and Temperature

The five questions in the Physical Data section all test the various physical data used with the FLIP solver. The data which can be tested include:

- Burn
- Fuel
- Mass
- Smoke
- Temperature

Parameters

Mode

The question mode - less than, equals, greater than, is in range or is not in range.

Value

The name of this setting will change depending on the physical data selected. In each case it is the value to test the particle data against.

Range

The possible range either side of the physical data value.

Other Questions

Boolean Input

The purpose of this question is to allow you to feed the result of an Xpresso calculation into the question object. It is used as follows.

1. Create a Question object and set it to 'Boolean input'
2. Add an Xpresso tag to a screen object and drag the Question object into the Xpresso editor
3. Create (or load from a preset) an Xpresso expression of some kind - it can be anything you like but must result in a boolean output
4. Connect the boolean output of the Xpresso expression to the Input value port of the Question object

Once this is done, you can test if the output from the Xpresso is either TRUE or FALSE and trigger an Action accordingly.

Parameters

There are two parameters:

Mode

Whether the input value should be TRUE or FALSE to pass the question.

Input Value

The input value (this is set to TRUE by default, but this has no meaning because you would normally connect up an Xpresso expression to this value).

Special note regarding Boolean questions

One problem you may see here is that the Boolean output from the Xpresso node may not be reset to the initial value when the scene rewinds to the start frame. Suppose a node outputs FALSE at the start, then TRUE at some point during the animation. Then you rewind the scene and you would expect this to be reset to FALSE. This is usually what happens but it may not in some cases. For example, if you are testing a particle state which can either be TRUE or FALSE, at the start frame there are no particles and the node cannot execute - so it retains the value it currently has. It will be reset the next frame (assuming there are particles in this frame) but if the question has already been tested and passed, it's too late.

The solution to this if you encounter this problem is to add a sub-question to the Boolean question. The sub-question should test for current frame > (start frame + 1) - i.e., if the start frame is 0, this should test for current frame > 1. This will allow the Boolean value to be reset before the question will pass.

Current Time

This mode tests whether the current scene time is either equal to or greater than the specified value. Note that its effect is quite different from the particle age question. As an example, suppose you have a Question which tests whether the current scene time is greater than 30 frames, and if so, passes control to an Action which changes the particle colour. The moment the scene frame exceeds 30, all the particles which have been produced so far will change colour, but new particles will continue to have the colour specified in the emitter.

Parameters

There are three parameters for this question:

Mode

Whether the scene time is equal to or greater than the specified time, or is within or outside of the range.

Time

The scene time to test.

Range

The possible range either side of the time value.

Particle Count

This mode tests the particle count. It looks at currently 'live' particles and does not include previous particles which have been deleted.

Parameters

There are three parameters for this question:

Mode

Whether the particle count is less than or greater than the specified count, or is within or outside of the range.

Particle Count

The particle count to test.

Range

The possible range either side of the count value.

Python Script

With this question, you can write a Python script to test particle parameters and trigger an Action. For details, please see the page '[Using Python in X-Particles](#)'.

Random Probability

This question doesn't test anything in the particle. It simply generates a random probability based on the 'Probability' parameter. If this is set to 100%, the Question always passes; if it is 0%, it will never pass. Set to 50% gives the question a 1 in 2 chance of passing.

By itself this isn't very useful, but as a sub-question in combination with other questions it is quite powerful because it introduces some random variation into the actions carried out on a particle. For example, you could combine it with a particle age question and set the probability to 50%. Without the random factor, the particle age question would pass, and trigger an Action, every time a particle reached the specified age, giving a rather too uniform appearance. But with the random probability set to 50%, the Action will only be triggered in 50% of cases even when the main particle age question passes.

Parameters

It has two parameters:

Random seed

The seed value for the random number generator.

Probability

The probability that the question will pass.

Number of Collisions

X-Particles keeps track of the number of collisions that have been made with scene objects (not particle to particle collisions). You can test for number of collisions with this question.

Note: this is the total number of collisions made by all particles, NOT the number made by an individual particle.

Parameters

There are three parameters for this question:

Mode

Whether the number of collisions is less than, equal to, or greater than the specified value, or is within or outside of the range.

Collisions

The number of collisions to test.

Range

The possible range either side of the number of collisions.

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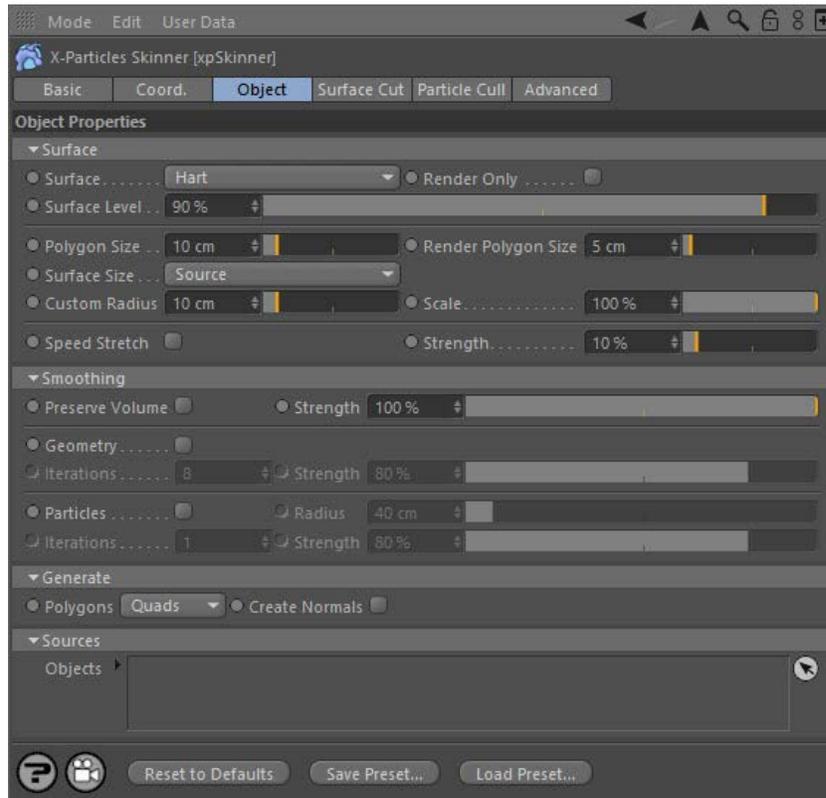
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Skinner Object

The Skinner object allows you to create a mesh from the emitted particles, or indeed from the vertices of any point objects. It is similar in concept to the standard Cinema 4D metaball object, but is much faster and far more powerful.

Object tab



For the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Surface section

Surface

Several different algorithms are available for the construction of the mesh. Choose which one gives the best results for your purposes.

Render Only

If checked, the generated mesh will only appear at render time.

Surface level

This setting governs how readily the individual "blobs" generated around each particle are to coalesce and form a continuous mesh. The higher this is the more blobs will be incorporated into one mesh; the smaller, the more likely you are to see lots of individual small blobs. You can set values over 100% but the mesh will become larger and may eventually explode.

Polygon Size

The Polygon Size is the size of the voxels used to define the mesh and therefore is a measure of the resolution of the mesh. The smaller the size, the higher the resolution and more polygons are created. However, a smaller polygon size also results in a smaller mesh.

If polygon size is increased, the mesh size itself will eventually become larger and will start to lose definition, becoming a single large round blob.

Render Polygon Size

The polygon size at render time. If it is smaller than 'Polygon Size', this results in a smoother mesh when rendered. However, if the 'Render Polygon Size' is less than the 'Polygon Size', as is usually the case, the rendered mesh will not match that in the editor. This is inevitable and a function of the way the Skinner works.

You should therefore treat the 'Polygon Size' as a low-resolution mesh for editing purposes. If you want to see in the editor what the mesh will look like on render, alter the 'Polygon Size' to match the 'Render Polygon Size'. But be aware that this may cause a significant slowdown in the editor.

Surface Size

This drop-down has two settings:

Source

With this setting, the particles use their own radius setting (which can vary between particles) to generate the mesh. Non-particle sources, which don't have a Radius parameter, use the 'Custom Radius' setting.

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Custom

With this setting, the particles use the Custom Radius setting (which will therefore be the same for all particles) to generate the mesh. Non-particle sources also use this setting.

Custom Radius

The radius to use when 'Surface Size' is set to 'Custom'.

Scale

Scale will scale all the radius values internally (scaling the surface), so if you have particles with different sizes (radius) the Scale can be used to tweak the surface size without having to change the particle radius values.

Speed Stretch and Strength

Speed Stretch "squashes" the mesh as though it was being stretched. The effect is changed with the Strength setting.

Smoothing section

Preserve Volume and Strength

When either of the two smoothing modes, Geometry or Particle, are selected, the size and shape of the mesh will change. Checking 'Preserve Volume' will attempt to retain the volume and shape. The 'Strength' setting determines the strength of the effect.

Geometry

This switch is used to smooth the generated mesh. One effect of this is to reduce the size of the individual blobs and any intermediate mesh.

Iterations

This will refine the smoothing but will cause further reduction in size.

Strength

The amount of smoothing. A value of 0% is the same as unchecking 'Geometry'. Note that setting this too high may cause the mesh to break up.

Particles

This switch is used to smooth the generated mesh. One effect of this is to reduce the size of the individual blobs and any intermediate mesh.

Radius

The smoothing radius around each particle. A value of zero is the same as unchecking 'Particles'.

Iterations

This will refine the smoothing but will cause further reduction in size.

Strength

The amount of smoothing. A value of 0% is the same as unchecking 'Particles'. Note that setting this too high may cause the mesh to break up.

Generate section

Polygons

This drop-down determines if the Skinner creates quads or triangles when it generates a mesh.

Create normals

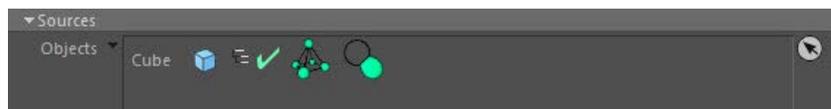
If checked the Skinner will generate normals for the mesh.

Sources section

Objects

Drag the source object(s) from which you want to use to generate a mesh into this list. This can be an X-Particles emitter or group, a standard Cinema 4D or Thinking Particles emitter, or any object that has vertices (or would do if made editable, such as a C4D generator object or spline primitive).

Each object has two flags which affect the result:



The first icon switches between using the object's points (if point based) or using its surface (if polygon based or the spline if spline based). Try a simple cube primitive as the source and switch between the two, you will see the difference immediately.

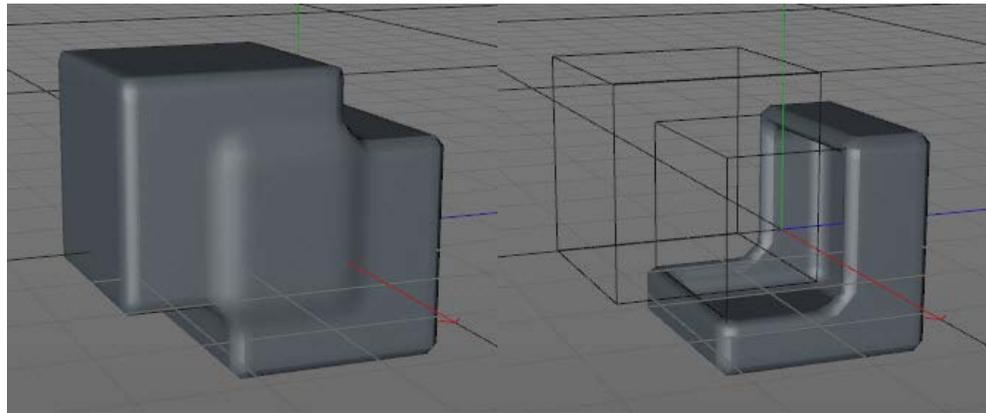


This icon switches between whether the source is a positive source or negative. What does this mean? Consider a Skinner with two cubes as source objects, both set to positive. The result would look like the screenshot on the left. If the leftmost cube is set to a negative, it acts like a Boolean and you see the effect in the right-hand screenshot.

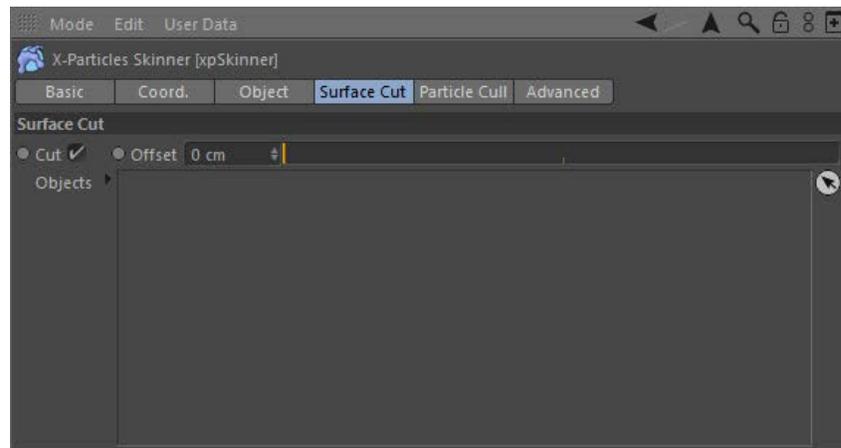
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Surface cut tab



This tab is used to cut the mesh generated by the Skinner with another object or objects.

Cut

If checked, objects dragged into the Objects list will cut the generated mesh.

Offset

The size of the 'gap' between the cutting object and the mesh.

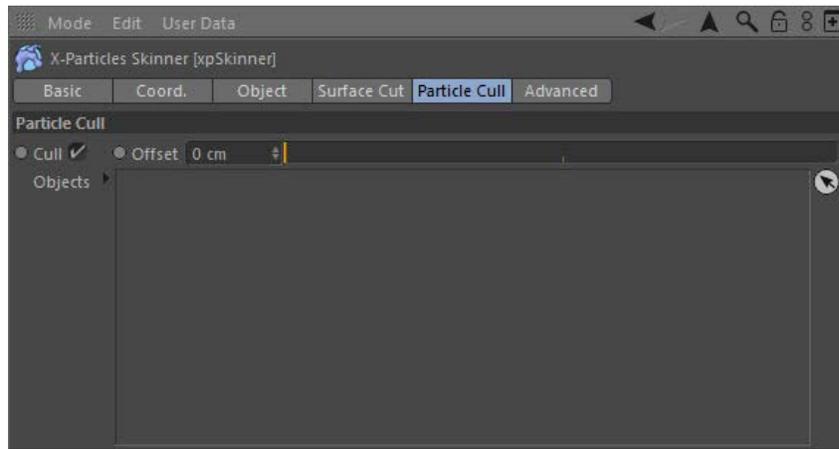
Objects

The objects to use as cutting objects. Each object has a flag which affects the result:



The 'outside' flag shown on the Cube will cut the mesh where it and the cutter intersect. The 'inside' flag shown on the Sphere will remove the mesh outside the intersection. Think of this as similar to a Boolean in Cinema 4D.

Particle Cull tab



This tab is used to kill particles which either enter the culling object or leave it, depending on the flag state on the object.

Cull

If checked, objects dragged into the Objects list will cull particles.

Offset

Defines an area of influence around the culling object within which particles are culled.

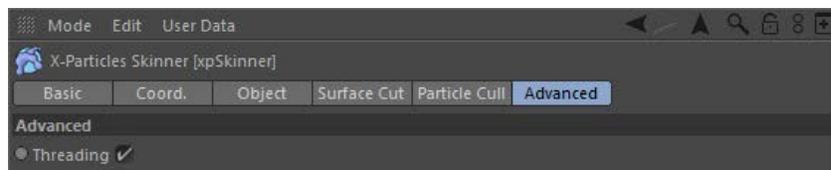
Objects

The objects to use as culling objects. Each object has a flag which affects the result:



The 'outside' flag shown on the Cube will cull particles which enter it (subject to the Offset setting, this may be a larger area than just the object itself). The 'inside' flag shown on the Sphere will cull particles which enter it.

Advanced tab



Threading

By default the Skinner is multi-threaded. You may disable this if you find the multi-threading is reducing your system responsiveness when using multiple applications.

Notes on using the Skinner

1. Priorities

It is possible to use objects other than an X-Particles Emitter as the source for a Skinner object. If you use an object which is itself a generator object (and that would include all Cinema 4D primitive objects, the Cloner, Lathe, Sweep, Extrude, Loft and Boolean objects among many others) then you should place those objects in the Object Manager *above* the Skinner that uses them. If you don't, then there is a possibility that the generator object might not exist when the Skinner wants it. A good example of this is if you use a Render Region, because that creates a new internally-cached version of the source object rather than using an existing one.

Although you may never see this if you don't use a Render Region, it is still good practice to put the Skinner below the object(s) it uses. Please note that this is an issue with the priority system in Cinema 4D and not X-Particles itself.

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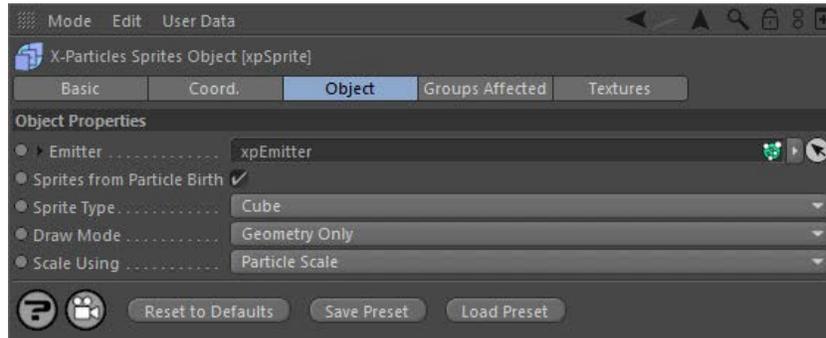
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Sprite Object

Sprites are small objects (actually Cinema 4D primitives or lights) which are a convenient way to generate simple geometric objects without setting them up with the Geometry tab as described above. They have the advantages that they are small, lightweight objects which can be readily controlled via the X-Particles control system, including changing the type of generated sprite and their attached materials.

Object tab



For the 'Groups Affected' tab and the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

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Object tab

Emitter

For objects to be generated from particles, you must tell the Sprite object which emitter it will work with. Drag an emitter object into this field to do that. Until you have done so, you will not be able to access any of the other settings in the Sprite object.

Sprites From Particle Birth

If this switch is checked, a sprite will be generated for each particle as soon as it is created. If it is unchecked, no sprite will be generated for newly-created particles until this switch is checked again, or until sprite generation for a particle is turned on by an Action.

Sprite Type

This drop-down menu lets you choose which type of object will be generated. These are all very simple Cinema 4D primitives, so are quick to generate and draw, speeding up viewport performance. The various types are:

- **Cube:** a small cube primitive.
- **Cross:** the cross object supplied with X-Particles. You can choose if you want this to be a 2D- or 3D-cross.
- **Placard:** a single small polygon. Useful for applying a texture with an alpha channel to act as a billboard sprite in conjunction with the 'Face camera' option (see below).
- **Sphere:** a sphere primitive. You can set the number of segments to improve performance.
- **Cylinder:** a cylinder primitive. You can set its orientation and whether it has caps or not. There is also a height multiplier value which can be used to increase the height of the cylinder.
- **Capsule:** You can set its orientation and there is also a height multiplier value which can be used to increase the height of the cylinder.
- **Cone:** a cone primitive. You can set the height and rotation segments, and the orientation, just as in the object manager for a cone primitive.
- **Pyramid:** a pyramid primitive. You can set the orientation, just as in the object manager for a pyramid primitive.
- **Disc:** a disc primitive. a cone primitive. You can set the rotation segments, internal radius, and the orientation, just as in the object manager for a disc primitive.
- **3-Plane:** the 3-plane object supplied with X-Particles.
- **Light:** an omni light, which is useful for generating large numbers of visible lights very quickly and making their parameters dependent on the age of the particle.
- **Points (Individual):** the sprite object will generate a series of splines each containing one point. This is very useful for use with the Metaball object in Cinema 4D. Just make the Sprite object a child of the Metaball and adjust the Metaball parameters as required. Note that with this option there are no other parameters to be set in the Sprite object.
- **Points (Point Cloud):** the sprite object will create a single polygon object with one vertex per particle, but no polygons. This point cloud can be used in the Skinner object to generate a mesh.
- **Text:** simple text generation.
- **Rubble:** the sprite object will generate small object primitives to give the illusion of small pieces of rubble or gravel.

Draw Mode

It determines what the Sprite object shows in the editor and at render time. It has four settings:

Geometry Only

This will turn off the editor display of the particles. This is because it can be distracting to see the particles and objects in the editor at the same time, especially in wireframe views.

Particles Only

Geometry will not be displayed and only the particles are shown. This is very useful if you are caching a scene which generates a lot of geometry. Because Cinema is quite slow in drawing multiple objects on screen, caching a lot of particles with geometry is also slow, as the sprites are shown in the editor. You can use this setting to generate the cache, then reset the drop-down menu to one that produces geometry before you render the cached scene.

Geometry and Particles

Both objects and particles are displayed.

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Geometry on Render Only

With this setting, geometry will not be generated in the editor (so speeding up the viewport) but will automatically be generated when rendering. This is a convenience setting so you don't have to remember to switch sprite generation on and off when creating a scene or rendering it.

Scale Using

The size of the sprites can be set in one of two ways from this drop-down:

Particle Scale

The scale of the particle will be used to scale the sprite. By default particles have a scale of 1, so with this option the generated object will have the default size given to it by the Sprite object, unless the particle scale is changed.

Particle Radius

This option will scale the sprite size up or down to match the particle radius.

Light settings

If you choose 'Light' as the sprite type, the interface changes to give the light parameters.

Details of the generation of lights by the Sprite object can be found [on this page](#).

Rubble settings

If you choose 'Rubble' as the sprite type, the interface changes to give the rubble parameters.

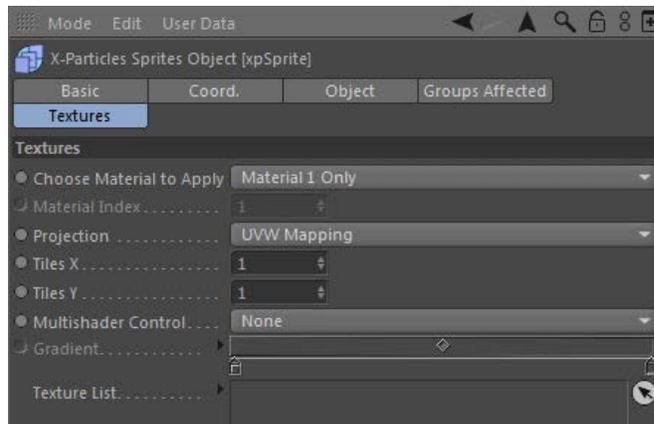
Details of the generation of rubble by the Sprite object can be found [on this page](#).

Text settings

If you choose 'Text' as the sprite type, the interface changes to give the text parameters.

Details of the generation of text by the Sprite object can be found [on this page](#).

Textures tab



This tab allows you to apply textures to the sprites. The textures can be any Cinema 4D channel shader or bitmap. To get age- or other particle-related effects, you should use the X-Particles [sprite shader](#).

Choose Material to Apply

This drop-down menu lets you choose which material is applied to the sprites. Available options are:

Material 1 Only

The first material in the 'Texture List' box is used. If there is no material in that list, no textures will be applied to the sprite.

Random Selection

For each particle the sprite object will choose at random a material from all those in the 'Texture List' box.

Select by Index

You can select which material is used from the list, where the first material has index 1, the second material index 2, and so on. It is up to you to make sure that there is a material corresponding to the index you entered. If you enter '3' and the list has no third material, no material will be applied to the sprites.

Projection

The texture mapping modes, as in a standard Cinema 4D texture tag.

Tiles X, Tiles Y

The tiling values, as in a standard Cinema 4D texture tag.

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Other:

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- [Load Palette](#)

This drop-down menu lets you use the Mograph Multishader to texture the generated sprites. It has several settings. To use this option, you must apply a material to the Sprite object which has a Multishader in the Color channel.

None

The multishader is not used.

Greyscale

Each sprite is assigned a random greyscale value. This is then used to select the shader to use from the shaders in the Multishader.

Color

Similar to 'Greyscale' each sprite is assigned a random RGB value and this is used to select from the list of shaders. This will give different results to 'Greyscale' especially when using the 'Color Red' (or Green or Blue) modes in the Multishader.

Use Gradient

With this setting the 'Gradient' setting becomes available. You can then design a gradient, either greyscale or color, which will give you control over the distribution of shaders from the Multishader.

Gradient

The gradient used when 'Multishader Control' is set to 'Use Gradient'.

Texture List

The list of possible materials to apply to the sprites.

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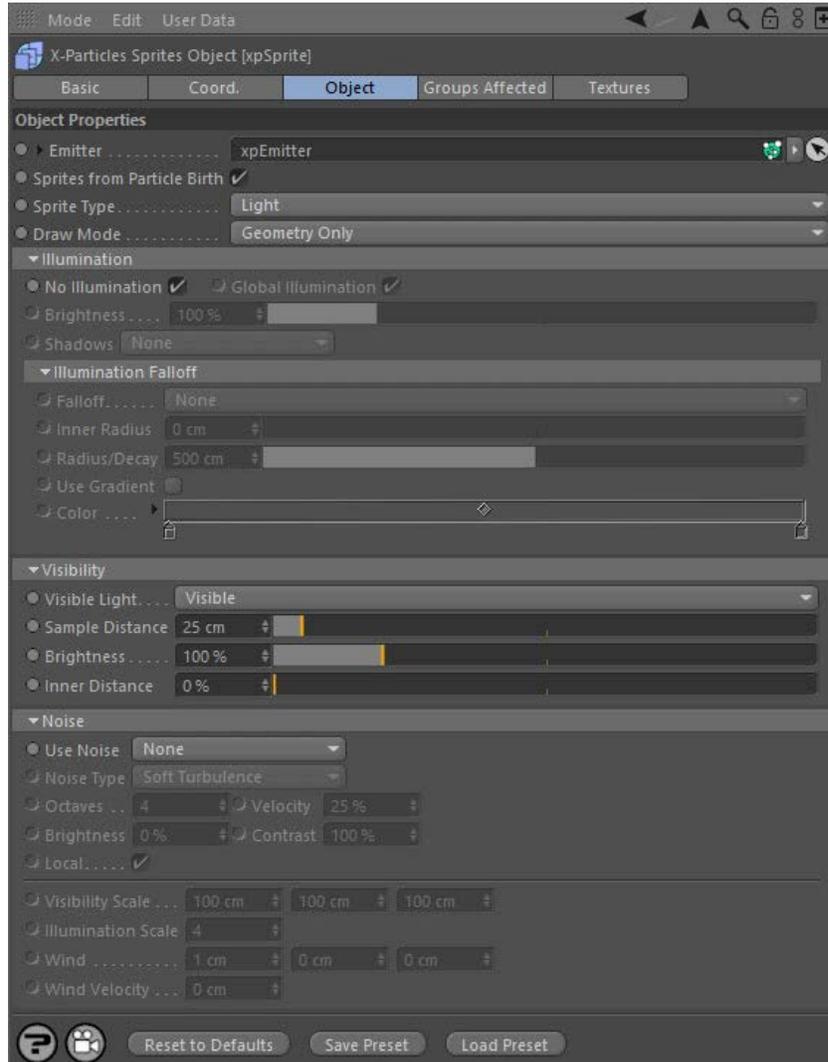
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Sprite object: Light generation

The Sprite object can also generate simple lights instead of a primitive object. Please see the [Notes section](#) at the foot of this page for details of changes to the Sprite Lights in X-Particles 3.

If you select 'Light' in the 'Sprite type' drop-down menu, the interface changes and you see the available parameters for the lights:



For the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Illumination section

No Illumination

Checking this switch means that the generated lights will not contribute to the scene illumination. This is probably what you want most of the time. Generating thousands of lights which do illuminate the scene will enormously increase render times!

The remaining parameters in this section are only available if 'No Illumination' is unchecked.

Global Illumination

Corresponds exactly to the 'GI Illumination' switch in the General tab of the light parameters in the attribute manager. Please refer to the Cinema 4D documentation for full details.

Brightness

The brightness of the light. Note that this is the illumination brightness, NOT the visible brightness (see below).

Shadows

This drop-down has four settings. For more details of these shadow types, please see the Cinema 4D reference documentation.

None

The light will not produce shadows.

Shadow Maps

The light will generate shadows using low-resolution shadow maps for speed and low memory usage.

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Raytraced (Hard)

The light will generate raytraced, hard shadows.

Area

The light will generate area shadows.

Illumination Falloff

If you open up this section, you see the following settings:



These are only available if 'No Illumination' is unchecked. They allow you to set the falloff for the light cast by the light sprite. They are identical in meaning to the illumination falloff settings for the lights in Cinema 4D; please refer to the C4D documentation for details.

Visibility section

This is the section that you will probably use most frequently, in order to generate visible lights in the scene. The parameters in this section correspond to the parameters for a Cinema 4D light object, and more information can be found in the C4D documentation.

Visible Light

This drop-down has three options:

None

The light is not visible.

Visible

The light will be visible in the scene (the same as selecting 'Visible' from the 'Visible light' drop-down in a Cinema 4D light object).

Volumetric

This is the same as selecting 'Volumetric' from the 'Visible light' drop-down in a Cinema 4D light object.

Sample Distance

The same as the corresponding setting in the Cinema 4D Light object, Visibility tab.

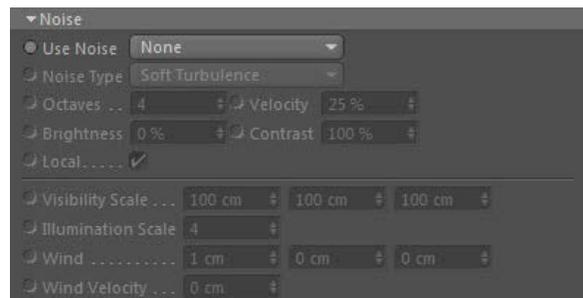
Brightness

This is the brightness of the visible light, NOT the light brightness when used for illumination.

Inner Distance

This values determine the inner distance for the visible light.

Noise section



This section gives access to all the noise settings which you find in a Cinema 4D light object. Please refer to the Cinema 4D reference documentation for details on how to use these settings.

Notes on using the Sprite Lights

1. All changes in light parameters are handled by the [Light modifier](#). The Sprite object sets the initial parameters of the light but does not alter them once the light has been generated.
2. The light will always take its colour from the particle colour. This can be changed with a [Color modifier](#).
3. For visible lights, there is no outer distance setting. The outer distance is the same as the particle radius (so this may need to be quite large). The radius can be changed with a [Scale modifier](#).

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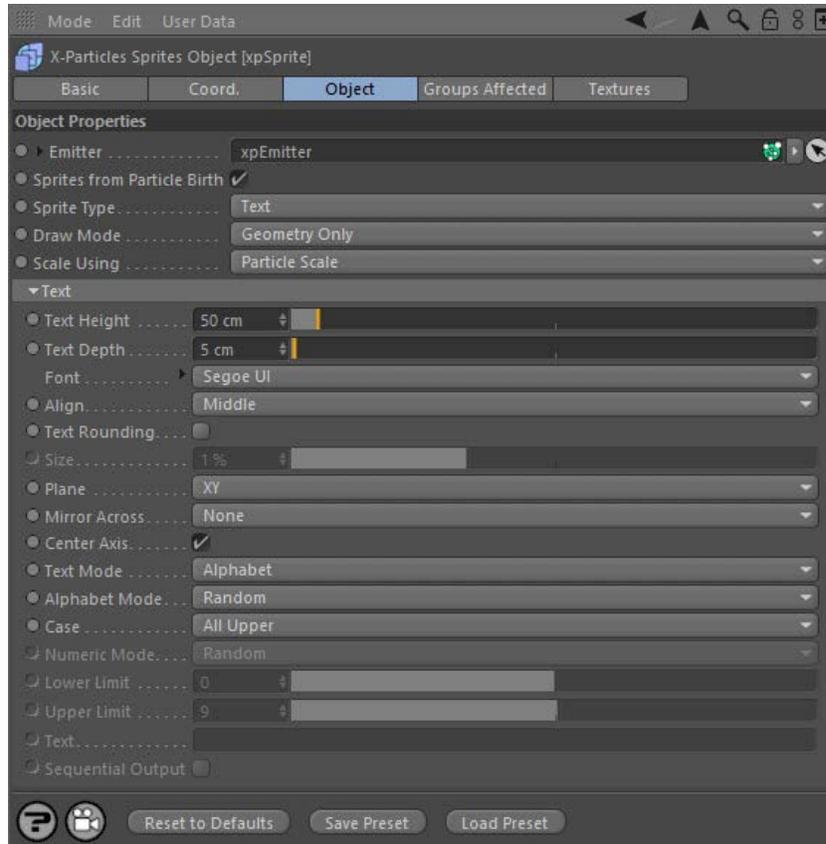
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Sprite Object - Text Generation

The Sprite object can generate text, using a variety of algorithms to generate simple text very quickly.



For the 'Groups Affected' tab and the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Settings

Text Height

The height of the text in scene units.

Text Depth

The depth of the text along the Z-axis in scene units (this corresponds to the Z-component of the 'Movement' setting in an Extrude object).

Font

Use this setting to choose the font for the generated text.

Align

Allows you to left-align, right-align, or centre the text.

Text Rounding

Checking this switch applies a bevel to the generated text. The size of the bevel can be set in the 'Size' field.

Size

Sets the size of the bevel on a text sprite, expressed as a percentage of the text height. Generally, the size should be 5% or lower for best results.

Plane

The plane on which the text is generated (the default is the XY plane).

Mirror Across

With the default settings the generated text is readable when viewed along the positive Z-axis. Depending on the 'Plane' setting and the camera angle, the text may be inverted when you look at it. If so, you can change its orientation with this drop-down. It allows you to reorient the text along any axis or combination of axes. You will probably have to find the correct one for your purposes by trial and error.

Center Axis

If you look at a Text spline in Cinema, and drop this in an Extrude object which you then make editable, the axis of the polygon object which results is located at the bottom and front of the object instead of in its centre. This is often perfectly acceptable, but not if you want to emit a

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trail from the text - in that case you probably want the axis to be centred on the text. If this switch is checked the axis is centred on the text, if unchecked it is left at the default setting.

Text Mode

This drop-down menu has five options:

Alphabet

Only letters are displayed. These are selected from the standard alphabet; the letters selected depend on the 'Alphabet mode' setting.

Numbers

Only numbers are displayed. The numbers generated depend on the 'Numeric mode' setting.

Alphabet and Numbers

Letters are displayed followed by numbers, so you can generate strings such as A1, B2, etc. if you need to.

User Text

The text generated is taken from the 'Text' field.

User Text and Numbers

The text generated is taken from the 'Text' field and is then followed by a number, determined from the 'Numeric mode' setting.

Alphabet Mode

This setting is only available if 'Text mode' is set to 'Alphabet' or 'Alphabet and numbers'. It has two options:

- Random: single letters are selected randomly from A to Z.
- Sequential: single letters are generated starting with 'A', then 'B', 'C', etc. up to 'Z'. After that 'A' is generated again, and so on.

Case

This setting is only available if 'Text mode' is set to 'Alphabet' or 'Alphabet and numbers'. It has three options:

- All Upper: only upper-case letters are generated.
- All Lower: only lower-case letters are generated.
- Mixed Upper and Lower: a random mixture of upper- and lower-case numbers is generated.

Numeric Mode

This setting is only available if 'Text mode' is set to 'Numbers', 'Alphabet and numbers' or 'User text and numbers'. It has two options:

Random

Numbers are generated randomly between the values in 'Lower Limit' and 'Upper Limit' inclusively.

Sequential

Numbers are generated starting with the value in 'Lower Limit' then incrementing by 1 each time until 'Upper Limit' is reached, at which point it reverts to the lower limit value again.

Lower Limit

This setting is only available if 'Text mode' is set to 'Numbers', 'Alphabet and numbers' or 'User text and numbers'. It shows the smallest number which will be generated.

Upper Limit

This setting is only available if 'Text mode' is set to 'Numbers', 'Alphabet and Numbers' or 'User text and numbers'. It shows the largest number which will be generated.

If you set this to a sufficiently large number you can ensure that in 'Sequential' mode the numbers are never repeated, i.e. they are unique.

Text

This setting is only available if 'Text Mode' is set to 'User Text' or 'User Text and Numbers'. The text in this field will be generated. No changes are made to the case of the text.

Sequential Output

This setting is only available if 'Text Mode' is set to 'User Text' or 'User Text and Numbers'. Normally, in these modes each particle will carry the full string of characters from the 'Text' field. By checking this switch, the Sprite object will generate one character from the string in the 'Text' field, in sequence. When the end of the string is reached, the sequence will start again from the beginning.

If 'Text Mode' is set to 'User Text and Numbers' each character from the string in the 'Text' field will have a number appended to it. The number will either be chosen at random or in sequence, depending on the chosen option in 'Numeric Mode'.

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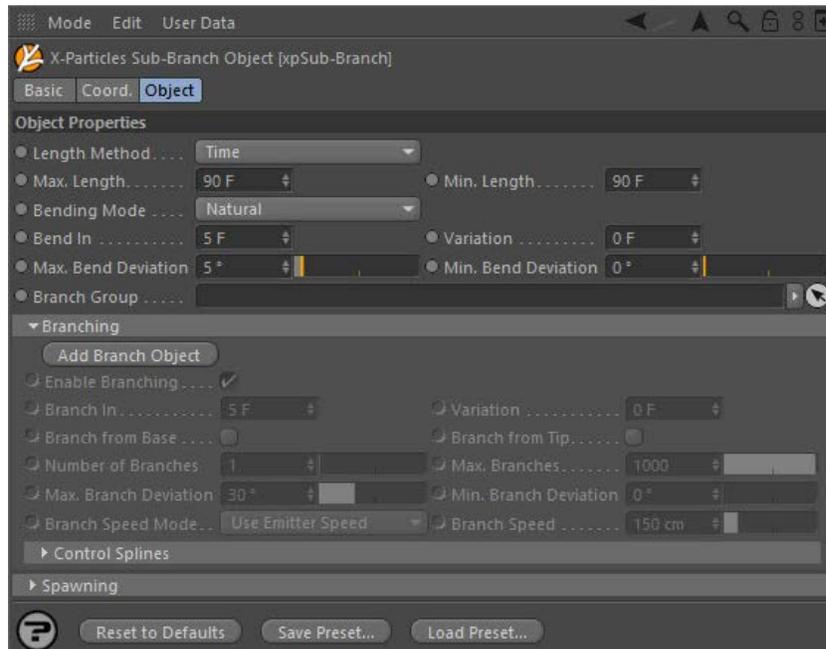
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Sub-Branch Object

This object is required when adding a branch level to a Branching modifier. For details of how to use it, please see the [Branching modifier manual page](#).

Interface

The object's interface looks like this:



For the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Parameters

Most of the settings in this object are identical to those with the same name in the Branching modifier. There are some small differences, which are shown below.

Branch Group

You can specify that particles in this branch object belong to a different group from the source particle. This is useful if you want different branch levels to be affected by different modifiers, such as a Gravity modifier.

Add Branch Object

This button will add another Sub-Branch object to this Sub-Branch object as a child object of it. Once you have added a sub-branch this button is unavailable since only one sub-branch object per branch level is permitted.

Enable Spawning

If this switch is checked, particles will be spawned from the particle which creates this branch. The settings (emitter to use, etc.) are in the main Branch modifier and different spawn settings for Sub-Branch objects are not available.

For all other parameters, please refer to the [Branching modifier](#).

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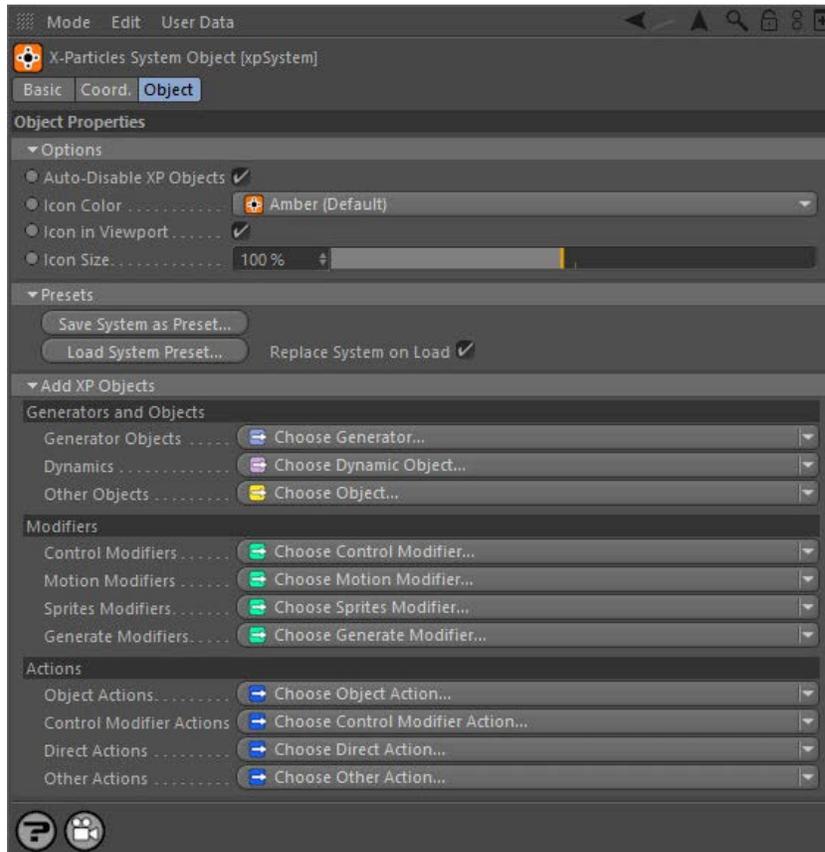
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The System Object

The System object

This is the System object's interface:



The System object is basically a null object, in that it has no visible editor presence or appearance at render time. Its function is to act as a collator of other X-Particles control system objects and to provide some convenience functions for the user.

So why not just use an ordinary null object? There are two reasons:

- the System object enables the convenient adding of X-Particles objects to the scene rather than constantly revisiting the Cinema 4D Plugins menu
- future versions of X-Particles may use the System object for more than just a holding tank for other objects, so it would be sensible to get into the habit of using it from the start

Parameters

Auto-Disable XP Objects

When this switch is turned on, if you then disable the System object in the Object Manager, turning the green tick to a red cross, all the X-Particles objects which are in the object hierarchy under this System object will be disabled automatically. They will all be enabled if you enable the System object again. This lets you enable or disable an entire setup with one click, rather than having to disable every object in that System object manually.

 In XP 3.5 the System object will remember the state (enabled or disabled) of the X-Particles objects under it when the System object is disabled. It will then restore that state when it is re-enabled rather than simply enabling all the objects even if they were previously disabled.

If you don't like this behaviour, uncheck this switch.

Icon Color

You can use this drop-down list to select a coloured icon for the System object in the Object Manager. By default it is a dark orange. The advantage of this is that, if you have several system objects in the scene, you can easily distinguish between them.

Icon in Viewport

If this switch is checked, the X-Particles logo will be drawn in the editor viewport. This will not be rendered in the final image. If you don't want to see the icon, uncheck this switch.

Icon Size

This slider allows you to change the size of the X-Particles logo in the viewport.

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Please see the [Presets manual page](#) for more about the X-Particles presets system and how it works.

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Save System As Preset...

Click this button to bring up the Presets dialog. When you save a preset from the System object, the entire System is saved together with all its child objects.

Load System Preset...

Click this button to load a System preset complete with all its child objects.

Replace System on Load

When loading a System preset, this switch controls what happens to the existing one. If the switch is checked, the existing System object is deleted, together with all its child objects, and replaced by the loaded preset. If it is unchecked, the System preset will be loaded as a new System - that is, if you had one System object before loading, you will now have two.

Add XP Objects

This section has a number of drop-down menus from which you can add X-Particles objects to the scene. They will be inserted under the system object as child objects of one of the object 'folders'.

To add one of these objects, click the small arrow to the right of each button. This will bring up a list from which you can select the desired object.

Note: by default the Object Manager will make the new object the current one. If you prefer to remain in the System object rather than jumping to the new object, hold down the Control key when clicking a button to add an object.

X-Particles scenes can get quite busy in terms of the number of objects which are added. To keep things tidy and so that you know where the objects are, if you add an X-Particles object by using the System object menus, the System object will group Emitters, Group objects, the various generator and dynamics objects, Questions, Actions, and particle Modifiers each under their own 'folder' - a special null object. For example, when you add an Action from the System object the Action will be made a child of a folder called 'Actions'. This folder will be created automatically, if necessary.

Note that adding an Action manually from the main X-Particles plugin menu will just drop it in the object manager in the usual way.

The same thing will happen for emitters, dynamic objects, generator objects, particle groups, and modifiers as well, provided they are added from the System object; and for Questions, if the emitter which adds them is itself a child of a System object. They will be grouped under folders with the names Emitters, Dynamics, Generators, Groups, Modifiers, and Questions respectively. Any other object will be grouped under the 'Other Objects' folder.

Although these special null objects are mainly there to keep the object manager tidy, they do have one other function: if you disable one of them in the object manager, this will automatically disable all their child objects of the specified type (e.g. disabling the Actions folder will automatically disable all its child objects, as long as they are Actions). Note that this functionality is not turned off by the 'Auto-Disable XP Objects' switch referred to above.

It is also possible to create sub-folders of these folder objects. See the '[Folders and Sub-Folders](#)' page for details.

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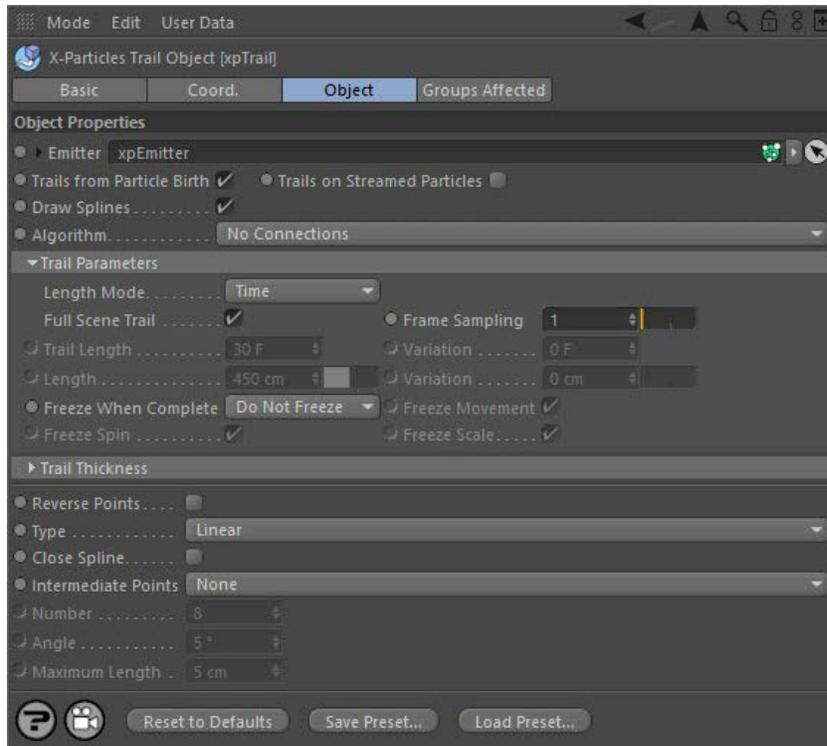
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Trail Object

The Trail object will generate splines from the path of the particles during the animation. The splines can then be used to generate other objects, such as in a Sweep object, or rendered with the X-Particles material.

Note: each emitter should only be associated with one Trail object. If you try to link two or more Trail objects to the same emitter, results are unpredictable and almost certainly not what you wanted.

If you try to use the same emitter with two Trail objects, it won't work; you may get splines but they may be distorted or missing parts. The reason is that each particle can only carry one set of data used by the Trail object, and if there are two Trail objects competing for the same data, it will become corrupted and the splines will not be generated correctly.



For the 'Groups Affected' tab and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

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Settings

Basic Settings

Emitter

For objects to be generated from particles, you must tell the Trail object which emitter it will work with. Drag an emitter object into this field to do that.

Trails From Particle Birth

If this switch is checked, a trail will be generated for each particle as soon as it is created. If it is unchecked, no trail will be generated for newly-created particles until this switch is checked again, or until trail generation for a particle is turned on by an Action.

You should normally leave this switch checked unless you are sure you want to turn it off.

Trails on Streamed Particles

This is a special switch for use with the Tendril modifier. That modifier generates a lot of additional particles, and usually you would not want them to have their own trails. If this switch is unchecked, no trails will be generated for particles created by the Tendril modifier. If checked, each particle generated by the Tendril modifier will have its own individual trail.

It is recommended that you normally leave this switch unchecked.

Draw Splines

If unchecked, the Trail object will not generate splines, so they will not appear in the editor or be rendered, and cannot be used in a Spline Mesher object or in a Sweep object.

Algorithm

This drop-down list has several settings to determine how trails can be used to connect particles or points in the generated trail:

- No connections

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- Straight Sequence
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Settings for 'No Connections' algorithm

These are the basic particle trails. Each particle has its own trail which can be rendered, used in the Spline Mesher or a Sweep object, etc.

Length Mode

The Trail length can be calculated in one of two ways: the time taken to draw the trail or the actual length in scene units. This drop-down lets you select the required option.

Full Scene Trail

If checked, this will cause the Trail object to generate trails which are as long as the scene length. If unchecked, the trail length can be set with the 'Trail Length' and 'Variation' settings. Only used if 'Length Mode' is set to 'Time'.

Frame Sampling

By default, the spline will contain one point for each frame of the particle's life. You can reduce the number of samples by increasing the value here.

The Frame sampling does not change the length of the spline. It alters the distance between points in the generated spline. You might want to do this for smoother splines when generating wavy splines - e.g. if the particles are being influenced by a Turbulence modifier. If you are generating splines which are only generated for less than the number of frames in the scene, it is recommended you leave this set at one. Otherwise you will see a slightly jerky movement of the spline as it follows the particle due to the reduced number of samples.

Only used if 'Length Mode' is set to 'Time'.

Trail Length

The length of the trail which will be produced, in frames. A setting of 30, for example, will generate a trail over 30 frames of the particle's life, and will then cease to grow (but will not be removed, and will continue to follow the particle). If you want trails to be generated for the entire life of every particle, turn on the 'Full Scene Trail' switch instead of using this setting.

Only used if 'Length Mode' is set to 'Time'.

Variation

This setting can be used to generate random variation in trail length. The value in this field is combined with the 'Trail Length' setting to produce trails of different lengths on each particle.

Only used if 'Length Mode' is set to 'Time'.

Length, Variation

The maximum length of the trail in scene units. Only used if 'Length Mode' is set to 'Length'.

Freeze When Complete

This drop-down is used to control what happens when the trail reaches its maximum length. It has three options:

Do Not Freeze

This is the default setting. When a trail reaches its maximum length the particle keeps moving, dragging its trail behind it.

Freeze Particle

If you want the particle to stop once the trail reaches the maximum length, check this switch. You can further opt to halt particle movement, spin, and scale independently.

Note: this is a global setting. If it is turned on, it will apply to all particles. If you want to freeze individual particles when their trail is complete without affecting other particles, use the [Freeze Action](#).

Freeze Trail

With this option, the particle will not be frozen but the trail will be, so the trail and the particle will be disconnected.

Freeze Movement/Spin/Scale

You can use these switches to affect particle movement, spin, and scale independently. Note that if none of these switches are checked, nothing will happen even if 'Freeze When Complete' is set to 'Freeze Particle'.

Settings for Connection algorithms

A variety of different algorithms are available for connecting particles together.

Straight Sequence

Each particle is connected to the next one in the particle stream to form a single trail. There is one parameter:



Skip Particles

 This allows you to skip over the specified number of particles when connecting them together. For example, if the value in this setting was 2, particle 1 would be connected to particle 4 (skipping 2 and 3), particle 4 to particle 7 (skipping 5 and 6) and so on.

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Segmented Sequence



This is similar to 'Straight Sequence' but allows you to divide the spline up into short segments with gaps between them. There are two parameters:



Segment Length

The length of each segment. The default value of 1 is the shortest possible segment, consisting of two adjacent particles linked together.

Gap Length

The length of the gap between segments. The default value of 1 is the shortest possible gap, which is the gap between two adjacent particles.

All Points to all Points

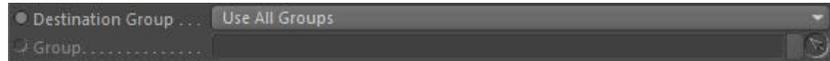
In this mode, each particle is connected to every other particle to form a complex net. There are no other parameters.

Nearest by Index, Nearest by Distance, and Cluster

These algorithms share some common elements, the most important being the ability to specify which particle groups are used.

Destination Group

When you select Nearest by Index, Nearest by Distance, or Cluster the options change, depending on the connection type. Common to all three however is this drop-down menu and link field:



This lets you select which particle groups are used in making the connections. The available options are:

- Use All Groups: each particle will form connections to other particles regardless of which group they are in
- Only Same Group: each particle will only form connections to particles in the same group as itself
- Only Different Groups: each particle will only form connections to particles in different groups to itself
- Specific Group: each particle will only form connections to particles in a specific group; specify which group to use by dragging the Group object into the 'Group' link field
- All Except Specific Group: each particle will only form connections to particles which are NOT in a specific group; specify which group to use by dragging the Group object into the 'Group' link field

Nearest by Index

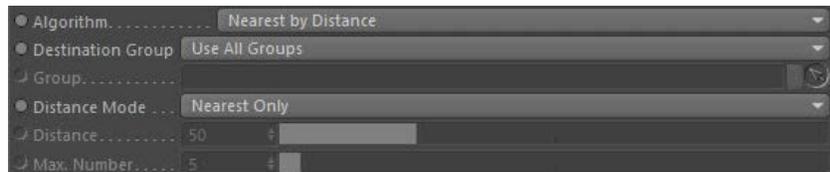
This mode displays the following settings:



Each particle is connected to the nearest other particle(s) where proximity is measured by the index in the particle stream. The options 'Maximum Connections' and 'Skip Particles' are available with this setting. For example, with the default settings, particle 1 would connect with particle 2, 2 to 3, 3 to 4, and so on. This is, of course, identical to 'Straight Sequence' mode. If 'Maximum Connections' is set to 2, then particle 1 will connect to particles 2 and 3, 2 to 3 and 4, etc. If 'Skip Particles' is set to higher than zero, not all particles will make connections. So in the previous example, if 'Skip Particles' is set to 1, particle 1 will connect to 2 and 3, particle 2 will be skipped and will not connect to any particles, particle 3 will connect to 4 and 5, particle 4 will be skipped, etc.

Nearest by Distance

This mode displays the following settings:



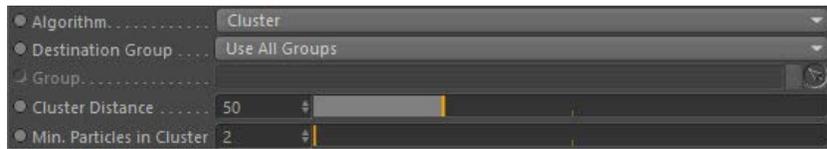
In this mode particles are connected to each other depending on the distance between them in the 3D world. The Distance mode drop-down becomes available, with these options:

- Nearest Only: each particle will connect to its physically closest neighbour
- All Within Distance: each particle will connect to every other particle which is closer to it than the value given in the 'Distance' setting. Increasing this value will result in more connections because more particles will be within that distance.
- Max. Number Within Distance: this is the same as 'All Within Distance' except that you can use the 'Max. Number' setting to limit the maximum number of connections. For example, if this is set to 5, and there are 10 particles within the threshold distance, connections will only be made to the 5 closest particles.

Note that in 'Nearest by Distance' mode, the generated spline may change radically over time as the distance between individual particles changes.

Cluster

This mode displays the following settings:



In this mode particles are connected to each other in groups or clusters. There are two settings:

- Cluster Distance: all particles in a cluster must be within this distance of one another. Increasing this value will give larger clusters but fewer of them,
- Min. Particles in Cluster: the absolute minimum is 2, in which case the two particles are linked by a straight line. As this value is increased, there must at least this many particles within the 'Cluster Distance' of one another to form a cluster.

Tendrils

This is a special mode for use with the Tendril modifier. It causes the Trail object to generate a single trail connecting all the particles in each tendril. There are no other parameters.

Constraints

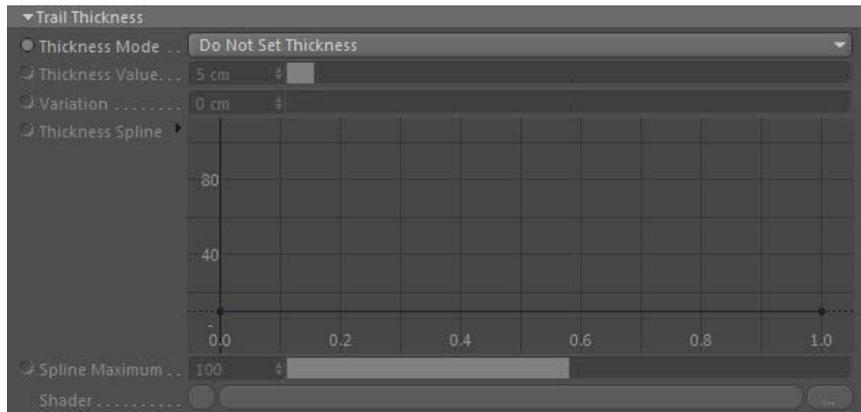
If you are using constraints (see the [Constraints object](#)) you can use this option to create a spline for each constraint. The spline can then be rendered with an XP Material (or the Hair renderer) or used in a Spline Mesher object (or Sweep object). To do this you must first turn on the required constraints in the Constraints object, then choose the constraints which will become splines in this section:



Simply check the constraints to be included by the Trail object.

Trail Thickness

These settings generate additional data to control the 'thickness' of a trail. This data is currently used only by the X-Particles material to alter the 'thickness' of the rendered spline, but this may be extended in future versions of X-Particles. The interface for this section looks like this:



Thickness Mode

This drop-down controls how thickness is generated. It has five settings:

Do Not Set Thickness

No thickness data is created.

Set From Value

With this option, the 'Thickness Value' and 'Variation' parameters become available and will set a uniform thickness along each trail.

Use Spline

If this option is selected the 'Thickness Spline' and 'Spline Maximum' parameters become available. You can then set the thickness along the length of the trail with the spline control.

Use Shader

If this option is selected the 'Shader' link field becomes available. If you add a shader to this link, the shader is sampled for all points along the trail and that value is then multiplied with the value in 'Thickness Value' to give the thickness along the length of each trail.

Use Radius

With this option the thickness depends on the particle radius. No other settings are then available.

Thickness Value and Variation

These fields are used to set the thickness in 'Set From Value' mode and (for 'Thickness Value' only) in the 'Use Shader' mode.

Thickness Spline

The spline control is used to set the thickness in 'Use Spline' mode. The thickness at the start of the trail is obtained from the value at the extreme left of the spline; the thickness at the end from the extreme right of the spline.

Spline Maximum

This is the maximum possible value in the spline (by default, it is set to 100). You can change the maximum value with this setting.

Shader

Use this link field to choose a shader when in 'Use Shader' mode. A noise shader works well in this field, and can be animated to give thickness which varies with time.

Spline settings

The settings in this section are exactly the same as all other splines in Cinema 4D. Please refer to the C4D documentation for details.

Note that the spline type is only available when 'Algorithm' is set to 'No Connections', 'Straight Sequence' or 'Cluster'. In other modes the spline will always appear to be linear (since the trail is then made up from multiple, independent, very short splines which cannot show curves).

Important: do not subdivide the spline (i.e. you should leave intermediate points as 'None') if you want to use the spline renderer to render the trail. Using intermediate points will cause the spline renderer to ignore the thickness setting and the colour. This is currently a limitation of the system.

A note on memory usage

When a trail is created, X-Particles must allocate sufficient memory to store the particle positions, and the actual trail spline is constructed using those stored position values. This can use up a lot of RAM very quickly. For example, if you have a scene which is 5000 frames long and 'Full Scene Trail' is checked *each trail* will use almost 100K of memory by the end of the scene. With high particle birthrates, this can use up available RAM and risk out-of-memory errors.

To reduce memory use, especially with long scenes and high particle counts, consider whether you really need the trails to be the full length of the scene. If you don't, you can reduce the memory requirement significantly by unchecking 'Full Scene Trail' and setting the 'Trail Length' to the required value.

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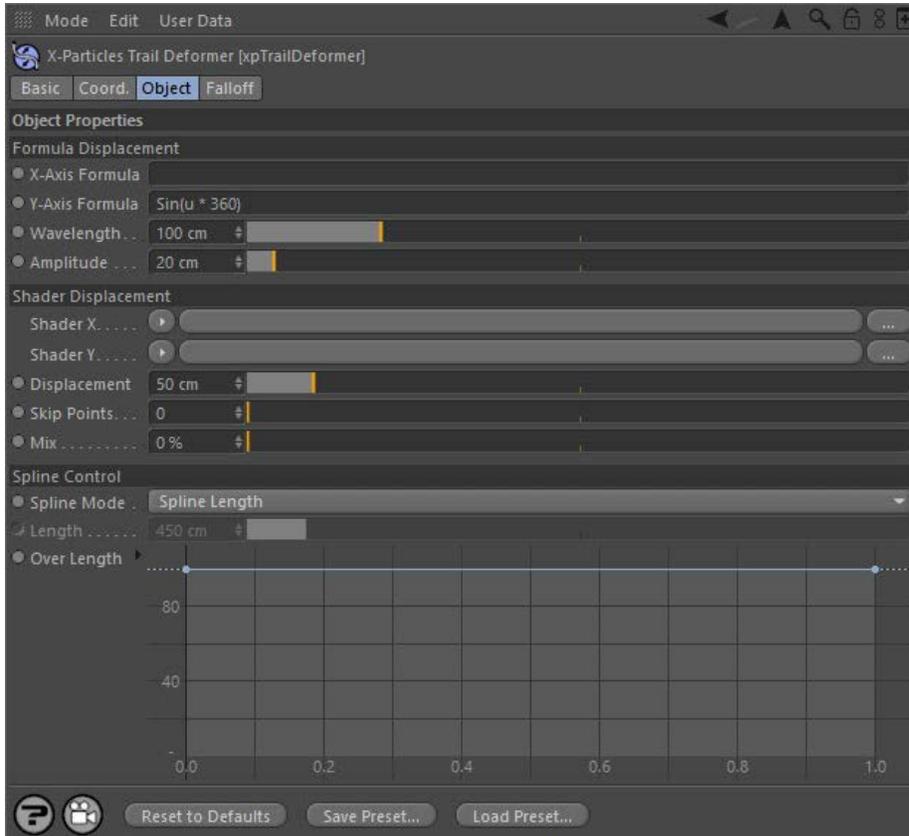
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Trail Deformer object

New Feature This is a new feature in this version of X-Particles. It is a deformer, used in the same way as any other deformer in Cinema 4D, which acts only on spline objects. You can use it on any spline but it is specifically intended for use with the X-Particles Trail object.

Note that this deformer does not affect particle movement at all, it only affects the generated spline. To use it, simply make it a child object of the Trail object (or other spline).

This is the object's interface:



Using the Trail Deformer

Formula Displacement

This is the core of the deformer. It functions in a similar way to the Formula Deformer that comes with Cinema, but with some differences.

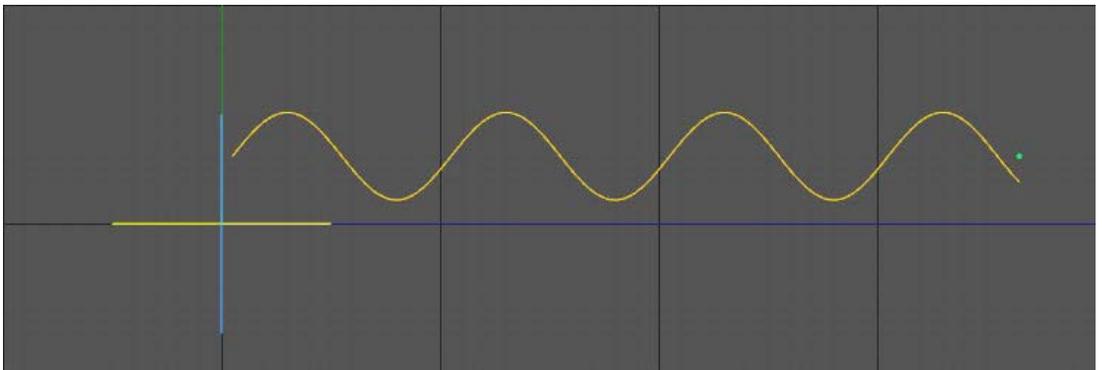
The way the deformer works is that for each point in the spline a displacement along either the X or Y axis, or both, is calculated and added to the current spline point coordinate. An example would be the simplest possible formula, consisting of a single number - let's say, '2'. So you would type '2' into the X or Y formula fields.

The deformer takes that value and multiplies it by the value in the 'Amplitude' parameter. If that is the default of 20 units, the result is $2 \times 20 = 40$. The value '40' is then added to the point's X or Y coordinate value. If this was added to the Y coordinate, the effect would be to move all the points in the spline along the positive Y axis by 40 units.

That isn't very useful, but with more complex formulas you can do a lot more than that. The default formula in the deformer is along the Y axis of the point and reads:

$\text{Sin}(u * 360)$

A very simple formula, but the effect is to displace the spline along to Y to produce a sine wave:



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You can use all the mathematical functions supported by Cinema 4D (see the Appendix in Cinema's online help for details) and can also use a few special symbols added by this deformer. These are explained below.

If you aren't mathematically inclined then a small number of presets for the deformer are contained in the preset files archive which is available for download from our website.

Formula symbols

As well as the functions and symbols implicitly supported by Cinema 4D, details of which can be found in Cinema's online help, this deformer supports additional symbols that you can use in your formulae. These are as follows.

Symbol	Meaning
t	The scene time in seconds.
x	The current value of the X-coordinate of a spline point, in object space.
y	The current value of the Y-coordinate of a spline point, in object space.
w	The wavelength value from the deformer's interface.
a	The amplitude value from the deformer's interface.
r	A value from 0 to 1 representing the relative position of a trail spline point along the length of the spline. The first point will always return a value of 0; the last point a value of 1. For all other points the value will change as the trail spline gets longer.
u	A value from 0 to 1 which is the position of a spline point in terms of a proportion of one wavelength. For example, if the wavelength is 100 units and a point is 50 units from the start of the spline, the 'u' value is $50/100 = 0.5$. If the point is 175 units from the start, the 'u' value is $175/100 = 1.75$, but values of more than 1 are reduced to a value of 0 to 1, so the actual 'u' value is 0.75 (and would also be 0.75 for points 275, 375, 475 etc. units from the start of the spline). This permits repeating patterns to be created, as shown in the sine wave above.

Remember that in all cases the value returned from a formula is then multiplied by the Amplitude value to give the actual displacement.

Formulae for X and Y displacement

You can use different formulae for the X and Y formula fields, or use the same formula in both (which is often not very useful) or only use a formula for one axis. An empty formula field has no effect on the spline point.

Other notes

There are three points to note:

1. If the formula field is empty, it returns a value of zero. Since this is then multiplied by the amplitude, this gives a displacement of zero along that axis (i.e. no effect). The same result would be achieved by entering the value '0' in the formula field.
2. Errors in the formula also return zero. If your formula appears to have no effect, it may have an error such as a symbol that isn't recognised or an imbalance in the number of parentheses used in the formula.
3. If you need to include angles in the formula, these are always in degrees (e.g. enter '360' not ' $\pi * 2$ ' if you want an angle of 360 degrees).

Shader Displacement

You can displace the trail spline points using a shader as well as, or instead of, a formula. The amount of displacement is given independently in the 'Displacement' parameter. Any shader can be used, including animated ones. Some, of course, will be much more useful than others. The one which you will probably use most is 'Noise'.

The blend between formula and shader displacement is controlled by the 'Mix' parameter. By default this is set to 0%, which means no contribution from the shader (if any) and the displacement is entirely due to the formula (if there is one). A value of 100% means that the shader controls the displacement completely, with no effect from the formula.

Spline Control

In addition to the above, you can also control the displacement over the length of the spline with the spline control. This allows you to do things such as having no displacement at the start of the spline and maximum displacement at the end; with a sine wave formula this gives a tentacle-like effect.

The spline works by multiplying the calculated displacement from the formulae and/or shaders by the value from the spline control; this value in turn depends on the relative position of a trail spline point along the length of the trail spline. The first point on the trail spline will always use the value from the extreme left of the control spline.

For all points on the trail spline, the value obtained from the control spline in the interface depends on the relative position of the point along the trail length. But what is meant by the 'trail length'? Since the trail may get longer over time, the length can be regarded in one of two ways. If the 'Spline Mode' parameter is set to 'Fixed Length' then the relative position of each point is calculated according to the value in the 'Length' parameter. For example, if 'Length' is set to 450 units, and a point on the trail spline is located at 150 units from the start of the trail, the point has a relative value of $150/450 = 0.333$. This is then used to read the value from control spline. Note that in this mode the relative value will never change for a given point.

If 'Spline Mode' is set to 'Spline Length' then the actual length of the trail spline is used. So, if at a specific time a point on the trail spline is 50 units from the trail start and the length of the trail at that point is 100 units, the relative position is $50/100 = 0.5$. But if after some more time has elapsed the trail length is now 200 units, the relative position of the point will have changed - it is now $50/200 = 0.25$.

Different effects will result from these two modes.

Parameters

X-Axis Formula, Y-Axis Formula

The formulae to use for displacement along the X and Y axis of the spline. An empty field will have no effect.

Wavelength

A value indicating how often a pattern will repeat. It is important to note that this parameter will have NO EFFECT unless the symbol 'u' (see above) is present in a formula. If it is not present, changing this value will not change the displacement.

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The amount of displacement. This is multiplied by the result of the formula to find the actual displacement of a point.

Shader X, Shader Y

The shaders to use for shader-based displacement of a point. An empty link field will have no effect on the point. The shader is sampled for each point on the trail spline, typically this will return a value between 0 and 1 for each point .

Displacement

The amount of displacement. This is multiplied by the result of sampling the shaders to find the actual displacement of a point.

Mix

The contribution to the displacement made by the formulae and shaders. A value of 0% means that all the displacement is generated by the formulae; a value of 100% means that the shaders control the displacement and the formulae have no effect.

Note that the default value is 0%, so even if you add shaders to the link fields, you will see no effect until you increase the 'Mix' value.

Spline Mode

A drop-down menu with two options, Spline Length and Fixed Length. These are explained in the Spline Control section above.

Length

The fixed-length value to use when 'Spline Mode' is set to 'Fixed Length'.

Over Length

The actual control spline. See the 'Spline Control' section above.

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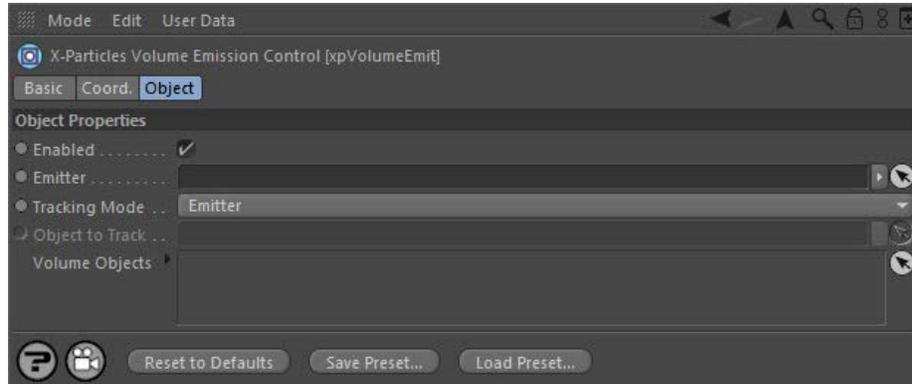
Volume Emission object

This object allows you to track whether an emitter (or some other object) is inside or outside the volume of an object and if so either emit or stop emitting particles. Multiple objects can be tested by the same Volume Emission object.

Note: this will only work if closed polygon objects are used. For example, a sphere or cube is fine but a plane or disc primitive would not work.

Interface

The object's interface looks like this:



For the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Settings

Enabled

Uncheck this switch to stop this object from working.

Emitter

Drag the emitter you want to track into this link field. If the field is left empty, nothing will happen.

Tracking Mode

This drop-down has two modes:

Emitter

In this mode the emitter is tested directly to determine if it is inside or outside the volume of the objects in the 'Volume Objects' list.

Object

In this mode the emitter itself is not tracked but some other object is tracked instead; the emitter will emit (or stop emitting) if that object is inside or outside the volume of the objects in the 'Volume Objects' list.

Object to Track

Only available if 'Tracking Mode' is set to 'Object'. Drag the object you want to track into this link field.

Volume Objects

This list contains all the objects whose volume will be tested to determine if the emitter, or other tracked object, is inside or outside the object. Drag the various objects you want to test into this list.

Each object has a flag which affects the result:



The 'outside' flag shown on the cube means that the emitter (or tracked object) must be OUTSIDE the cube for particles to be emitted. The sphere has the inside flag, so the emitter (or tracked object) must be INSIDE the sphere for particles to be emitted.

Note: the outside flag takes precedence. If you have a scene as in the screenshot and the emitter is inside both cube and sphere, no particles will be emitted (because the outside flag on the cube will prevent emission as the emitter is inside the cube).

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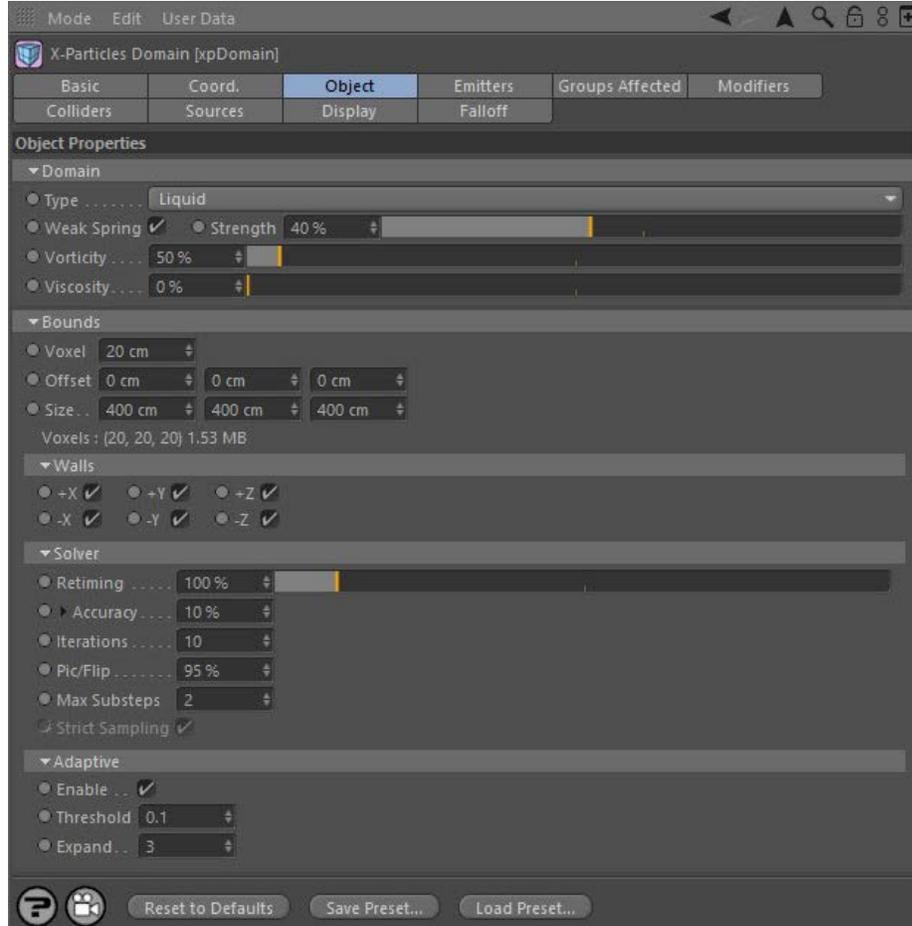
The Domain object is a FLIP (Fluid Implicit Particle) solver for the simulation of fluids, gases, smoke, fire, etc.

For details of how to use the FLIP solver and the XP Material for volume rendering, see the main [Volume Rendering](#) page.

Note that this is quite different from the [SPH fluids object](#) also present in X-Particles.

Interface

The object's interface looks like this:



For the buttons at the bottom of the interface and the 'Groups Affected' tab, please see the ['Common interface elements'](#) page.

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Object tab

Domain

These are general settings for the solver.

Type

This drop-down has three options, allowing you to choose the type of solver:

Liquid

The solver uses algorithms for the simulation of liquids.

Gaseous

This type of solver is more intended for gas, smoke, and fire simulations.

Particles (Gas)

If 'Gaseous' mode is selected the domain object will create its own internal emitter to generate particles for smoke, fire, etc. This is convenient but does not allow access to the many options in the emitter. If you need to change those, choose 'Particles (Gas)' mode and drag an emitter into the link field which appears.

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Particles

A link field for an emitter; this field only appears if 'Type' is set to 'Particles (Gas)'.

Particles Per Voxel

Not available if the solver type is 'Liquid'. In the other two types, the solver volume is divided into a number of virtual small cubes known as voxels. The solver requires a particle emitter to provide air for the simulation (this is created automatically in 'Gaseous' mode, in 'Particles (Gas)' mode you must supply one). This setting is the number of air particles per voxel. Larger numbers result in a more accurate simulation at the expense of longer playback times.

Weak Spring

This is a weak force between the particles that push them apart to give better particle distributions during simulation. FLIP can loose volume over time, this helps to combat that. For liquids it helps to keep the liquid volume, for gas it helps to keep the air particles better distributed giving a more accurate simulation. Please note: this does add some small overhead, turning it off will save some memory and computation time.

Strength

This value represents how strongly the particles are pushed apart by the weak springs.

Vorticity

When solving simulations energy and swirling motion can be lost due to inaccuracy and interpolation. Vorticity calculates this swirling motion and boosts it, enabling you to put back or boost this motion. This can be used to give more turbulent motion, especially useful for fire/smoke simulations that will have turbulent motion. Adding a [Turbulence modifier](#) can also help to inject additional movement or an additional [Vorticity modifier](#) to have larger or smaller motion. The vorticity in the Domain object is at the grid resolution.

Viscosity

This setting changes the viscosity of a fluid. With higher values the particles stick together more strongly, giving a thicker, more treacly fluid.

Bounds

These settings control the size of the solver.

Voxel

This is the voxel size within the boundaries of the solver. The solver volume is divided into cubes of this size. Smaller values result in more accurate simulations but are slower to playback and render. As the voxels get smaller, more particles are required to generate the smoke, etc.

The number of voxels used and the memory required are shown in this section after the 'Size' setting.

Offset

Changing this value will offset the solver volume from the object axis. Note that any particles which are no longer inside the solver as a result will not be used for the simulation.

Size

The size of the solver, represented by a yellow box in the editor. Particles will not escape from this box but will collide from its walls.

Voxels

For information, the number of voxels used on each axis and the memory required. The memory shown is a guide, note that a small change in voxel size can result in a very large change in memory use and computational time.

Walls

By default the solver has 6 walls, along the 6 orthographic axes (X+, X-, etc.). You can turn off any or all of these walls by unchecking the relevant switch. This is not just a cosmetic effect: particles will not rebound from disabled walls and will escape the solver. Once outside the solver they will not take part in the simulation.

Solver

Retiming

As in the emitter, this value can be used to slowdown or speed up the simulation. The diffusion of properties (smoke) cannot be changed by this, the diffusion is an inherent part of the solving and due to the voxel resolution and interpolation of the particles to/from voxels.

Accuracy

The domain is an iterative solver, refining the calculations each iteration. More iterations result in a more accurate simulation but will take longer to complete. The accuracy setting determines how close to 'exact' the solution is; the higher it is the more likely it is to reach the maximum number of iterations.

Fast

Click the small black arrow to the left of the word 'Accuracy' to see this option.

By default this is unchecked, which gives the most stable solver. Checking this switch will give a faster solve but also reduced stability.

Iterations

The maximum number of iterations allowed, for very fast velocity changes (explosions) this may need to be higher if you notice artifacts (the 'Accuracy' setting may also have to be increased). Each iteration takes the particle velocities closer to being divergent free.

Pic/Flip

PIC (particle in cell) is the direct voxel solution and tends to be more viscous. FLIP is the particle flow and tends to be noisy and vibrant. Blending the two helps to keep down noise from pure particle advection whilst keeping the fluid motion lively. This field controls the blend between the two.

- Change Speed
- Change Spin
- Change Sprites
- Control Morphing
- Control Spawning
- Explode Particles
- Freeze Particles
- Other Actions ---
- Editor Display Only
- Stop Following Spline
- Unlink TP
- Unstick from Source Object

Other:

- Online updater
- Load Palette

Max Substeps

The solving will only be accurate if particles don't move beyond a single voxel. The motion is broken into small times (substeps, just like the project Subframes value except done only during the solving). This setting limits how small the time steps are, many substeps will slow the simulation but make it more accurate. For very fast moving fluid (such as explosions) this may need to be higher if you notice incorrect simulations or artifacts.

Strict Sampling

This is not available in 'Liquid' mode. Inaccuracies in the simulation can cause volume loss, for gaseous simulations this can result in pockets of empty voxels. This option ensures that voxels always have air particles in them. Using this option can result in some loss of information from resampling and slightly slower simulation computation.

Adaptive

Enable

The amount of memory required and time to calculate depends on the number of voxels used. Enabling this option will limit the voxels calculated to be only around those that contain any information (such as liquid particles or smoke). This helps to reduce memory use and speed up calculation when only a small part of the domain has any particles.

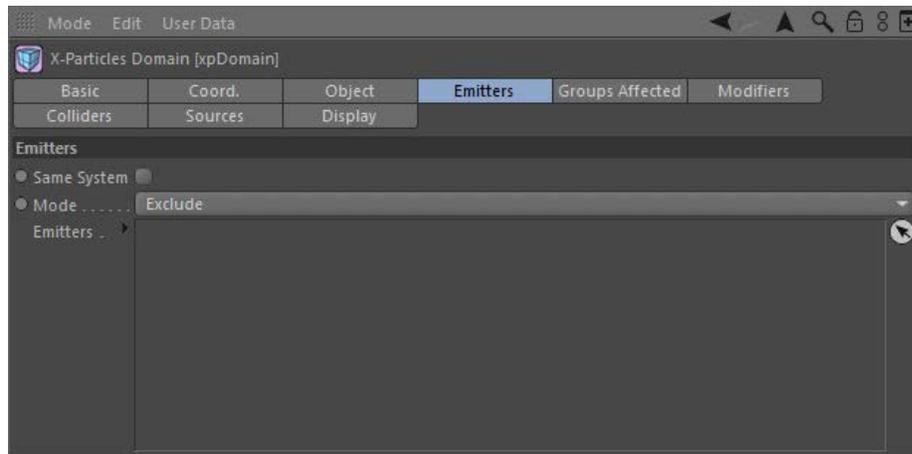
Threshold

This setting determines the level below which is considered no (zero) information for smoke, velocity etc.

Expand

This setting expands the adaptive bounds by this number of voxels to allow the smoke/velocity within to flow into more of the domain. For fast moving simulations (such as explosions) this may need to be higher or adaptive not used as the fluid may flow out of the bounded volume.

Emitters tab



Same System

If this switch is checked, only emitters in the same System object hierarchy as the domain object will be affected by it. If it is unchecked any emitters may be affected by the domain (if they are within its bounds, of course).

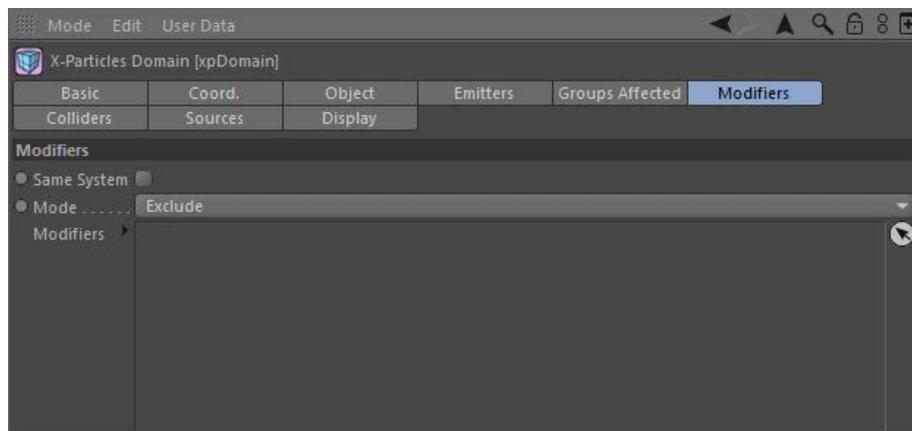
Mode

If 'Mode' is set to 'Exclude' you can drag any emitters into this list which you do not want to be affected by the domain. If it is set to 'Include' no emitters will be affected by the domain except the ones you drag into the list.

Emitters

The list of emitters.

Modifiers tab



Same System

If this switch is checked, only modifiers in the same System object hierarchy as the domain object will affect it. If it is unchecked any modifier may affect the domain.

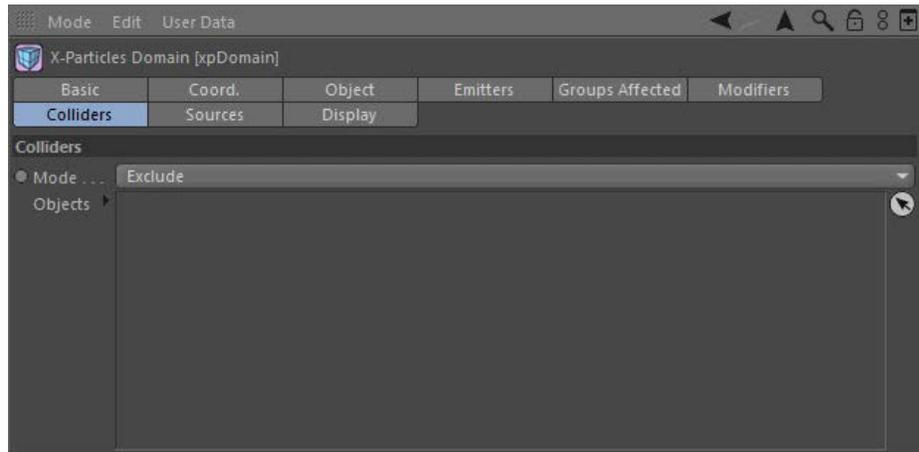
Mode

If 'Mode' is set to 'Exclude' you can drag any modifiers into this list which you do not want to affect the domain. If it is set to 'Include' no modifiers will affect the domain except the ones you drag into the list.

Modifiers

The list of modifiers.

Colliders tab



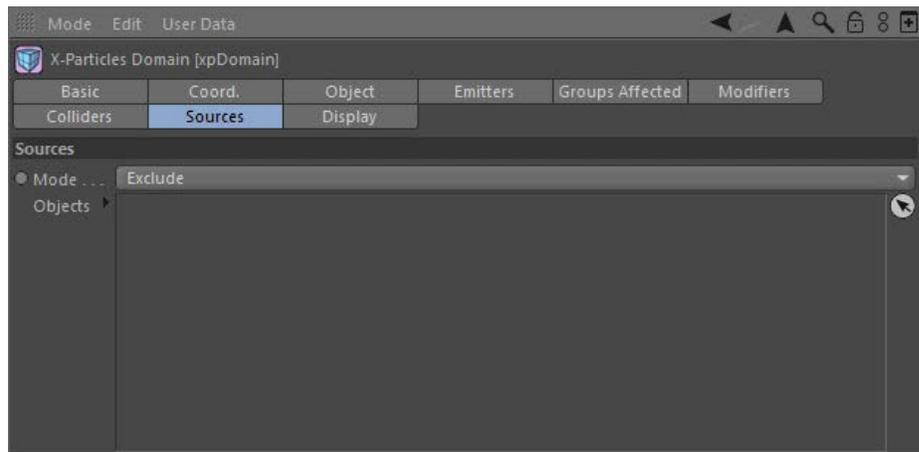
Mode

If 'Mode' is set to 'Exclude' you can drag any objects into this list which you do not want to act as obstacles in the domain. If it is set to 'Include' no objects will act as obstacles except the ones you drag into the list.

Objects

The list of objects.

Sources tab



Mode

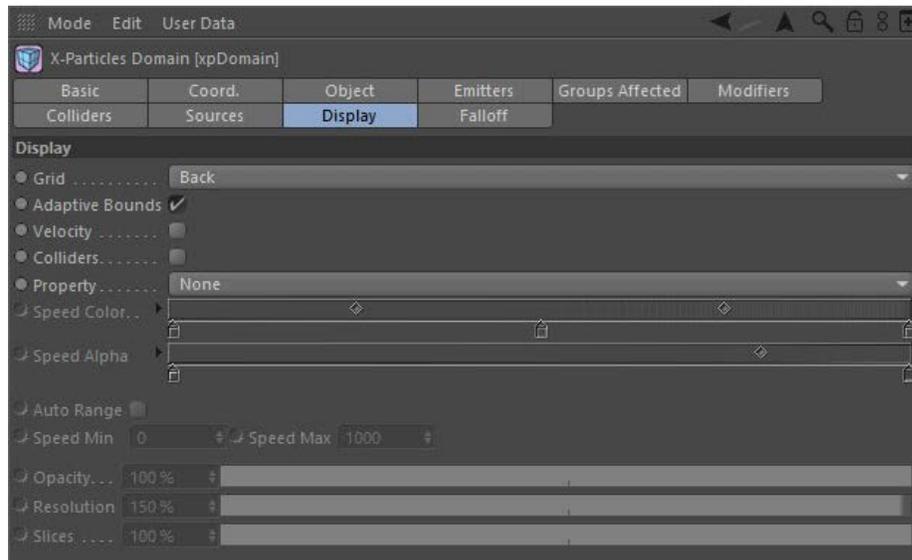
If 'Mode' is set to 'Exclude' you can drag any Domain tags into this list from objects which you do not want to act as sources in this domain. If it is set to 'Include' no objects will act as sources except the ones whose Domain tags you drag into the list.

Objects

The list of Domain tags.

Display tab

This tab controls the solver display in the editor.



Grid

This is the solver display itself. The drop-down has four options:

None

The solver is not displayed in the editor.

Voxels

A 3D grid is shown with each grid cell corresponding to one voxel.

Back

A 2D grid displayed on whichever wall faces the camera (so it will change as the view is rotated).

Base

A 2D grid which is always displayed on the base of the solver.

Adaptive Bounds

If this switch is checked the domain object will display the interior bounds of the domain as they change during the simulation. This can help to see what is calculating and to fine tune the 'Threshold' and 'Expand' settings so you can see if the adaptive bounds are far enough away from where your smoke/fire is located. The reason for this is that the simulation may not look as good if the bounds are very close to the simulation.

Velocity

If checked, the velocity (speed and direction) of the simulation are shown as coloured lines in the solver. The colours are taken from the 'Speed' colour and alpha gradients. Note that if you set the 'Property' option to anything other than 'None' both the velocity display and the property display will be shown. This may result in slightly odd artifacts in the editor display but these will not appear in the render.

Colliders

Collider objects (more properly 'obstacles' in the domain) will probably enclose many voxels completely, many not at all, and some only partially. Where the particles in a simulation hit the obstacle, you may see some leak through the obstacle geometry. These can occur where voxels are only partially enclosed by the mesh.

When checked, this switch will show solid voxels (i.e. those enclosed by the collider object). If you see leaking particles, it can help decide where leaks might be occurring.

Property

This drop-down controls which particle parameter is used to display the simulation. It has seven settings:

None

Nothing is displayed, giving the fastest possible simulation.

Temperature

The temperature of the particle is used for the display. The colour used is taken from a gradient.

A second gradient is used to control transparency of the areas with different temperatures. The transparency maps to the colour gradient, so that with the default settings the blue (cold) areas are transparent whereas the red (hot) areas are opaque. You can alter this gradient to see areas with different temperatures.

Smoke, Fire, Fire + Smoke, Fuel and Speed

These parameters are used to colour the particles using different colour and transparency gradients for each parameter.

Opacity

The overall opacity of the display.

Auto Range

When this switch is checked, the colour and alpha gradients for the displayed property are automatically mapped to the range of values in that property. For example, if temperature is displayed, the coldest areas are given the colour blue while the hottest ones are red. If this switch is unchecked you can choose the temperature range to map to the gradients using the 'Temp Min' and 'Temp Max' settings.

Min, Max settings

These settings are only available if the corresponding property is selected for display, except in the case of 'Speed Min' and 'Speed Max' which will also be available if 'Velocity' is checked.

The settings displayed will vary depending on the property being displayed.

Resolution

The resolution of the display in the editor. Decrease the value for a faster but lower-resolution display.

Slices

The number of 'slices' taken through the domain to display in the editor. More slices give a more precise display. Easier to use than to explain!

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Dynamics: Constraints

In X-Particles 3, particle constraints have been moved out of the emitter and into a separate object. To enable constraints, simply add a Constraints object to the scene.

Before using the Constraints object for the first time please read the section '[Using the Constraints object](#)' at the bottom of this page.

The object's interface has several tabs:

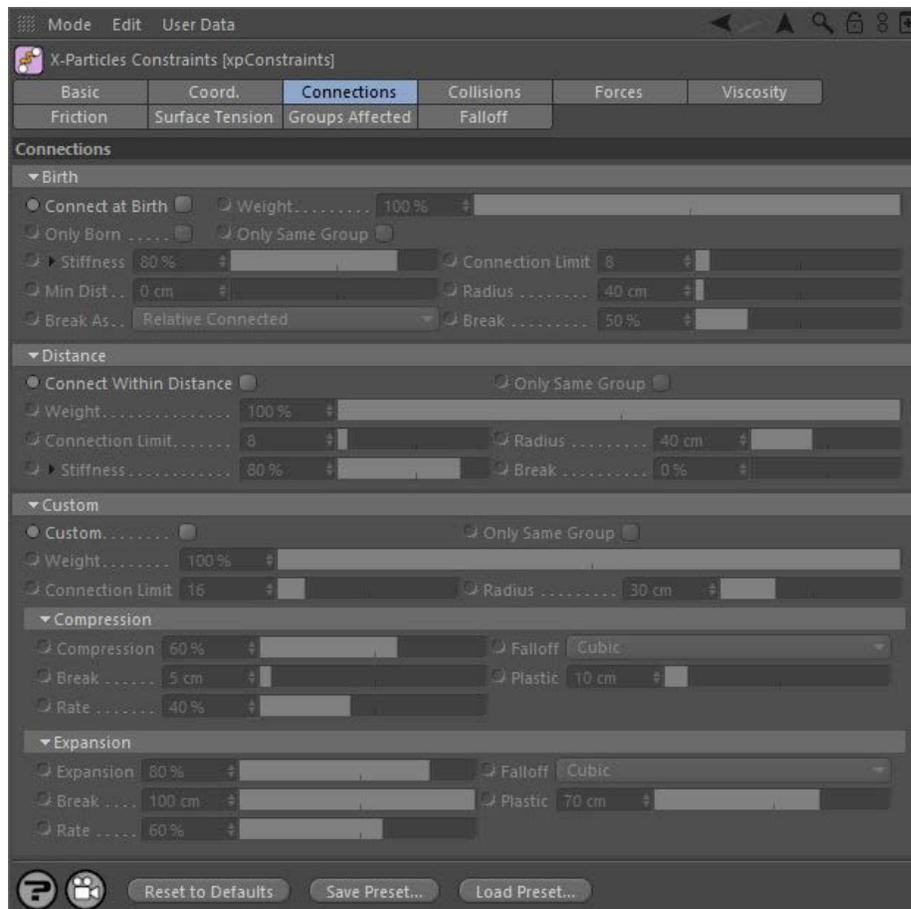


Each tab is shown in its own section below.

[Connections](#)
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For the 'Groups Affected' and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Connections tab



Birth

[Connect at Birth](#)

If checked, makes a connection between a particle when it is born and any other particle, subject to the settings such as Connection Limit and Radius.

[Weight](#)

See '[Using the Constraints object](#)' below.

[Only Born](#)

If checked, only makes connections between particles born at the same time.

[Only Same Group](#)

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Connections will only be made between particles in the same group.

Stiffness

This is a measure of how "strong" the connection is. Note that for stiffer connections it can give more predictable results to have a lower 'Stiffness' value and higher iterations and/or subframes (see the X-Particles [project settings](#)). A very high stiffness can cause unstable solving.

The stiffness settings can be expanded by clicking the small black arrow to the left of the word 'Stiffness' to show a control spline and other settings. These settings are:

Map to Param

The value from the 'Map' spline is mapped to the parameter chosen from this drop-down. For example, if the drop-down is set to 'Radius' particles with a small radius take the value from the left of the spline, while those with a larger radius take it from the right of the spline. This is a percentage value which is then multiplied with the 'Stiffness' setting to produce the final result.

The parameters which can be mapped are:

- Temperature
- Mass
- Age
- Radius
- Speed

Min, Max

These are the minimum and maximum values from the mapped parameter. For example, if 'Radius' is mapped then a minimum value of zero means that particles with a radius of zero take the mapped value from the extreme left of the spline, while particles with a radius of 100 or more take the spline value from the extreme right of the spline.

Map

The control spline to which the selected parameter is mapped.

Connection Limit

This is a limit on the number of connections each particle can make. Keep this as low as possible, as too many connections can dramatically slowdown playback in the scene.

Min Dist

This setting limits the connections made to particles which are further away than this distance. This helps to control clumping so that particles don't just connect to the very closest ones.

Radius

The distance between particles must be less than this value for a connection to be made.

Break As

This drop-down controls how the link should break. A broken link means that there is no longer a connection between the particles. It has four options:

None

Connections will not break if this option is selected.

Relative Connected

The value in 'Break' is a percentage value of the distance when the particles were connected.

Relative Radius

The value in 'Break' is a percentage value of the distance in 'Radius'.

Absolute

'Break' is an absolute distance setting and connections will break when they are longer than the 'Break' value.

Break

A measure of how much the connection can stretch before it breaks. 0% means that the connection will never break. 50% means that it will break when it has stretched by 50% of its original length. When 'Break As' is set to 'Absolute' this changes to a distance measurement, rather than a percentage. In this case the connection will break when it is longer than this value.

Distance

Connect Within Distance

If this switch is checked, connections will be made between particles within the distance specified in 'Radius'.

Break

With the Distance connections, 'Break' behaves in the same way as 'Relative Connected' in the 'Birth' connections section.

Other parameters

The other parameters in this section work in exactly the same way as in the 'Birth' section.

Custom

Custom

- [Change Speed](#)
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Other:

- [Online updater](#)
- [Load Palette](#)

With this connection type you can set the parameters manually so as to connect and disconnect particles dynamically.

Only Same Group, Weight, Connection Limit and Radius

See the parameters with the same name in the 'Birth' section.

Compression sub-section

Compression

This is the stiffness when the link (the connecting 'spring') is compressed.

Falloff

This drop-down controls how the stiffness falls off over the 'Radius' value. It has four possible settings:

- Flat
- Linear
- Quadratic
- Cubic

Break

This is an absolute distance; it represents the distance below which the connection will break.

Plastic

Below this distance the connection becomes 'plastic' - that is, it will no longer try to spring back to its original length, it has been deformed too much. Note that the stored length of the constraint changes depending on the 'Rate' value.

Rate

This is the rate at which the link becomes plastic (fixes to the new distance between the particles as they move in the scene).

Expansion sub-section

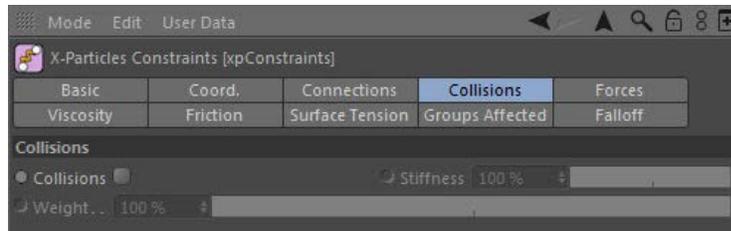
Expansion

This is the stiffness of the link if the distance between the connected particles is greater than its connection distance (how far apart they were when linked).

Falloff, Break, Plastic and Rate

See the parameters with the same name in the 'Compression' section.

Collisions tab



This tab provides very simple particle to particle collisions but is much faster than the [P-P Collision object](#) and solves as part of the constraint. In other words, the collision can be a condition to the final solution of the constraint and not just an absolute value.

Collisions

Check this switch to enable collision constraints.

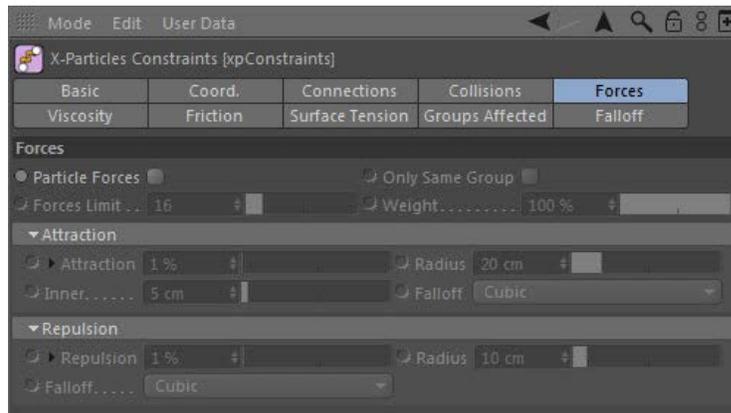
Stiffness

This controls how stiff the collision is. Essentially a dynamic 'spring' is created to keep the particles apart (from intersecting).

Weight

See ['Using the Constraints object'](#) below.

Forces tab



These are forces which act between particles but there is no connection made between the particles.

Particle Forces

Check this switch to enable particle forces.

Only Same Group

Connections will only be made between particles in the same group.

Forces Limit

This is the number of particles the force is allowed to act on at the same time. The more particles the longer it takes and the more iterations are needed to complete the solution.

Weight

See '[Using the Constraints object](#)' below.

Attraction

Particles will attract one another but only if the distance between them is less than the Radius value.

Attraction

The strength of attraction is given in this setting.

The 'Attraction' setting can be expanded by clicking the small black arrow to the left of the word 'Attraction' to show a control spline and other settings. This spline acts to control attraction in exactly the same way as the 'Stiffness' parameter in the [Connections tab](#).

Radius

For attraction to take place the distance between two particles must be less than this value.

Inner

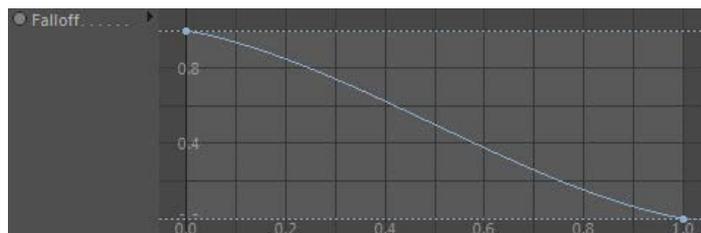
This limits the force so it only applies if the particles are farther apart than this value, which prevents them from completely collapsing.

Falloff

The falloff of the attraction effect over the 'Radius' distance. It has five possible settings:

- Flat
- Linear
- Quadratic
- Cubic
- Custom

Selecting 'Custom' will show a control spline for falloff which can be changed as required:



Repulsion

Particles will repel one another but only if the distance between them is less than the Radius value.

Repulsion

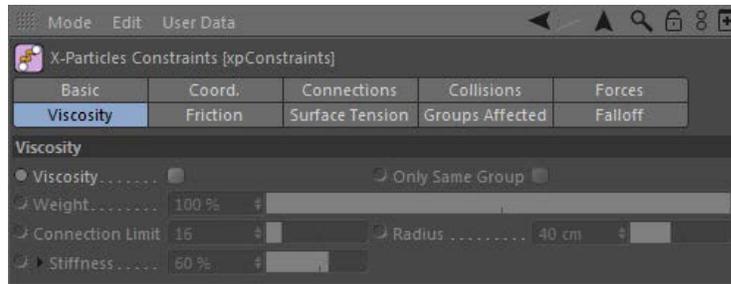
The strength of repulsion is given in this setting.

The 'Repulsion' setting can be expanded by clicking the small black arrow to the left of the word 'Repulsion' to show a control spline and other settings. This spline acts to control repulsion in exactly the same way as the 'Stiffness' parameter in the [Connections tab](#).

Radius, Falloff

These settings are identical to those in the 'Attraction' setting.

Viscosity tab



This tab provides a viscosity solver that can generate the effect of low or high viscosity in the particle flow. How high the viscosity can be depends on the iterations and subframes in the project settings (just as with all the constraints).

Viscosity

Check this switch to enable viscosity.

Only Same Group, Weight

These work in the same way as the other constraint types.

Connection Limit

How many surrounding particles are included in the viscosity solution. This doesn't need to be very high. If it is too high you will need lots more iterations/subframes. Keep it low and try more iterations/subframes.

Radius

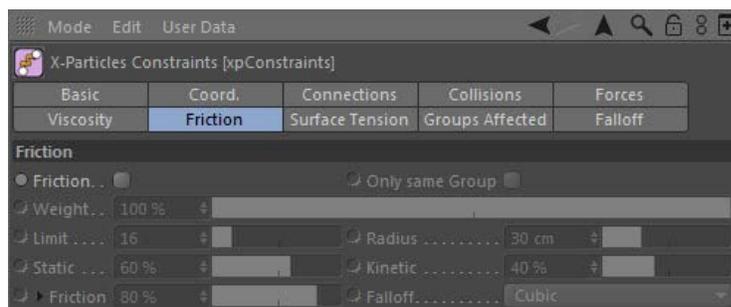
This is the maximum distance to surrounding particles to include in the viscosity solution.

Stiffness

Much like the other constraints, the stiffness represents how strong the viscosity is, but it is not linear (as with the other constraints) and the actual viscosity depends on this value and the iterations/subframes in the project settings.

You can get a higher and more stable viscosity with this as a lower (not 100%) value and more iterations/subframes. By having a softer constraint and more iterations/subframes you enable the particles to avoid large changes which can result in instability, especially when solving against other constraints (including fluids, FLIP and SPH).

Friction tab



This tab represents friction occurring between particles.

Friction

Check this switch to enable friction.

Only Same Group, Weight, Limit, Radius

These work in the same way as in the ['Viscosity'](#) tab.

Static

This value is a percentage of the 'Radius' value. Within this distance the particles have the full friction stiffness applied, which results in something like static friction where they try to hold each other to stop relative motion between them.

Kinetic

If the distance between particles is greater than the value derived from the 'Static' parameter, how stiff the friction then is.

Friction

The strength of friction is given in this setting.

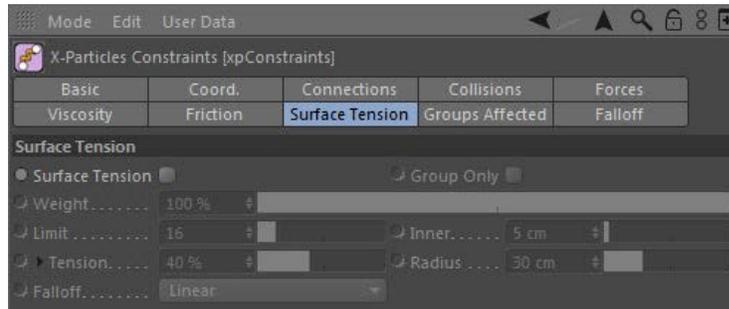
The Friction setting can be expanded by clicking the small black arrow to the left of the word 'Friction' to show a control spline and other settings. This spline acts to control friction in exactly the same way as the 'Stiffness' parameter in the [Connections tab](#).

Falloff

The falloff of the friction effect over the 'Radius' value. It has four possible settings:

- Flat
- Linear
- Quadratic
- Cubic

Surface Tension tab



Surface tension is similar to the 'Attraction' force ('Forces' tab). It is an attractive force between the particles, except it only happens at the 'surface'. This is an SPH surface, so it is determined by a radius around each particle that contributes to an overall surface, much like the Skinner and SPH Fluid object.

This is best used with another constraint (Forces or Collision) to keep the particles apart and create an inner force to give volume.

Surface Tension

Check this switch to enable surface tension.

Only Same Group, Weight, Limit

These work in the same way as in the ['Viscosity' tab](#).

Inner

As in the 'Attraction' force, this is the closest distance the force is allowed to prevent collapse. If using with SPH fluids set this to be similar to the SPH radius to allow the SPH to control the density of particles within this distance.

Tension

The strength of surface tension is given in this setting.

The 'Tension' setting can be expanded by clicking the small black arrow to the left of the word 'Tension' to show a control spline and other settings. This spline acts to control surface tension in exactly the same way as the 'Stiffness' parameter in the ['Connections tab](#).

Radius

This is the surface and force radius, increasing this creates bigger blobs of particles.

Falloff

The falloff of the surface tension effect over the 'Radius' distance. It has four possible settings:

- Flat
- Linear
- Quadratic
- Cubic

Using the Constraints object

Think of a constraint as being a means of restricting particle movement. A constraint is like a tiny spring between particles, or between particles and a collider object. This spring can pull particles together, can stretch, and can also break. The Constraints object calculates the resulting forces from this spring (technically it 'solves' the constraint) and can combine several different constraints to produce a final solution.

Note that solving the constraints may require more subframes and/or iterations than the default values, especially if high stiffness levels or strong forces are used. You can alter these values scene-wide in the X-Particles tab in the [project settings](#).

To restrict the Constraints object to certain particles, simply create however many particle groups are required and drag the particle groups to be affected by the Constraints object into the 'Groups' list in the 'Groups Affected' tab.

Connection constraints can be seen in the viewport as yellow lines connecting the particles. However, this does add some overhead, so to see the constraints in the viewport you must turn on 'Display Constraints' in the Display tab of the emitter.

It is possible to use the constraints as splines that can be rendered or used to generate geometry. To do this, add a Trail object to the scene, link it to the emitter, and set the algorithm to 'Constraints'.

X-Particles settings in the Project settings

For stiff constraints, more iterations and a higher number of subframe steps are required. If you find that connections are not being made, or don't behave as expected, try adjusting these values.

Weighting

Each constraint object solves all of the constraints enabled within it at the same time, finding a solution (particle positions) that satisfies all the constraints enabled in the object together, depending on the 'Weight' value set for each type of constraint. In other words, the 'Weight' value alters the influence each constraint type provides to the overall solution.

Collisions and other constraint types

In addition to particle connections (found in the 'Connections' tab) there are several other types of constraints, such as collisions, friction, etc. These constraints are solved independently of each other. For example, if you only need collision constraints, enable only those and place the constraint object last in the Object Manager. This is important because the order of solving constraints is in the order the constraint objects are found in the OM.

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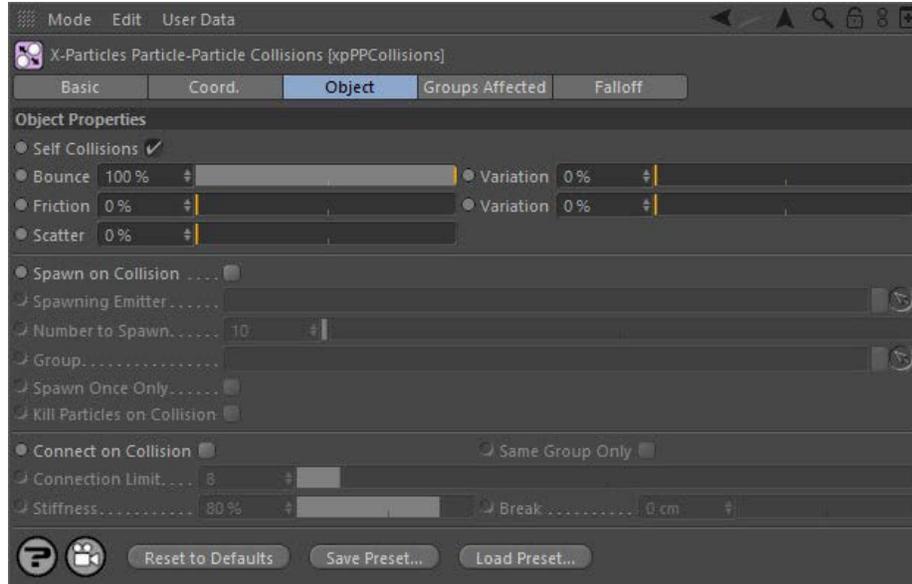
Dynamics: Particle-Particle collisions

In X-Particles 3, particle to particle collisions have been significantly enhanced and are now contained in a separate object, rather than the emitter.

To restrict particle-particle collisions to certain particles, simply create however many particle groups are required and drag the particle groups to be affected by the object into the 'Groups' list in the 'Groups Affected' tab.

Interface

The object's interface looks like this:



For the 'Groups Affected' and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Object tab

Self Collisions

If checked, particles will collide with other particles from the same emitter.

Bounce (and Variation), Friction (and Variation), and Scatter

These settings are identical to the same parameters in the [Collider tag](#). Please refer to the tag for details.

Spawn on Collision

Check this switch to spawn new particles when two particles collide.

Spawning Emitter

Drag an emitter into this field; this emitter will be used to generate the new particles. As explained in the [Spawn modifier page](#), it is NOT a good idea to use the same emitter which is producing the particles which collide and trigger the spawning. Use a different emitter instead. When you drag an emitter into this field, the 'Emitter Only Spawns' switch in that emitter will be turned on automatically. If you really need it turned off, you can do so manually.

Number to Spawn

This is the number of particles to be spawned on collision.

Group

This allows you to specify the group to which the spawned particles will belong. If there is nothing in this field, the group is determined by the spawning emitter. To specify the group, drag the desired Group object into this field.

This setting is useful if you want to ensure that the spawned particles are, or are not, affected by a specific modifier, for example.

Spawn Once Only

If this switch is on, the emitter will only spawn once from a collision between two specific particles. After that, neither particle will spawn again unless in collision with another particle which hasn't yet spawned.

Kill Particles on Collision

If this switch is checked, both the colliding particles will be removed from the scene (this doesn't stop you from spawning new particles from the collision).

Connect on Collision

If this switch is checked, when two particles collide a connection will be made between them. You can see these if you turn on 'Display Constraints' in the Display tab of the emitter.

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Connection Limit

This is a limit on the number of connections each particle can make. Too many connections can dramatically slowdown playback in the scene.

Same Group only

If this switch is checked, connections will only be made between particles in the same group.

Stiffness

This is a measure of how "strong" the connection is.

Break

A measure of how much the connection can stretch before it breaks. The connection will break if its length exceeds the value in this setting. A value of 0 means that the connection will never break.

Notes

You should be aware that if you have a large number of particles close together, it may seem as if some particle-particle collisions are being missed. Consider the situation with three particles close together. In a particular frame, particles 1 & 2 collide and particle 2 is given a new direction. It doesn't actually move anywhere yet, the movement of a particle is calculated at the end of the frame when all the influences on a particle, such as modifiers and collisions, have been taken into account. Before then though, suppose a collision between particle 2 and 3 is also detected. Particle 2 then is given a different direction, overwriting the one from the previous collision. Looking at the animation it would seem as though the first collision had been missed and only the second one detected.

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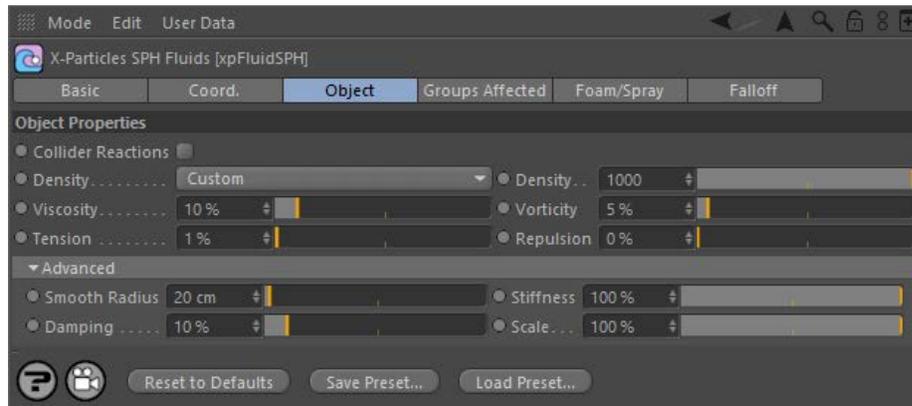
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Dynamics: SPH Fluids

In X-Particles 3, SPH fluids have been moved from the emitter to a separate object. Note that this object governs the behaviour of the fluid; to create a mesh from the particles you will need a [Skinner object](#).

Interface

The object's interface looks like this:



See below for the [Foam/Spray Tab](#).

For the 'Groups Affected' and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Object tab

Collider Reactions

Check this switch to use the Density Correction/Attraction/Repulsion from any collider tags in the fluid calculations. This will slow down the fluid simulation, so by default it is unchecked.

Density drop-down and Density value fields

This drop-down has two settings, either Custom or Particle. 'Custom' allows you to set the density in the 'Density' parameter. 'Particle' will take the density from the particle itself.

Density will control the fluid volume. If you lower the density the particles will be spaced more and give more volume to the fluid. It will also make the fluid faster and more stable (few particles affecting each other). Increasing the density may require more time steps to keep it stable.

Viscosity

This sets the fluid simulated viscosity. However, this isn't "true" viscosity, it is an approximation. It adds the velocity influence of the surrounding particles, which gives a more viscous motion. To make a really viscous fluid it might help to add some particle-particle attraction from the constraints.

Vorticity

This increases the curl of the particles motion by adding back in any vorticity already present in the fluid. This will give a more swirling and turbulent motion. If your fluid needs added vorticity then this can be added using Curl Turbulence (see the [Turbulence](#) modifier).

Tension

This causes this fluid particles to pull together giving an attraction much like surface tension.

Repulsion

Causes the fluid particles to be push away from each other to force them to spread out more. This can be used to help to reduce particle clumping when only a few particles are close by.

Smooth Radius

The radius over which the properties of the fluid are smoothed (such as density).

Stiffness

This controls how "strong" the fluid effect is, lowering it will make the fluid have less influence on the particles' motion.

Damping

Damping helps to reduce explosive forces. If you simulate a fluid with a density that is very low then the forces trying to keep the density can become very large, if the smoothing radius isn't sufficiently large enough to smooth over enough particles (low density means the particles are spaced further apart, and if this is beyond the smoothing distance it can become unstable). Increasing this setting damps the forces but also reduces motion from the fluid.

Scale

The X-Particles fluids work best at the default scene scale. If the scene needs to be bigger or smaller than normal then use this setting rather than trying to increase the density or smoothing radius. This keeps the particles behaviour as if they were in the default scale. Essentially it

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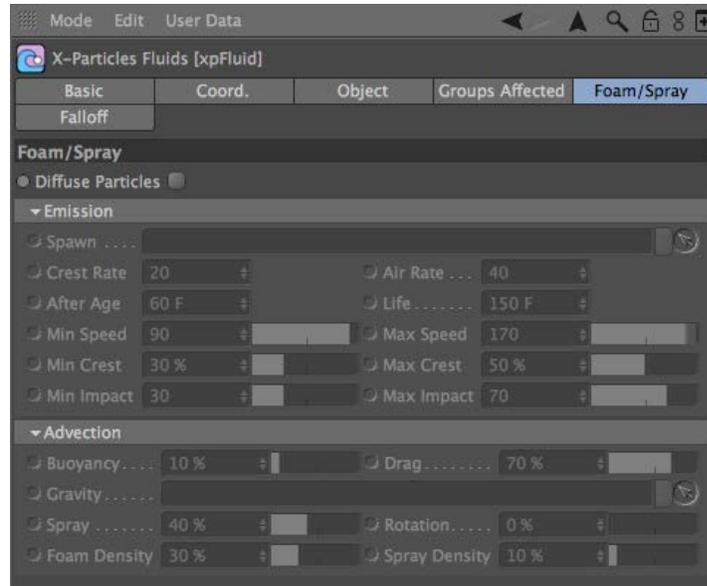
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scales the particles back to the default scene using this value, so if you want the fluid scale smaller use values of less than 100%.

Foam/Spray

These settings allow you to add foam, trapped air and spray to the fluids:



Diffuse Particles

Check this switch to generate diffuse particles. These particles are created from the fluid by a second emitter (dragged into the 'Spawn' link) that represent particles of spray, foam, or trapped air. Diffuse particles are not part of the fluid but are affected by the fluid depending on the fluid density around the diffuse particle. Any diffuse particles beyond the fluid volume (less than the 'Spray Density') are treated as spray and not affected by the fluid so will be solved as non-fluid particles.

Emission settings

Spawn

Drag the emitter to use to spawn diffuse particles into this link.

Please Note: if you only want the Diffuse Particles created by the fluid interaction then set the Spawn emitter to Spawn Only. If you would like the emit only your own Diffuse Particles (for example, to float objects on the fluid) then set the Crest/Air Rates to 0 and emit your own Diffuse Particles with the Spawn emitter itself.

Crest Rate

This is the spawn rate (can be fractional) for particles created at the crest of waves (using the 'Crest Min' and 'Crest Max' settings).

Air Rate

This is the spawn rate for diffuse particles created as trapped air between colliding fluid particles (controlled with the 'Min Impact' and 'Max Impact' settings)

After Age

Only those fluid particles which are older than this setting will create diffuse particles. This enables an emitter to fill or flow before creating the diffuse particles (otherwise on emission diffuse particles would be created immediately).

Life

The maximum lifespan of the diffuse particles. Their actual lifespan depends on how they were created (potential of creation/velocity of particles).

Min Speed and Max Speed

This is the speed range needed by the fluid particles to create the diffuse particles. The highest speed (most energetic) particles of your simulation should be set to create diffuse particles.

Min Crest and Max Crest

These settings represent the curvature of the wave crest needed to create diffuse particles. A low value implies something flat (which would not realistically create spray) and high values mean something like a wave curving right back on itself (again not realistic) so mid-range value are more natural.

Min Impact and Max Impact

These are the impact speeds between particles needed to trap air.

Advection settings

Buoyancy

The lifespan the particles are given if the surrounding fluid density is below the 'Foam Density' setting.

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Drag

This controls how much the fluid drags the foam/air particles, but does not affect spray.

Gravity

Drag a Gravity modifier into this link to specify which modifier to use. Otherwise the fluid section will use the first gravity modifier it finds when evaluating modifiers for this emitter (used for buoyancy, opposite to gravity direction).

Spray

On creation of the diffuse particles this controls how much random velocity is given to them to spray them away from the creation point.

Rotation

If this is set then the diffuse particles are given a rotation which is then aligned (Y axis) to the fluid surface (when near the surface).

Please Note: if the diffuse spawning emitter is emitting particles this setting will only align their rotation if they have some (if 'Use Rotation' in the emitter was enabled).

Foam Density and Spray Density

The surrounding fluid density below which diffuse particles are considered to be spray or foam.

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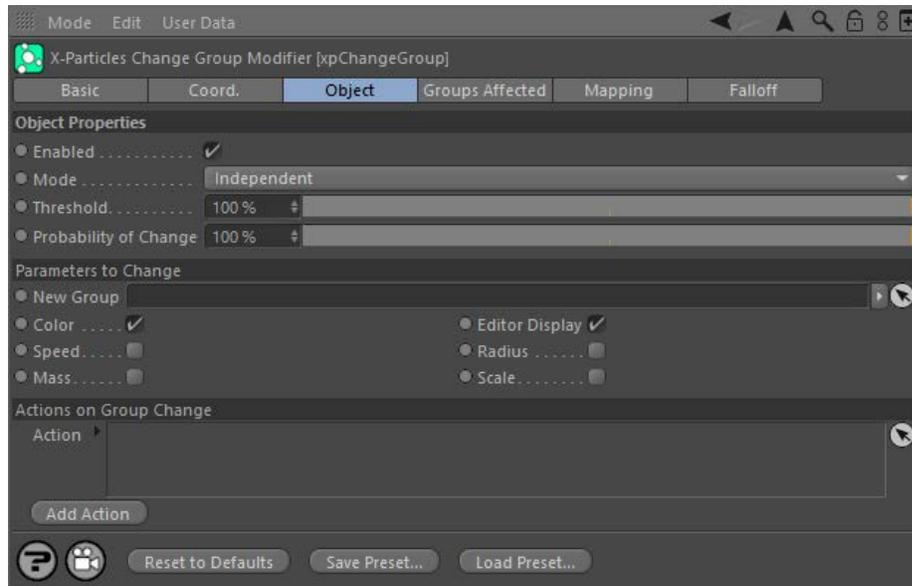
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Change Group Modifier

This modifier changes the group number of a particle. All particles are assigned a group number by the emitter when they are generated. This modifier always causes the group number to be changed, but optionally a number of other particle parameters (color, display type, etc.) can also be changed.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of effect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Threshold

For the modifier to have an effect, the particle must be within its field of effect. The strength of that effect varies according to the falloff. At the default setting of 100%, the particle must be within the zero-falloff area of the modifier - that is, the 'red zone' shown on screen - for the group to be changed. As you reduce this value, the group will change even if it is within the 'yellow zone' of the modifier. Note that with the default Infinite setting for the falloff, the particle is always in the modifier's red zone, so the modifier will make any change immediately and the Threshold value is not used.

Probability of Change

This setting adds a random factor into deciding if the group will change. If it is set to 100% a change in group will always occur (after taking the falloff and 'Threshold' setting into account). If this is set to zero a change will never occur. Between those two values is a probability that the change will take place. This setting is useful to prevent particles always changing group at the same time, so making the effect look more natural. Note that if the probability is set to a low value, and if the particle passes very quickly through the modifier's field of effect, a change in group may never occur.

Parameters to Change

In X-Particles 3, groups can control several different particle parameters, in addition to the color and editor display. You can select which options to change from these controls. For example, if 'Color' and 'Mass' are selected, the particle color and particle mass will be changed to those values in the new group. By default, 'Color' and 'Editor Display' are selected, but you can turn these off if desired.

New Group

Drag a Group object into this link box. Particles in the groups in the 'Groups to change' list will all be changed to this group. That is, their internal group number will change and their appearance in the editor will be changed to that of the new group. From then on, those particles will belong to the new group and will only be affected by modifiers and actions which affect that group.

If there is no Group object in this field, no groups will be changed.

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Color/Editor Display/Speed/Radius/Mass/Scale

If any of these switches are checked the corresponding particle data will be changed to the value given in the new group.

Actions on Group Change

You can drag any Action, or multiple Actions, into the Action list. These Actions will be carried out when a particle group is changed. Note that you don't need an accompanying Question to trigger this Action. The Action is triggered directly by the modifier.

Add Action

Clicking this button will add an action to the scene and drop it into the Action list.

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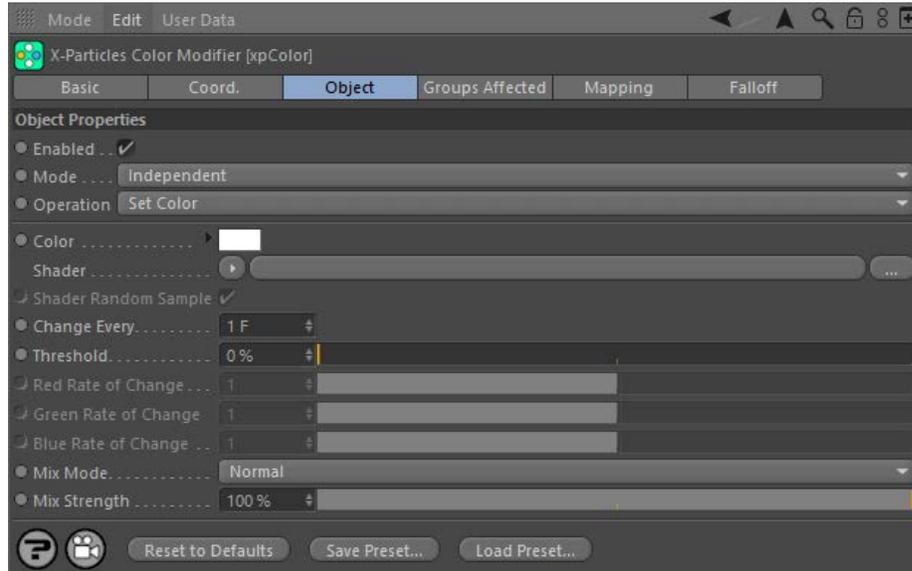
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Color Modifier

This modifier changes particle color in a controlled fashion, that is, not just a simple color change but a graduated change over time.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Operation

The modifier has several modes of operation, selectable from this drop-down:

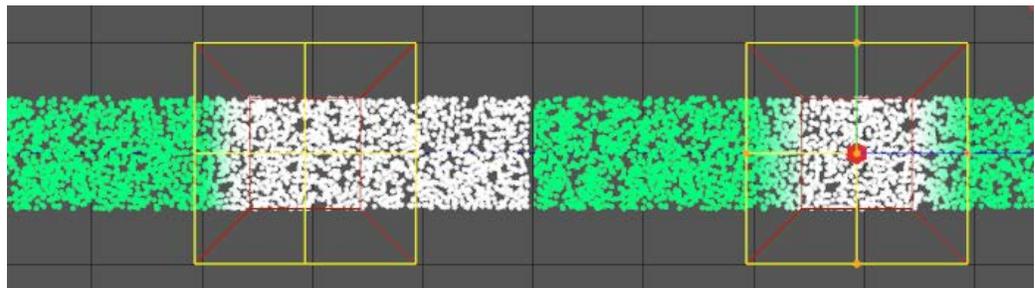
Set Color

The simplest mode, simply changes the particle colour as it passes through the modifier's falloff. The colour change is permanent. The rate at which the colour change occurs is influenced by the modifier's falloff.

Set By Falloff

In this mode, the colour changes while the particle is in the modifier's falloff, but reverts to the original colour as it passes out of the falloff zone.

This image shows the difference between the two modes, with Set Color on the left and Set By Falloff on the right:



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In this mode, the modifier will change the colour by a set amount as long as the particle remains within the modifier's falloff. The rate of change is governed by the three rate of change parameters (see below). You can change the red, green, and blue components at different rates if desired.

Random

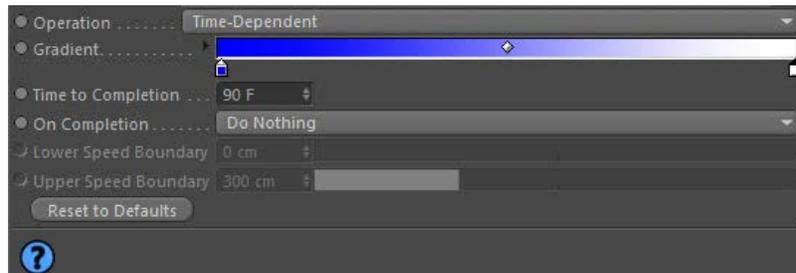
The modifier assigns a random color to each particle.

Random (From Shader)

In this mode, the modifier randomly samples a shader in the 'Shader' link field. The particle colour is only changed once unless 'Shader Random Sample' is checked, in which case the shader is repeatedly sampled.

Time-Dependent

Deprecated This mode displays a color gradient and when the particle enters the modifier's falloff it will change the colour to the colour on the left of the gradient. Then over time it will change the colour to the colour on the right of the gradient. How long it takes to make the full change is governed by the 'Time to Completion' parameter:



When the color change is complete, what the modifier does then is governed by the 'On Completion' parameter.

Age-Dependent

Deprecated As for the 'Time-Dependent' mode but the rate of change is governed by the particle age.

Speed-Dependent

Deprecated As for the 'Time-Dependent' mode but the rate of change is governed by the particle speed. There are two additional settings used in this mode: 'Lower Speed Boundary' and 'Upper Speed Boundary'. All particles with a speed less than the lower boundary will have the color at the left of the gradient, while all particles with a speed above the upper boundary will have the right-hand gradient color. Particles with speed in between the two boundaries will have a color somewhere along the length of the gradient.

Gradient

The colour gradient used in the the time, age, and speed-dependent modes.

Time to Completion

This parameter is only available if 'Operation' is set to 'Time-Dependent'. It is the amount of time taken to change the colour from the left of the gradient to the colour at the right of the gradient.

On Completion

This parameter is only available if 'Operation' is set to 'Time-Dependent'. It governs what happens when the colour change is completed. There are three options:

Do Nothing

No further change to the particle colour will occur.

Wrap to Start

The colour will be changed back to the colour at the left of the gradient and the process repeated.

Reverse

The colour change will be reversed: it will begin to change back to the colour at the left of the gradient, taking the time in 'Time to Completion' to reverse the change.

Lower Speed Boundary, Upper Speed Boundary

These parameters are only available if 'Operation' is set to 'Speed-Dependent'. All particles with a speed less than the lower boundary will have the color at the left of the gradient, while all particles with a speed above the upper boundary will have the right-hand gradient color. Particles with speed in between the two boundaries will have a color somewhere along the length of the gradient.

Color

Only available in 'Set Color' and 'Set By Falloff' modes. It sets the particle color, in combination with color from the shader (if present).

Shader

Only available in 'Set Color', 'Set By Falloff' and 'Random (From Shader)' modes. In the first two modes, the shader is sampled and the color combined with that from the 'Color' parameter. In 'Random (From Shader)' mode the shader alone determines the color.

Shader Random Sample

If checked, the shader (if present) will be sampled repeatedly for each particle, causing the color to change each time it is sampled. If it is unchecked the shader will be sampled only once for each particle.

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Change Every

Sets how often the color is changed. The default is 1 frame, so the particle color may change every frame.

Threshold

This is a setting designed to introduce some random chance into the color change. Each time the color is due to change for a particle (see 'Change Every' above) a random number is generated; if that number exceeds the threshold, the change will take place, but if it does not there will be no change. You can see that a value of 0% will always result in a change occurring; a value of 100% will mean that a change never occurs.

Red/Green/Blue Rate of Change

These parameters are used in conjunction with the 'Increment/Decrement Color' mode - see above. The maximum value is 255, which will cause an instant color change. A value of zero will result in no change. Values less than zero will reduce the color values for each component.

Mix Mode/Mix Strength

This drop-down determines how the color from the 'Color' and 'Shader' fields are blended. The standard four blend options are available. The 'Mix Strength' parameter governs the relative contribution of each color to the final result. A value of 100% means that only the shader color is used, while 0% will only use the Color field color.

These parameters have no meaning if no shader is present in the 'Shader' field.

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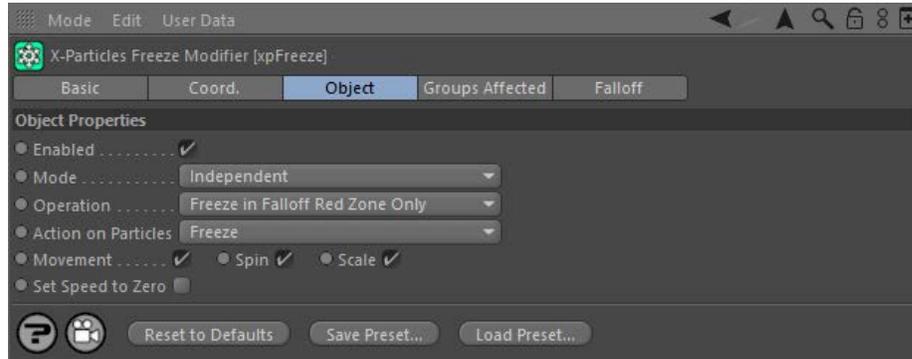
N.B. Don't confuse this modifier with the Freeze Tag, which is very different!

Summary

This modifier halts particle movement. It does not stop particle generation or trails or anything else in the system, it just stops particles from moving.

Interface

This is the modifier's interface:



For the 'Groups Affected' and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Operation

This setting has two modes:

Freeze in Falloff Red Zone Only [default setting]

This mode essentially acts as a switch. If a particle enters the 'red zone' of the modifier, and if the drop-down menu 'Action on particles' is set to 'Freeze', it will be halted. Subsequently, if the drop-down is set to 'Unfreeze' (which can be done by an Action), the particle will start moving again. Very importantly, note that if the particle is halted and the modifier is moved so that the particle is no longer in the red zone, it cannot be restarted!

In this mode, particles in the 'yellow zone' of the modifier are unaffected.

Freeze Depends on Falloff

This mode is very similar but introduces a probability weighting. A particle in the red zone will always be halted. But one in the yellow zone may or may not be frozen, depending on the strength of the falloff. This means that some fast-moving particles will make it through the modifier without being frozen at all.

Particles still in the modifier's red zone will be unfrozen if the appropriate option is selected, as with the first mode. Those still in the yellow zone may or may not be unfrozen depending on the falloff and how long they remain in the modifier's field of effect (which can vary, such as when the modifier is animated).

Action on Particles

This setting determines what effect the modifier has on particles. It has two modes:

Freeze [default setting]

The modifier will freeze the particle (bring it to a stop). This is subject to the caveats noted in the 'Operation' setting described above.

Unfreeze

Frozen particles will start moving again. If a particle is not frozen then the modifier will have no effect on it if this mode is selected. Again, be aware of the caveats noted in the 'Operation' setting described above.

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Movement/Spin/Scale

Check these buttons to specify which parameters are frozen. For example, you can choose to stop a spinning particle from moving but keep spinning, or halt any change in scale but keep the particle moving. If no buttons are checked, the modifier will have no effect.

Set Speed to Zero

When a particle is frozen, it keeps its current speed value, although it cannot be moved. If it is unfrozen again, it will move with the speed and direction it had before it was frozen. Occasionally this is a problem; suppose you test a particle for speed in a Question object, then you might expect a frozen particle to have a speed of zero, but it may not. If it is important that any frozen particle also has its speed set to zero, check this switch.

Important note

Adding a Freeze modifier to the scene will immediately halt all particle movement, spin, etc., since by default it has an Infinite falloff. This can be used to halt all particle movement and then turn it on again, since by definition with an Infinite falloff all particles are in the red zone of the modifier. Turning the modifier on and off can be done with an Action or even (if you prefer the retro option) with a keyframe.

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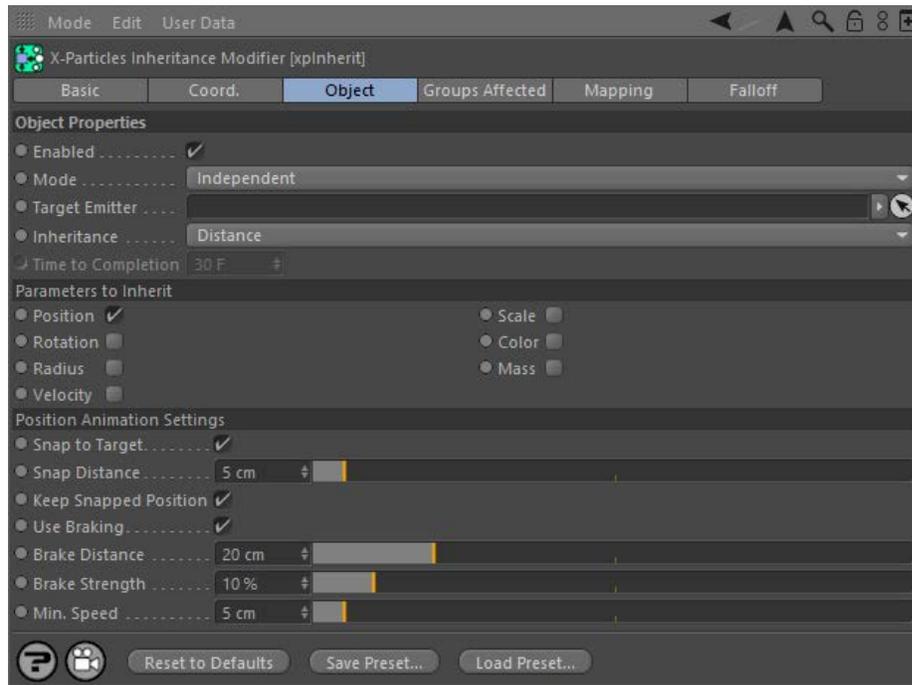
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Inheritance Modifier

This modifier causes a particle to inherit certain parameters from a particle from another emitter. The particles which provide the parameters to be inherited are called the 'provider' particles in this manual.

Interface

The object's interface looks like this:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Object tab

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Target Emitter

Particles affected by this modifier will inherit parameters from those emitted from another emitter. This field contains the emitter whose particles have the parameters which will be inherited. If this field is empty, the modifier will have no effect.

Note that when you drag an emitter into this field, the inherit modifier is automatically added to the exclusion list of that emitter (since an emitter cannot inherit from itself!).

Inheritance

Inheritance can take place in four ways, given in this drop-down menu:

Distance (Relative)

In this mode, the particles inherit parameters as soon as they are inside the modifier's field of effect. The rate of change of the parameter will depend on the distance between the two particles - the particle which is to inherit a parameter and the one providing it. For example, if you select 'Radius' as one of the parameters to inherit, the inheriting particle's radius will change to be closer to that of the provider particle the closer the two get.

Important: the distance between particles is relative to the distance between them when they entered the modifier's field of effect. In other words, if the particles never get closer to one another, the particles will never inherit the properties of the target particle, such as rotation. The only exception to this is if 'Position' is inherited since that will always move the particles closer together.

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With this mode, instead of the relative change in distance between two particles being used, a fixed value given in the 'Distance' setting is used instead. If the distance between the two particles is less than this value, one particle will inherit the parameters of the other. The rate of change will depend on the distance between the particles in relation to the 'Distance' setting. For example, if 'Distance' is set to 500 units, and the distance between the particles is 501 units, no inheritance will occur. If the distance between them falls below 500, inheritance will occur and will occur more rapidly as the distance shortens.

Important: the difference between this and the relative mode is that inheritance will occur even if the distance between the particles never changes, provided that it is below the value from the 'Distance' setting.

Time

The particle parameter will change to that of the provider particle over time; it is not affected by the distance between the particles. The time to complete the change is given in the 'Time to Completion' setting.

Immediate

With this mode the change in parameter takes place immediately. For example, if you choose 'Position' as the parameter to change, the particle will immediately jump to the position of the provider particle.

Time to Completion

This is the time taken to complete inheritance of a parameter if 'Inheritance' is set to 'Time'.

Distance

The distance between the two particles must be less than this value before inheritance will occur. This setting is only used if 'Inheritance' is set to 'Distance (Absolute)'.

Parameters to Inherit

You can choose which parameter(s) the particle will inherit from the provider by checking the required switches. Note that 'Velocity' means that the particle will inherit both the speed and direction of the source particle.

Position Animation Settings

These settings are only available if 'Inheritance' is not set to 'Immediate' and 'Position' is one of the parameters to inherit. They control how the particle moves towards the provider particle's position.

Snap to Target

If checked, this will cause the particle to snap to the provider particle's position when the distance between them is less than the 'Snap Distance' setting.

Snap Distance

When the distance between the two particles is less than this value, the particle will snap to the provider particle's position, provided that 'Snap to Target' is checked.

Keep Snapped Position

If this switch is checked, once snapped to its target the particle will maintain the same position and direction/speed as the provider particle.

Use Braking

Braking causes the particle to slow down as it approaches the provider's position. Check this switch to use braking. Note that braking is not available if 'Inheritance' is set to 'Time'.

Brake Distance

Braking will commence when the distance between the two particles is less than this value.

Brake Strength

This is the percentage reduction in speed each frame when braking is active. To prevent the particles slowing almost to zero, set the 'Min. Speed' value. The larger the brake strength the harder the particles are braked. Lower values will give smoother braking but if too low, the particle may snap to the provider position with a noticeable jump.

Min. Speed

The minimum speed the particle can have when braked.

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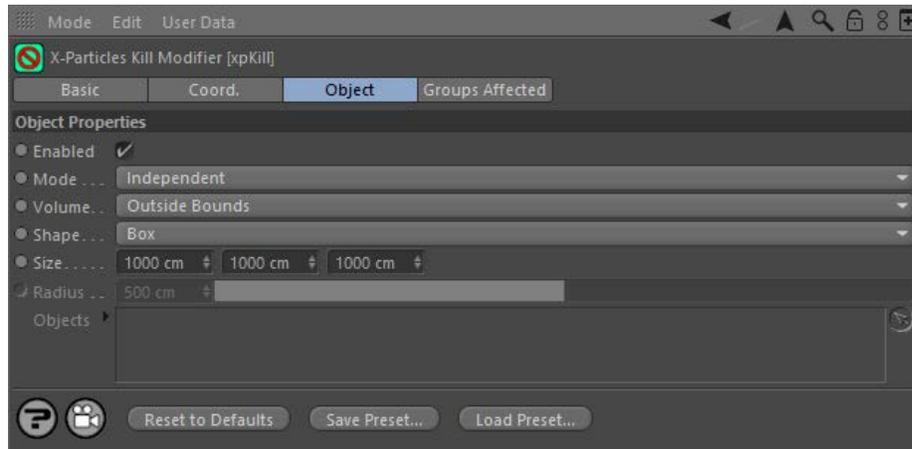
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Kill Modifier

The Kill Modifier provides a way to force particles to stay within certain bounds. Those which stray outside the defined boundary will be killed.

Here is its interface:



For the 'Groups Affected' tab and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page. This modifier does not have a Falloff tab.

Settings

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Volume

This defines the nature of the bounding volume.

Inside Bounds

The particles must stay *inside* the modifier's boundary (shown as a yellow box or sphere).

Outside Bounds

The particles must stay *outside* the modifier's boundary (shown as a yellow box or sphere).

Objects

One or more objects can be dragged into the modifier's Objects list. The effect depends on the flags which are set for each object.

Outside Camera FOV

In this mode particles are killed if they are outside the field of view of the current camera (note: this will only work correctly with Perspective cameras).

Shape

The shape of the modifier, either a Box or a Sphere. Only applies when 'Volume' is set to 'Inside Bounds' or 'Outside Bounds'.

Size

The size of the object when 'Shape' is set to 'Box' (not available in Objects or Camera modes).

Radius

The size of the object when 'Shape' is set to 'Sphere' (not available in Objects or Camera modes).

Objects

This is a list of bounding objects. Each object in the list (which must be a polygon object of some kind) has two flags.

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The object will only act as a bounding object if the green tick is present. It is disabled if it has a red cross.

Outside/Inside flag

In this screenshot the Cube has the *Outside* flag, while the Sphere has the *Inside* flag:



- The Outside flag means that the particles will die if they are outside the Cube.
- The Inside flag means that the particles will die if they are inside the Sphere.

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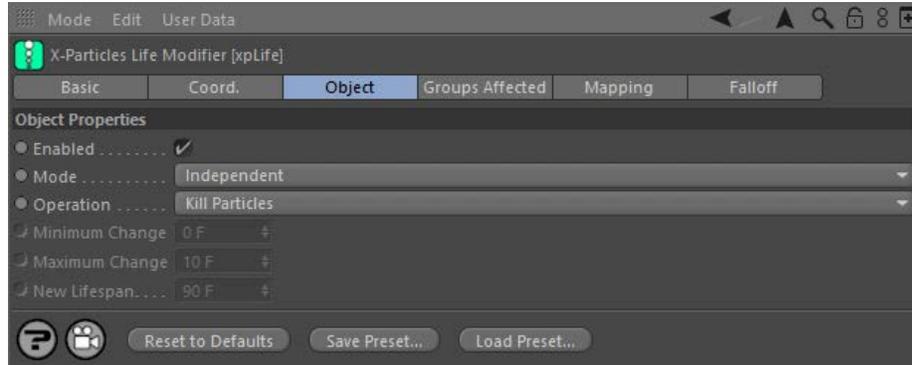
Life Modifier

Summary

This modifier kills particles or alters their lifespan.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Operation

This setting has four modes:

Kill Particles

In this mode, the modifier will kill particles, that is, remove them completely from the scene. It operates in a similar fashion to the Destructor modifier in Cinema 4D, except that the probability of the particle being killed is dependent on the modifier falloff.

If the falloff is set to Infinite, or if the falloff is another shape and the particle passes through the 'red zone' of the modifier, the particle will always be removed. If it passes through the 'yellow zone' of the modifier's falloff then the probability of the particle being removed depends on the falloff value. The longer the particle is in the yellow zone, the greater the probability that it will be killed, so that probability depends in turn on the speed of the particle and the size and shape of the modifier falloff.

Increase Particle Lifespan and Decrease Particle Lifespan

Here the particle lifespan will be changed but the particle will not be killed. There are two values which you can change: these are the minimum and maximum possible changes to the lifespan. For example, if the minimum value is 5 frames and the maximum is 10 frames the lifespan will change by at least 5 frames and at most by 10 frames. Again, this is influenced by the falloff and the maximum change will only occur within the 'red zone' of the modifier.

Set New Lifespan

This allows you to set the lifespan to a specific value, found in the 'New Lifespan' setting.

Minimum Change / Maximum Change

These are the values used when 'Operation' is set to 'Increase (or Decrease) Particle Lifespan'.

New Lifespan

Only available when 'Operation' is set to 'Set New Lifespan', this is the new lifespan of the particle. Note that if the new lifespan is less than the particle age, the particle will immediately die.

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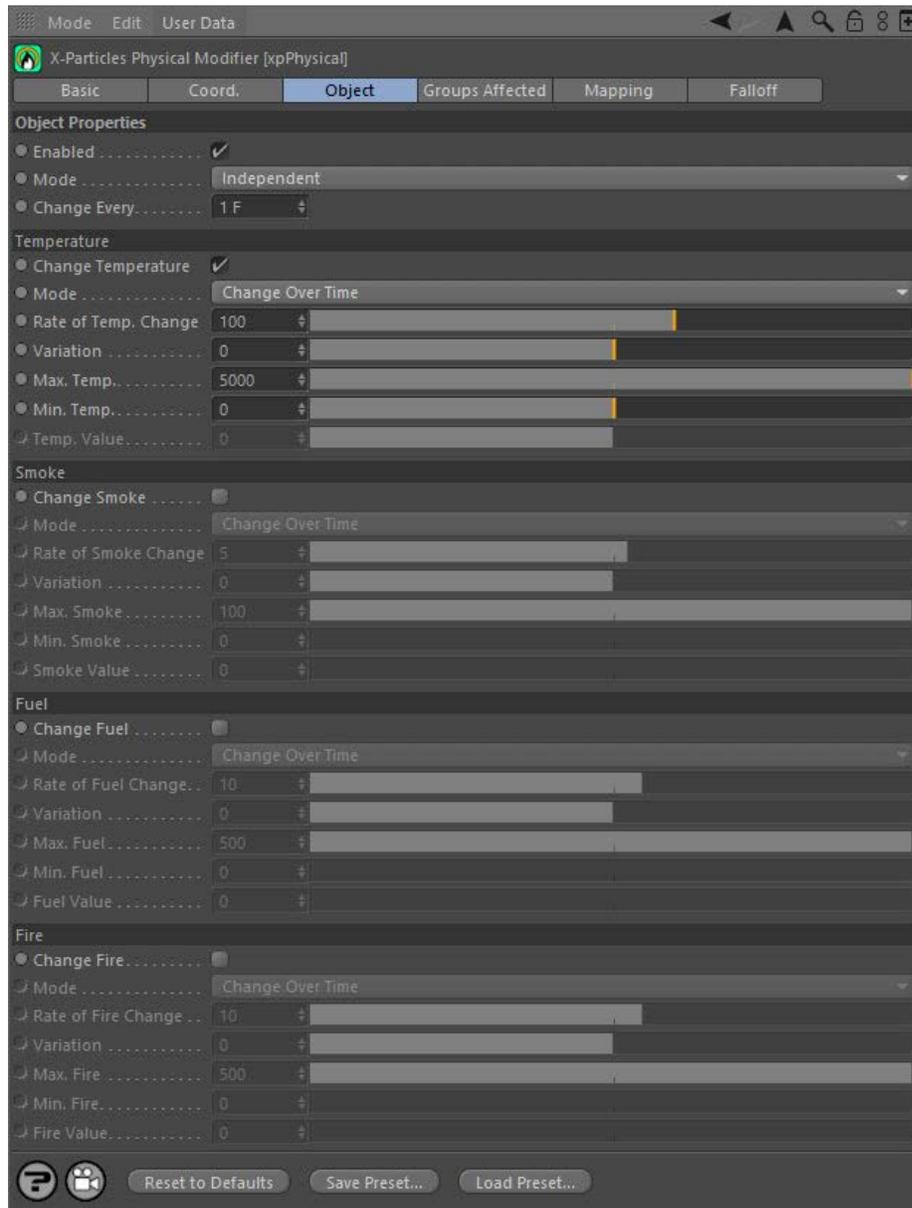
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Physical Modifier

This modifier allows you to change physical properties of the particle, which are used by the FLIP simulator.

Interface

The object's interface looks like this:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Object tab

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

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Change Every

This setting controls how often the parameters will change. By default it is set to change every frame, but this can be increased to slow down the rate of change if desired.

Temperature parameters

Change Temperature

If this switch is checked, the modifier will change the particle temperature.

Mode

 This drop-down menu controls how the modifier will change the temperature. It has two options:

Change Over Time

The temperature will change using the value in the 'Rate of Temp. Change' parameter.

Set Value

The temperature will be changed immediately to the value in 'Temp. Value'.

Rate of Temp. Change and Variation

This is the rate of change of the temperature. The change in this setting will take place each time the change occurs so at the default settings the temperature will increase by 100 every frame. Negative values will decrease the temperature. Variation can be added with the 'Variation' setting. These parameters are only used if 'Mode' is set to 'Change Over Time'.

Max. Temp and Min. Temp

These are the maximum and minimum values for temperature which will not be exceeded. These parameters are only used if 'Mode' is set to 'Change Over Time'.

Temp. Value

The temperature value used when 'Mode' is set to 'Set Value'.

Change Smoke/Change Fuel/Change Fire

These sets of controls function exactly like the 'Change Temperature' controls for their respective parameters.

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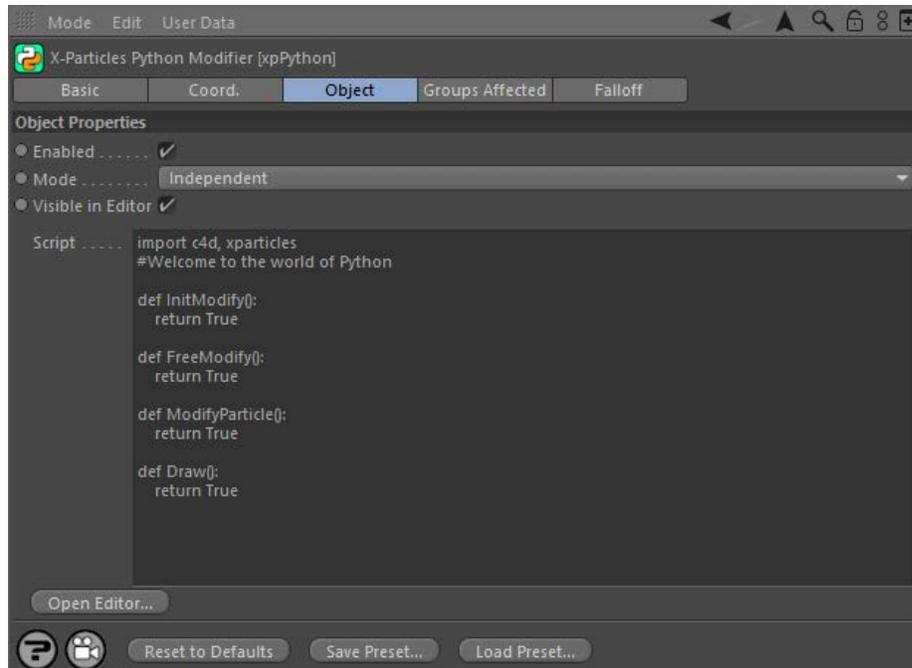
Python Modifier

Summary

With this modifier, you can arrange for Python code to be executed when a particle is within the modifier's field of effect. You have access to the particle data, which allows you to change the data in any way you like.

Interface

This is the modifier's interface:



For the 'Groups Affected' and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of effect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Visible in editor

To make the modifier invisible in the editor, but still active, check this switch.

Script

This is where you enter the Python script to be carried out. A simple default script is provided. To see how to use this, see the page '[Using Python in X-Particles](#)'.

Open Editor...

This button opens the Cinema 4D script editor, which provides a better coding environment for writing your scripts. When you finish with the editor, simply close it and the Script field in the modifier will be updated automatically (this sometimes seems to take a few seconds).

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Rewind Modifier

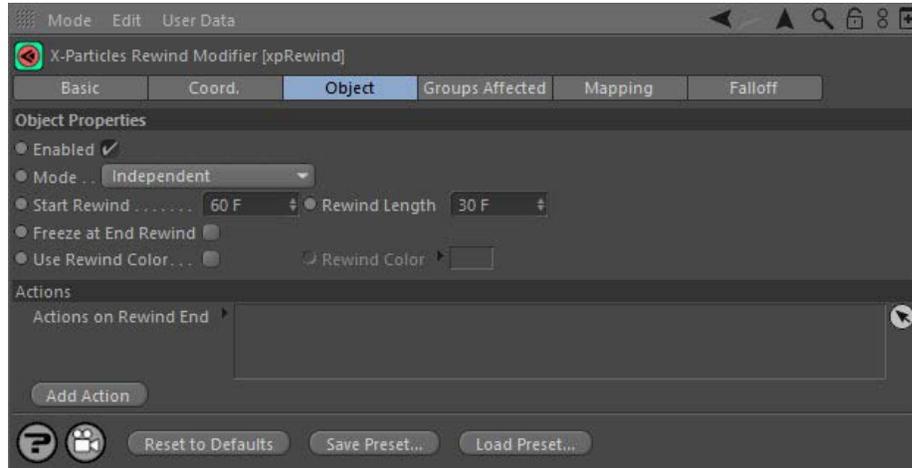
Summary

This modifier lets you record various particle parameters - position, size, direction, speed, etc. - and then use the stored data to 'rewind' the particles at a later stage. Think of it as a local, temporary cache of data which can be reused as many times as required.

Important: please read the section on '[How to use the Rewind modifier](#)' before using it for the first time.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Start Rewind

This is the time that you want to start rewinding the particle. The time refers to particle age, NOT the current scene time.

Rewind Length

This is the length of time to rewind the particle.

The default setting for 'Start Rewind' is 2 seconds (60 frames at 30 frames per second) and the default 'Rewind Length' is 1 second (30 frames at 30 fps). What this means is that the modifier will start to rewind the particle at 60 frames and will rewind it for 30 frames, so that when rewinding is complete the particle will be where it was when it was 30 frames old. What happens then depends on the 'Freeze at End Rewind' switch.

Freeze at End Rewind

If this switch is checked the particle will freeze when rewinding is complete. You can unfreeze it at any time by using a Freeze modifier or Freeze action.

If this switch is unchecked the particle will move again with the direction, speed, etc. that it previously had when it was at that point.

Use Rewind Color, Rewind Color

If 'Use Rewind Color' is checked the particles will change to the colour setting given in 'Rewind Color' while rewinding, then revert to the actual particle colour when rewinding is complete. It is intended as a visual cue so that you know when a particle is being rewound; its use is entirely optional.

Actions on Rewind End, Add Action

The 'Actions on Rewind End' list can contain Actions which are carried out when the particle has finished rewinding. Drag the required Actions into the list or use the 'Add Action' button to create a new Action.

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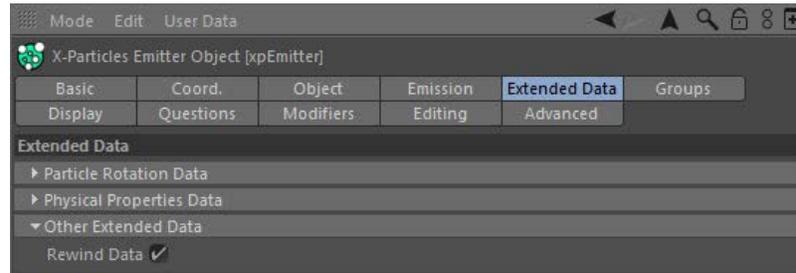
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How to use the Rewind Modifier

Using the modifier is very easy but there is one important step to follow before using it.

Turn on extended particle data for this modifier

To cut down on the amount of data each particle collects, saving on memory CPU cycles, not all data required by every component in the system is collected by default. To use the Rewind modifier, you MUST turn on data collection for it. To do that, go to the emitter and in the Extended Data tab, 'Other Extended Data' section, turn on 'Rewind Data':



Now the emitter will collect the data the modifier needs.

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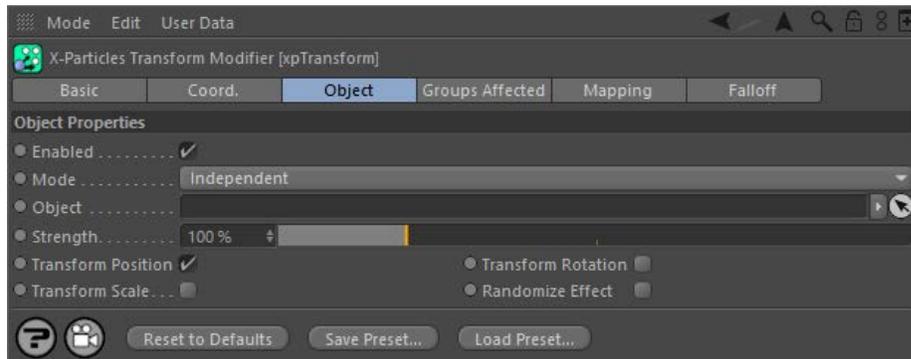
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Transform Modifier

This modifier causes the particle's position, scale, or rotation to change in conformity with another object. What this means is that if the linked object moves (for example) by +100 units on the Y-axis, the particles will also move +100 units on the Y-axis from their current position.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Object tab

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of effect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Object

Drag the object to be linked to the particles into this field. If the field is empty, the modifier will have no effect.

Strength

You can adjust how much of the object's movement is translated into particle movement with this slider. If it is set to 100%, the particles will move the same amount as the object. A setting of 0% effectively prevents any action.

Transform Position/Transform Scale/Transform Rotation

These switches allow you to set which changes in the object are carried over to the particle. By default, only position is checked.

Randomize Effect

If this switch is checked, after calculating the new position (or scale or rotation) of the particle, it will be randomised to between zero and the calculated value. This lets you produce a more natural-looking effect.

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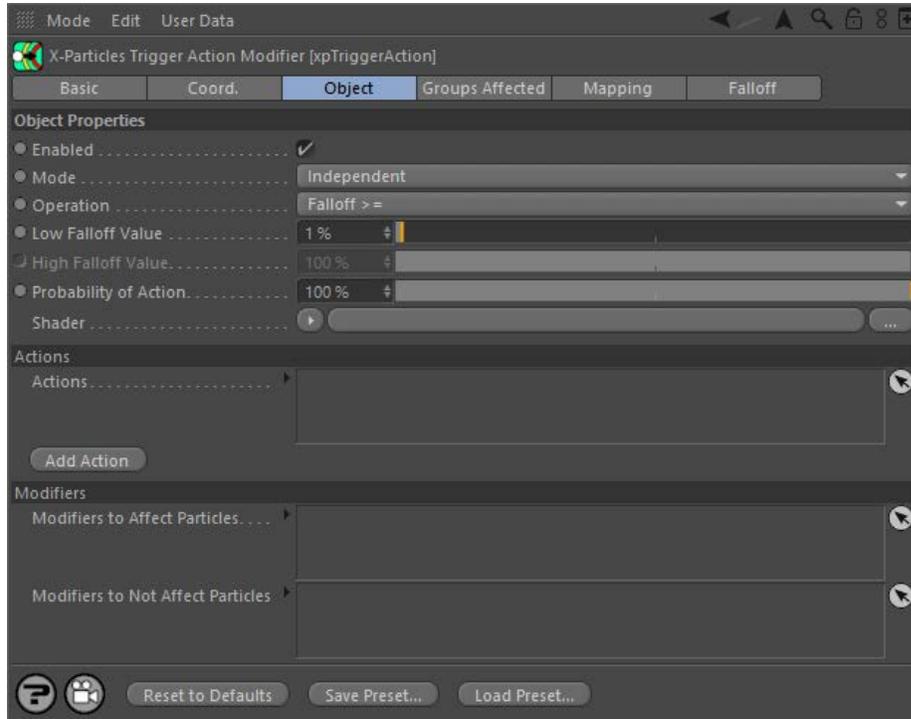
Trigger Action Modifier

Summary

This modifier will trigger an Action while a particle is in its field of effect. This lets you trigger actions in certain parts of the 3D world without any other effect on the particle. You can also use it to turn action-controlled modifiers on or off without using an Action.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Operation

This drop-down has three settings:

Falloff >=

The modifier's falloff value at the particle's position must be equal to or greater than the value in 'Low Falloff Value'.

Falloff Range

The modifier's falloff value at the particle's position must be equal to or greater than the value in 'Low Falloff Value' AND equal to or less than the value in 'High Falloff Value'.

Falloff <=

The modifier's falloff value at the particle's position must be equal to or less than the value in 'High Falloff Value'.

Low Falloff Value and High Falloff Value

These are the falloff values used in the 'Operation' setting as described above.

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Probability of Action

This slider helps to introduce some random variation into the triggering of actions. With no variation, actions are always triggered at the same point, which may appear rather too uniform. By reducing this value below 100%, there is a chance that the action will not be triggered even if all other parameters indicate that it should be. If it is not triggered, the modifier will try again in the following frame. Note that with low probabilities the action may never be triggered.

Shader

This is another way to introduce some random variation in the triggering of action by sampling a shader in this link field. This acts in the same way as the 'Random Probability' setting described above, and in fact the two settings may be used together.

Actions

These are the Actions to be executed when the particle passes the test in 'Operation' (see above).

Add Action

Clicking this button will add an action to the scene and drop it into the Actions list.

Modifiers to Affect Particles

Drag any modifiers (which must be in action-controlled mode) into this list and if the particle passes the test in 'Operation' then these modifiers will be set to affect the particle. This is a workflow convenience - you can do exactly the same thing by adding an Action to the Actions list and using the action to cause a modifier to affect a particle.

Modifiers to Not Affect Particles

Drag any modifiers (which must be in action-controlled mode) into this list and if the particle passes the test in 'Operation' then these modifiers will be set to NOT affect the particle. This is a workflow convenience - you can do exactly the same thing by adding an Action to the Actions list and using the action to cause a modifier to not affect a particle.

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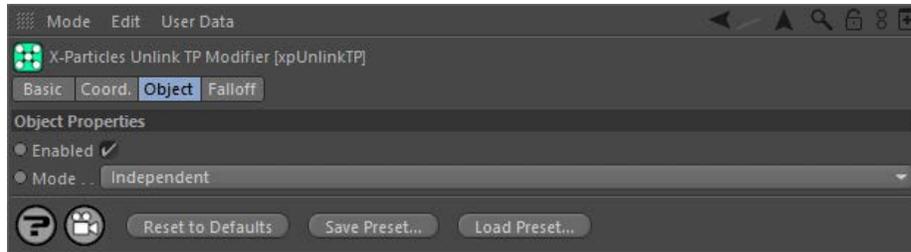
Unlink TP Modifier

Summary

If an emitter is generating Thinking Particles, this modifier can be used to unlink a Thinking Particle from its corresponding X-Particle. At that point, the generated Thinking Particles are no longer controlled by the X-Particles system. In version 2 of X-Particles, the Thinking Particle cannot later be re-linked to the X-Particle.

Interface

This is the modifier's interface:



For the 'Groups Affected' and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

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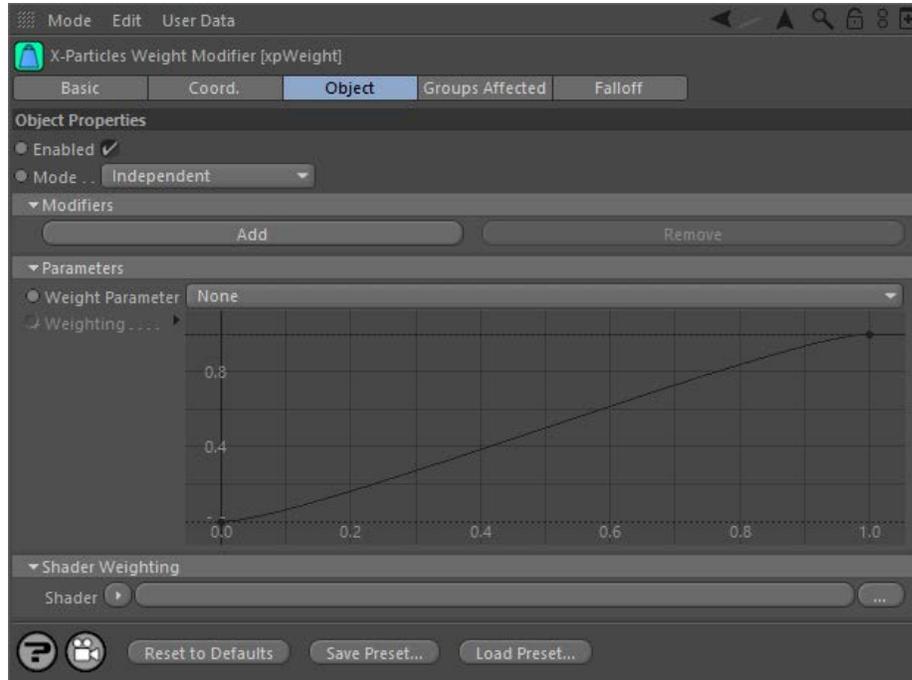
Weight Modifier

This modifier allows you to apply a weighting to any modifier or modifiers. Think of it as an additional 'strength' control, but which allows you to change the strength depending on parameters such as particle age.

Please see the notes at the end of this page on using the Weight modifier before using it for the first time.

Interface

This is the modifier's interface:



For the 'Groups Affected' and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Modifiers

This section is where you set which modifiers are to be influenced by the Weight modifier. To add a modifier, click the 'Add' button. This will show these fields:



Drag the modifier to be affected into the 'Modifier' field. By default the Weight is set to 100%, which will have no effect (i.e. the modifier will continue to work at full strength). If you reduce it to zero, the modifier will be inactive. Values over 100% are also possible, which will increase the strength of the modifier or make it more likely to carry out its effects.

You can add as many modifiers as you like and set the weight for each independently.

To remove a modifier from the list, click 'Remove'. This will remove the last modifier from the list.

Weight Parameter

You can also affect the modifier strength by using the weight parameter. For example, if you set the parameter to 'Age' you can then use the spline to affect the modifier strength over the life of the particle. The value from the spline is then combined with the Weight value for that

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modifier, giving very flexible control over the modifier strength.

The default is 'None' which means that the spline control is unavailable and has no effect.

Available weight parameters

Lifespan

The lifespan of the particle is used to determine the point where the spline is sampled. Newly-created particles will take their weight value from the extreme left of the spline; those who have reached the limit of their lifespan will take the weight from the extreme right of the spline. All other particles will take the weight from some point along the spline.

Age

Similar to 'Lifespan' but it is possible to set a minimum and maximum age. Particles whose age is below the minimum will take their weight value from the extreme left of the spline; those whose age is above the maximum will take the weight from the extreme right of the spline.

Color

When you select this parameter, a drop-down list appears from which you can opt to use the red, green, or blue component of the colour, or its overall brightness. For example, if you choose 'Red' then particles with no red at all in their colour will take their weight value from the extreme left of the spline; those which are pure red will take the weight from the extreme right of the spline.

Speed, Radius, Mass and Distance Travelled

For these parameters two fields will appear setting the minimum and maximum values. For example, if 'Speed' is selected particles whose speed is less than the minimum will take their weight value from the extreme left of the spline; those whose speed exceed the maximum will take the weight from the extreme right of the spline. All other particles will take the weight from some point along the spline.

Note that the minimum and maximum values are important and you will need to adjust them appropriately depending on the parameter being tested.

Weighting

The spline control used to affect the weight assigned to the modifier when the 'Weight Parameter' is anything other than 'None'. The value obtained is then combined with the Weight value for that modifier to produce the final weight used.

Shader Weighting

An optional shader can be added to this field. The shader is sampled and will be used to further influence the final weight. For example, a Noise shader can be used to provide a more random weight value.

Using the Weight modifier

Most modifiers can be weighted by the weight modifier, but there are some that can't - usually because a weight or strength has no meaning for that modifier. The four which cannot be used are the Follow Surface, Kill, and Python modifiers, and the Weight modifier itself (i.e. you cannot weight another Weight modifier).

In X-Particles the majority of modifiers affect parameters which can vary widely and can be changed by varying amounts, such as speed or particle radius. This kind of modifier works best in a Weight modifier; the effect of reduced weight will be to reduce the change carried out by the modifier.

Others, however, cause stepwise changes, such as the Geometry modifier when it changes the index of a generated object associated with a particle, or the Life modifier which either kills a particle or does not. This can't be weighted in the same way, but these modifiers usually test their falloff value against a random variable to decide whether to make the change or not. With these modifiers, reducing their weight will reduce the chance of whatever action they take actually occurring.

Finally, the Weight modifier makes changes to particle data which is reset each frame. When using a Weight modifier, it must execute before the modifiers it weights; and therefore it **MUST be placed ABOVE the other modifiers** in the Object Manager. If you add a Weight modifier by using a System object, this will be done automatically but if you add one manually you will have to change the order yourself. Placing a Weight modifier below other modifiers will not cause any problems, but it will not work at all.

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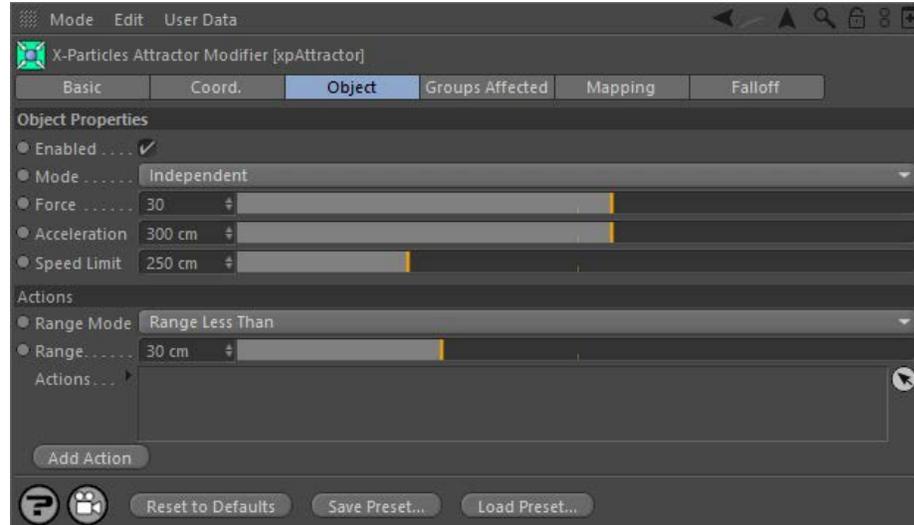
Attractor Modifier

Summary

This modifier is similar to the standard Cinema 4D Attractor modifier, but with the advantage that it can be controlled by X-Particles Actions.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of effect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Force

This is the force applied to the particle to attract it to the modifier.

Acceleration

This will accelerate the particle as it moves towards the modifier. Because the particle speed can become very high, very quickly, you can limit the speed to the value in the 'Speed limit' setting.

Speed limit

The maximum speed the accelerated particles will have.

Range Mode

Range Less Than

The Actions in the 'Actions' list will be triggered while the particle is closer to the Attractor than the value in 'Range'.

Range More Than

The Actions in the 'Actions' list will be triggered while the particle is farther away from the Attractor than the value in 'Range'.

Range

The minimum distance the particle must be from the modifier for actions in the 'Actions' list to be triggered.

Actions

You can drag any action into this list. When the action is triggered depends on the 'Range Mode' setting (see above).

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Add Action

Clicking this button will add an action to the scene and drop it into the Action list.

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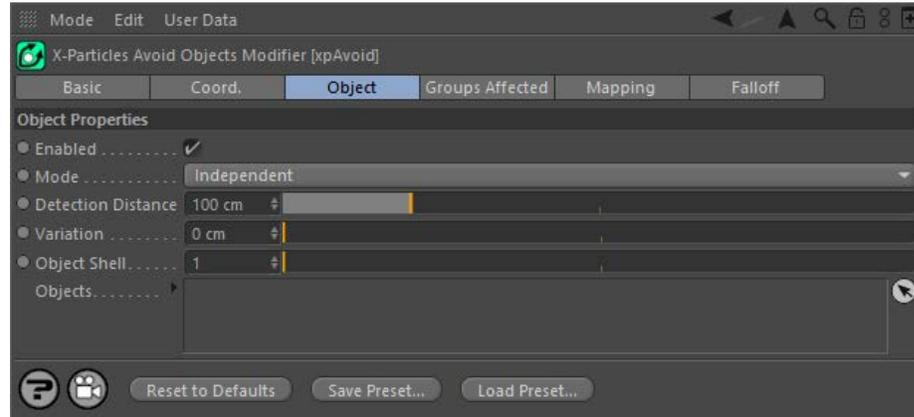
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Avoid Modifier

This modifier will change particle direction to avoid other objects in the scene.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Detection Distance

This is the distance in scene units at which the particle will detect that there is an object to be avoided. The shorter this distance, the closer the particle will get to the object before starting to turn to avoid the object. If you set this too low (e.g. less than the distance the particle will travel in one frame), the particle may fail to avoid the object altogether.

Variation

Applies some random variation to the 'Detection Distance' so that the particles don't all start to avoid the object at the same time.

Object Shell

This applies a scaling factor to each object so as to create an 'invisible shell' around the object. This shell is what the particle will actually avoid. The default is 1, which sets the shell to be the same size as the object, meaning that the particles will only just avoid the object. Set to a higher number, the particle will avoid the object by a wider margin.

Objects

Drag the objects you want the particle to avoid into this list. You can add any kind of polygon object, or an object that would be a polygon object if it was made editable (e.g. object primitives, C4D generator objects, the Mograph cloner, etc.) but not objects without polygons (e.g. splines, lights, etc.).

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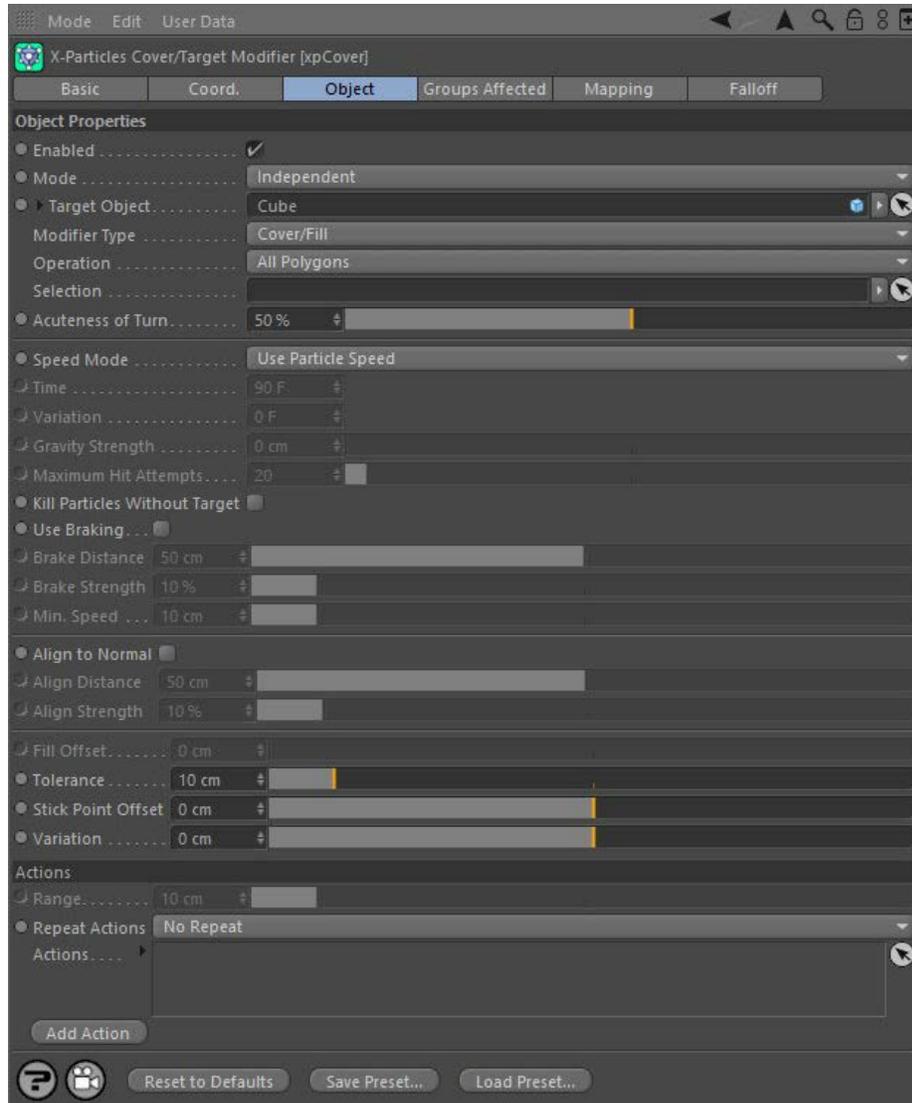
Cover/Target Modifier

Summary

In Cover/Fill mode, this modifier causes the particles to either coat the surface, or fill the volume, of another object. Once the object is coated/filled, the particles will stick to it and will move with the object if the object is moved during an animation. In Target mode, the particles will head for the Target object (if 'Attract' is selected) or be repelled from it. They will never stick to the object in this mode.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Parameters

Enabled

If this button is unchecked, the modifier will be disabled (inactive).

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

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To use this modifier, first drag an object into the link field 'Target object'. There are some restrictions on what you can put here:

- the object must either be a polygon object, or a spline, or a Cinema 4D primitive object or spline
- it must be alone and not in an object hierarchy (e.g. placing the object inside another object will give incorrect results)
- you can use an Extrude, Lathe, or Sweep object as the object to be covered/filled
- it cannot be in a generator such as a Subdivision Surfaces object or a Mograph cloner or an Array object
- you CAN add a deformer to the object to be covered/filled, even ones such as the Explosion deformer!
- if you use any of the the 'Object Vertices' modes (see below) you can even animate a deformer attached to the object and the particles will move to follow the deformed object

Once you have selected your object, you can in some circumstances also drag a selection tag into the 'Selection' link field. This is only used in the 'All Polygons' or 'Object Vertices (Random)' modes described below.

Modifier Type

This can be either Cover/Fill or Target. In Cover/Fill mode, the modifier causes the particles to either coat the surface, or fill the volume, of another object. Once the object is coated/filled, the particles will stick to it and will move with the object if the object is moved during an animation. In Target mode, the particles will head for the Target object (if 'Attract' is selected) or be repelled from it. They will never stick to the target object in this mode.

Operation

This drop-down menu determines how the modifier works. There are several options:

All Polygons

In this mode, all the polygons of the target object will be used as possible targets for a particle to stick to their surface. A polygon selection tag may be used to define which polygons will be used. Point selection tags can also be used but the selection will first be converted to a polygon selection.

Visible Polygons (Using Normals)

Only those polygons which are "visible" to the particle will be targets for particles. Whether a polygon is visible is defined by the surface normal of the particle. If the normal points away from the particle at an angle of less than 90 degrees, it is said to be visible; if not, it is not visible and that polygon will be ignored. This method may, depending on the object, result in some polygons being coated when they are not truly visible from the position of the particle. However, this mode is much faster than the alternative mode described next. Polygon and point selection tags cannot be used in this mode.

Visible Polygons (Using Rays)

This is the same as the previous option but fires an invisible ray from the particle to try to hit a polygon in the object. This method is more accurate but slower than 'Visible Polygons (Using Normals)'.

Object Vertices (Random)

Instead of polygons, the object's vertices are used as targets for the particles. A point selection tag may be used to define which vertices are used. Polygon selection tags are first converted to a point selection, where possible. In this mode you can animate deformers attached to the target object and the particles will move with the vertices of the deformed object. In the current version this will work for most deformers but not the Cinema 4D Displace deformer or the X-Particles Particle deformer.

Object Vertices (Ordered)

This mode also uses the object's vertices as targets. However, in 'Object Vertices (Random)' the vertices are selected randomly, as the name implies. For objects with a lot of points, this could mean that not all points receive a particle, while some points receive multiple particles. 'Object Vertices (Ordered)' guarantees that each vertex will receive a particle, provided you emit enough particles of course. It works by assigning the first particle emitted to the first point in the object, the second particle to the second point, and so on.

In this mode you can animate deformers attached to the target object and the particles will move with the vertices of the deformed object. In the current version this will work for most deformers but not the Cinema 4D Displace deformer or the X-Particles Particle deformer.

You can use this mode to assign one, and only one, particle to each vertex. You would first work out the number of points in the object, then limit the number of emitted particles in the emitter (e.g. by limiting the maximum number of particles, or by using shot emission or pulse emission with an interval longer than the scene length) then use this modifier to allocate one particle per vertex. You can use the 'Get Count From Object' feature of the emitter to limit the number of particles to the number of vertices in an object automatically.

Object Vertices (Ordered, Random)

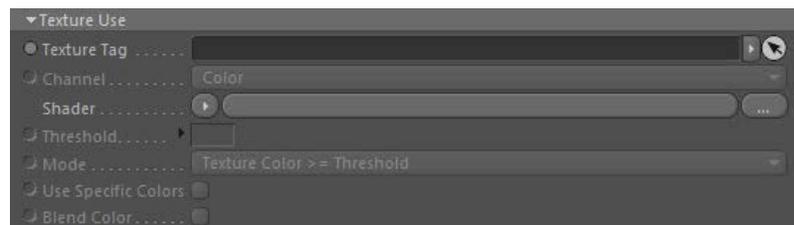
This is the same as 'Object Vertices (Ordered)' except that instead of each vertex in the object being covered by a particle in vertex order (i.e. point 1 gets the first particle, point 2 the second particle, and so on) the vertices are covered in random order. But each point will still receive one particle until all the points are covered.

Object Volume

All the previous options stick particles to the surface of an object. This option causes the object to be filled with particles. Selection tags cannot be used in this mode.

Texture

In this mode, you can use a texture to control the covering of an object by particles. If you select this option, the following section of the interface appears:



Texture Tag

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- [Change Spin](#)
- [Change Sprites](#)
- [Control Morphing](#)
- [Control Spawning](#)
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You can drag a texture tag into this field and the modifier will use the material referenced by that tag. Any of the texture tags assigned to the object may be used, but they must have UVW mapping. No other form of mapping will work correctly.

Using a tag is convenient if you have already set up a material and don't want to have to duplicate it in another shader. Once you add the tag to this field, you can select the channel to sample in the 'Channel' drop-down menu, but you can no longer use the 'Shader' field - that is, you can't use a texture tag and a shader simultaneously.

Channel

This is the material channel which governs the sticking of particles to the target object.

If you have dragged a texture tag into the 'Texture Tag' field, you can choose the channel to use from the material. By default this is the Color channel, but you can choose from several others. One thing you can do is use a channel which is not being used in the material. For example, you could set up a shader to govern particle sticking in the displacement channel but leave that turned off in the material editor. The modifier can still sample that channel even though it is not being used in the material.

Shader

Instead of using an existing texture tag, you can set up any shader in exactly the same way as if you were using the material editor. Or, you can copy a channel from a material and paste it into this field. Note that the 'Shader' field is disabled if there is a texture tag in the 'Texture Tag' field. If you set up a shader, then add a texture tag, only the tag is used; the shader will be ignored.

Threshold

The threshold is a colour value. The sampled colour from the texture must either be equal to or greater than (or equal to or less than, depending on the 'Mode' setting) this value for particles to be stuck to that point on the target. The default is mid-grey (RGB 127, 127, 127) so if 'Mode' is set to equal or greater than, particles will only be stuck where the sampled texture colour is brighter than mid-grey.

This colour is also used when the 'Use Specific Colors' switch is checked - see below.

Mode

'Mode' has two settings:

- Texture Color >= Threshold
- Texture Color <= Threshold

If the first setting is selected, the brightness of the colour in the texture must be equal to the threshold, or brighter than it. Particles will not stick to darker areas. If the second option is chosen, the texture colour must be as dark as, or darker than the threshold. Particles will not stick to brighter areas.

Use Specific Colors

This switch controls how the modifier compares colours in the texture to the threshold. When unchecked (the default) the average brightness of the two colours are compared. When it is checked, the RGB components of the colours are compared individually.

For example, we can represent RGB colour values as ranging from 0 to 1, so that white is RGB 1, 1, 1. The average brightness of that colour is then $(1 + 1 + 1) / 3$, which is of course 1. Now, suppose we have a texture with two colours - a yellow-orange with RGB values of 1, 0.5, 0 and a blue with values 0, 0.5, 1. We set the threshold to be the same yellow-orange (1, 0.5, 0).

You can see that the average brightness of the colours is the same in all cases - it works out at 0.5. So with 'Use Specific Colors' unchecked, particles will stick to any areas of the texture which are either yellow-orange or blue, because the average brightness of the texture colour is the same as the threshold colour brightness..

Now suppose we turn on 'Use Specific Colors'. The individual RGB components are now compared. For the yellow-orange, its RGB values are the same as the threshold, so particles will be stuck to areas with that colour. But the blue colour does not match: its red component is lower than the threshold, so particles will not stick to that area.

The usefulness of this switch is that you can specify exactly what the colour in the texture must be in order to stick particles. Suppose you set the threshold to pure red (RGB 1, 0, 0) and turn on 'Use specific colours'. Now particles will only stick to those areas in the texture which are pure red.

Blend Color

If this switch is turned on, the cover modifier will send the particles to points on the target object such that the source texture is remapped to the target. In this example, the source object is the sphere and the destination is a cube:



You can see that the texture from the sphere has been reproduced on the cube. It appears on each face because of the UV mapping of the cube; different UV maps would give different results.

To achieve this effect, you need to do the following:

- Set up the emitter to emit from an object, *under texture control*
- Add the texture tag from the source object
- Set the Emit Channel to None (you want particles to be emitted from the entire surface) and the Color Channel to Color
- In the Cover/Target modifier, set Operation to Texture and Channel to Color
- Drag the texture tag *from the source object* into the Texture Tag link field
- Finally, set the Threshold colour to black and the Mode to 'Texture Color >= Threshold' to ensure that all points on the surface are covered

Selection

Drag a point or polygon selection into this field. Polygon selections are ignored unless the 'Operation' is set to 'All Polygons' or 'Object Vertices (Random)' (in which case the polygon selection is first converted into a point selection). Note that this means that the 'Object Vertices (Ordered)', and 'Object Vertices (Ordered, Random)' modes cannot be used with a polygon selection, only a point selection.

Point selections are ignored unless 'Operation' is set to 'Object Vertices (Random)', 'Object Vertices (Ordered)', 'Object Vertices (Ordered, Random)' or 'All Polygons'. (In the case of 'All Polygons' the point selection is first converted to a polygon selection, where possible.)

Vertex maps can be used instead of a selection tag, but will be ignored unless Operation is set to 'Object Vertices (Random)'.

Acuteness of Turn

This is the angle at which the particle turns towards its target when the modifier begins to influence it. Lower values will give shallower turns but may result in particles missing their target, depending on for how long and/or how strongly the modifier influences them.

Setting the particle speed

Speed Mode

This setting determines how quickly the particles will arrive at the target. It has three options:

Use Particle Speed

In this mode, the particles use the speed given to them by the emitter when they were created. This means that some particles will take longer than others to reach their target point, because they were further away from their target than other particles. It also means that if the target object is animated and moves away from the emitter, the particles will have to chase it and will take longer to reach the target.

With this option, the braking parameters also become available (see below).

Set Time to Reach Target

This mode takes the value from the 'Time' field and the modifier then gives each particle a speed which will enable it to reach its target point in that number of frames. For example, if the value in 'Time' is 80 frames, a particle created at frame 10 will reach its target at frame 90 (10 + 80 = 90). If you set the emitter to shot mode, all the particles released in that shot will arrive at the target at the same time even if some particles were further away from their target point than others. If the target is animated and moves away from the emitter, the particles will speed up in an attempt to reach their target in the specified time. Note that if the target moves very fast, and the value in 'Time' is small, the particles may have to move very fast indeed to catch up, and may then overshoot the target as a result.

Gravity

In this mode the particle will be pulled towards the target, increasing its speed as though it was being attracted by gravity.

Time and Variation

This value is used in conjunction with the 'Speed Mode' setting 'Set Time to Reach Target', as described above. You can use the 'Variation' setting to add some variation in the time taken by the particles to reach the target.

Gravity Strength

The strength of the attraction force when 'Gravity' speed mode is selected.

Use Braking

This and the next three parameters are only available if 'Speed Mode' is set to 'Use Particle Speed'.

When this switch is enabled, the modifier will slow the particle as it approaches its target. This gives a much smoother effect than an abrupt halt when the particle hits its target.

Note: with a slow-moving particle, the final snap to its target point will be much more noticeable than for a faster particle. To remove the snapping effect, turn the 'Tolerance' value (see below) down to a lower value - you may need to reduce it to 2 scene units or less, depending on the final speed.

Brake Distance

If 'Use Braking' is checked, the modifier will start to slow the particle when the distance to its target point is less than this value.

Brake Strength

This is a percentage value and the modifier will slow the particle by this percentage of its speed each frame.

Min. Speed

This is the lowest speed the particle will have when braked. If this is set too low, there is a risk that the particle could move so slowly that it will never reach its target.

Aligning particles

Align to Normal

If this switch is checked, the modifier will rotate the particle to align its Z-axis to the normal of the polygon it will stick to. For this to work, particle rotations must be enabled in the emitter.

Align Distance

If 'Align to Normal' is checked, the modifier will start to rotate the particle when the distance to its target point is less than this value. If the distance is very short, there may not be sufficient time to complete the rotation before the particle reaches its target. In that case, you can

increase this value or try increasing the 'Align Strength' value.

Align Strength

When the modifier starts to align the particle, it will do so by mixing the values for the current rotation and the target normal, with a strength given by this setting. The higher the value, the faster the particle will be aligned. If the value is small, there may not be sufficient time to complete the rotation before the particle reaches its target. In that case, you can increase this value or try increasing the 'Align Distance' value.

Other options for Cover/Fill mode

Maximum Hit Attempts

This is used to determine how many attempts will be made to find a suitable polygon or vertex to act as a target for a particle. If this was not present, it would be possible in some cases for the system never to find a polygon or point and enter an endless loop. The default value is 20, which is enough in most cases. If you find that some particles do not find a target on the object, you can try increasing this value, but this may slow down the system. It is not used in the 'All Polygons' or 'Object Vertices' modes.

Kill Particles Without Target

If the count in 'Maximum Hit Attempts' is exceeded, the particle will not have a target point on the target object. It will then follow whatever direction given to it by the emitter and influenced by any other modifiers. In the next frame, it will try again to find a target point, and will keep on doing so in successive frames until it eventually succeeds.

However, this has two consequences: if it never finds a target point you are left with 'loose' particles that don't move to the target; and it may slow down playback in the editor if many particles have to keep trying to find a target point each frame.

This switch prevents this from happening: if checked, any particles which fail to find a target point in one frame are simply removed from the scene.

Fill Offset

This is only available in 'Object Volume' mode. It allows you to shrink the space inside the object which the particles will try to fill. It can be useful to increase this value if you find particles are too close to the object's surface so that any sprites or generated objects protrude from it (which you may want, of course!).

Tolerance

This is the minimum distance that the particle must be from its target before the particle will snap to the target. It is needed because each particle moves a set distance per frame, so it is unlikely that the particle will ever hit the target exactly. When it gets to within this distance therefore, it will be snapped to the target. You may need to increase this for very fast particles, or reduce it if you are doing close-ups and the particle appears suddenly to jump to a new point.

Stick Point Offset

With this setting you can alter the distance away from the target at which the particle adheres to the target object. For example, if you choose 'All Polygons' mode, the modifier will find a point on the surface of the target object. If 'Stick Point Offset' is set to 20 units, it will then set the target point to 20 units away from the selected point along the polygon or vertex normal.

The purpose of this setting is to allow you to offset the sticking point so that the objects associated with the particles do not partially embed themselves in the surface of the target. It works best with regular objects such as spheres, cubes, or platonics and less so with less regular objects such as cylinders or capsules. This setting is not available with the 'Visible Polygons (Using Rays)' mode of operation or, of course, with the 'Fill Object' mode.

Variation

This setting adds random variation to the 'Stick Point Offset' setting.

Other options for Target mode

Target Effect

This can be set to either 'Attract', which causes the particles to head towards the target, or 'Repel', which makes them move away from it.

Actions

You can drag any Action, or multiple Actions, into this box.

In Cover/Fill mode, these Actions will be carried out each frame for each particle while it is stuck to the object (but see 'Repeat Actions' below). When it is unstuck again, the Action(s) will no longer be carried out. Note that you don't need an accompanying Question to trigger this Action. The Action is triggered directly by the modifier.

In Target mode, the Action will be triggered when the particle comes within range of the target. The range is set in the 'Range' attribute.

Range

In Target mode only, the Action will be triggered when a particle gets within this distance to its target.

Repeat Actions

In Cover/Fill mode only, this setting determines if the Action(s) will be carried out each frame while the particle is stuck to its target. There are two options:

Repeat

The Action(s) are repeated each frame while the particle is stuck to the target.

No Repeat

The Action(s) are carried out once when the particle arrives at its target, but are not repeated after that.

Add Action

Clicking this button will automatically create a new Action and add it to the 'Actions' list.

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Direction Modifier

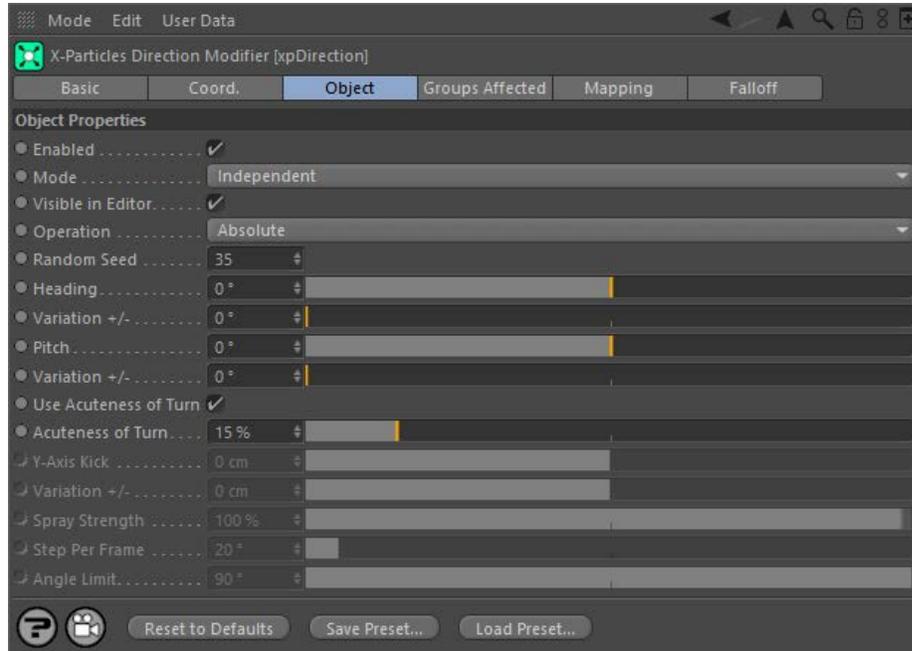
Summary

This modifier changes the direction of particles passing through it.

 In this version, the modifier draws an arrow to show the direction the particles will take (except in Ring and Spray modes).

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of effect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Visible in Editor

 If this switch is checked, the direction for the particles will be shown by an arrow drawn on screen. This will not move if you rotate the modifier, as this does not affect the direction, *unless* 'Operation' is set to 'Use Modifier Rotation' (see below). Uncheck this switch to hide the arrow.

Operation

This setting has six options:

Absolute [default setting]

The Absolute setting will cause the particle to move along the heading chosen in 3D world space. For example, if the particle is currently moving along the positive X-axis, setting the heading to -90 degrees will cause it to move along the negative X-axis, which is actually 180 degrees from the initial direction.

Important: this is a direction in global space. The new direction will always be the same, regardless of the current direction of the particles or the rotation of the emitter.

Spray

This option will cause the particles to spray out from their current direction of travel. The width of the spray is governed by the 'Spray Strength' setting (see below). The best results with this option can be seen with a very narrow particle stream with all particles initially travelling in the

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same direction.

Circular

This will cause the particle to change its direction relative to its current direction. Each frame, the modifier will alter the particle's direction relative to its current direction. So for example, if the 'Heading' is set to +5 degrees, each frame the heading will increase by 5 degrees. The result is that the particle will move in a circle unless the modifier stops acting on it. Exactly how long it takes to move in a circle depends on the Heading, the 'Acuteness of Turn', and the modifier's falloff. The end result of this is that the particle will move in a circle. You can then use the 'Y-axis Kick' to move the particle along the Y-axis (note: that's the emitter object Y axis, not the world Y axis). This is an easy way to make the particle move in a spiral.

You can rotate the emitter to alter the plane in world space on which the particle moves.

Jitter

This mode is identical to the Circular mode but instead of a consistent change in direction each frame, the direction will change randomly. So if the 'Heading' setting is set to 45 degrees, the particle heading will change randomly each frame between +45 and -45 degrees.

Ring

In this mode you can make the particles adopt a flat ring or disc shape. The particles will deviate from their original path by a maximum value set in the 'Angle Limit' parameter. The speed with which they deviate is controlled by the 'Step Per Frame' parameter.

To form a ring, you should turn off 'Sub-Frame Emission' in the emitter. This is because you are trying to generate a specific pattern and sub-frame emission is there precisely to avoid such things! If you leave it on, you will see an irregular disc instead of a ring. The best results with this option can be seen with a very narrow particle stream with all particles initially travelling in the same direction.

Use Modifier Rotation



With this mode, the direction is the direction in which the modifier points. This lets you simply rotate the modifier to point in the desired direction, without having to enter a heading and pitch value. The 'Variation' parameters can still be used to vary the direction from the actual pointed direction.

Heading (and Variation)

This is the particle heading (corresponding to the 'H' angle in an object rotation). The variation parameter adds some random variation into the actual heading produced.

Pitch (and Variation)

This is the particle pitch (corresponding to the 'P' angle in an object rotation). The variation parameter adds some random variation into the actual pitch produced.

You may be wondering why there is no setting for Bank. This is because it is not needed. To make a particle move in any direction only requires the heading and pitch. Bank would make the particle spin on its own axis, which is not useful in this case.

Use Acuteness of Turn

This switch is only available if 'Operation' is set to 'Absolute'. If it is checked, the modifier will use the 'Acuteness of Turn' setting to determine how sharply the particle changes direction. Turning it off will cause an immediate direction change with no curve.

Acuteness of Turn

This setting determines the sharpness of the turn the particle makes when changing direction. A value of 100% will cause the particle to turn immediately to its new direction. A value of 0% will mean that it will not turn at all!

The setting required depends on what you want to do and on factors such as the particle speed. Generally, values of 15-20% produce nice, smooth curves.

Y-Axis Kick (and Variation)

This setting is only used with the Circular mode. When applied to a particle it causes the particle to move up or down on the Y-axis. Combined with circular movement this will cause the particle to move in a spiral.

Spray Strength



This parameter lets you control the strength of the Spray mode.

Step Per Frame

This is only used in 'Ring' mode. It controls how fast the particles deviate from their current path to the limit given in the 'Angle Limit' setting. A large number will cause a very rapid change in direction, small numbers will cause a more gradual change.

Angle Limit

This is only used in 'Ring' mode. It gives the maximum angle by which the particle will deviate from its current path. For example, if a particle is currently travelling along the Z-axis with no X or Y axis movement, an angle limit of 45 degrees will result in a maximum 45-degree deviation away from the Z-axis (this could be in any direction along X or Y). The speed with which the limit is reached is governed by the 'Step Per Frame' setting.

You can set this parameter to a maximum of 90 degrees. Note that at or near this setting, you may start to see some distortion begin to appear in the particle stream.

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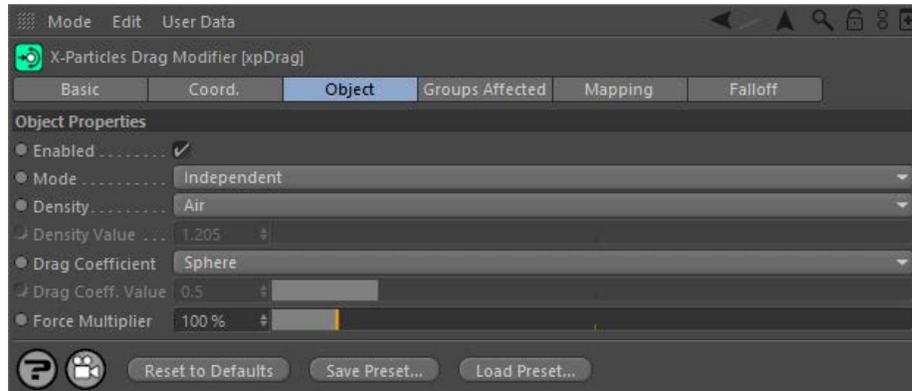
Drag Modifier

This modifier acts in a similar way to the inbuilt Friction modifier in Cinema 4D, but with greatly enhanced functionality.

For explanatory notes on this modifier, please see '[How to use the Drag modifier](#)' below.

Interface

The object's interface looks like this:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Object tab

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Density, Density Value

The density of the medium through which the particle is moving (see '[How to use the Drag modifier](#)' below). Several density values are available from the drop-down, or you can select 'Custom' and enter a custom value into the 'Density Value' field.

Drag Coefficient, Drag Coeff. Value

The drag coefficient of the object (see '[How to use the Drag modifier](#)' below). Several values are available from the drop-down, or you can select 'Custom' and enter a custom value into the 'Drag Coeff. Value' field.

Force Multiplier

This setting is not physically accurate but lets you fine-tune the result of the modifier once you have set up the density and drag coefficient values. If the effect is not quite what you want, change this value to reduce or increase the force acting on the particle.

How to use the Drag modifier

The Drag modifier goes some way to providing a physically accurate effect of drag on a particle. Drag occurs when an object moves through a medium - which could be air or another gas, or some kind of liquid. Drag acts to slow the object down; "air resistance" is a common term used for the drag on an object moving through air.

Drag is influenced by a number of factors:

- The density of the medium: the greater the density, the greater the drag. The modifier has several preset density values built-in, or you can add your own by selecting 'Custom' in the 'Density' drop-down. You can find densities for almost any medium on the net.
- The speed of the object: as the speed increases so does the drag effect.
- The drag coefficient: this value is usually determined experimentally for an object. The modifier includes coefficients for a variety of objects, and again, you can find more on the net. Custom values can be used by selecting 'Custom' in the 'Drag Coefficient' drop-down.
- The surface area of the object in its forward direction. The modifier uses the particle radius for this. This is not physically accurate but determining the surface area of an object (which might be very irregular in shape and could be rotating, so the forward surface area is constantly changing) is not simple and would certainly be time-consuming. The particle radius is used as an approximation. Note that the particle scale has no effect, so if you want the drag to be influenced by surface area, any objects associated with the particle MUST derive their size from the particle radius, not the scale.

Using these values, a drag force in newtons is calculated. This force then acts to slow the particle. In the real world, objects with greater mass are affected less by drag than similar objects with less mass. This is also true for the Drag modifier: the speed reduction varies according to particle mass, so if your particles have different masses, the drag effect will vary. Note that a particle mass of 1 in this case is assumed to be equivalent to 1 gram.

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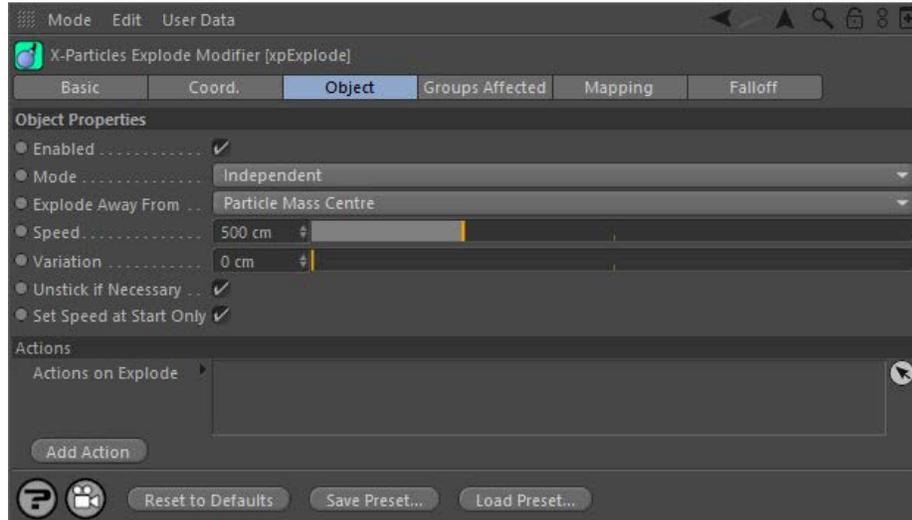
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Explode Modifier

This modifier causes particles to 'explode' away from their current position.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Explode Away From

This drop-down has two settings:

Particle Mass Centre

The centre of mass of all the particles is first calculated. A particle which is affected by the modifier will then explode away from the centre of mass. This is a useful option if the modifier is in action-controlled mode and you activate the modifier with an Action.

This Modifier

With this option, a particle which is affected by the modifier will then explode away from the position of the modifier itself. This is useful if you are animating the modifier and it has a falloff other than infinite, since the particles can then be stripped away from an object by moving the modifier over that object.

Speed and Variation

This is the speed with which the particles will move when they explode. You can add some random variation to this with the 'Variation' setting.

Unstick if Necessary

If a particle is stuck to an object, for example by a Cover/Target modifier or by sticking the particle to an object at emission, the particle must be unstuck for this modifier to work. This will be done automatically if this switch is checked. Otherwise you will have to use an Action to unstuck the particle first.

Actions on Explode

Actions dragged into this list will be executed when any particle is 'exploded' by the modifier.

Add Action

Clicking this button will add an action to the scene and drop it into the Actions list.

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Flocking Modifier

Summary

This modifier attempts to emulate the flocking effect seen in bird flocks and fish shoals. It uses the rules for "boids" developed by Craig Reynolds. If you want to know more, search for "boids" on Google and you will find many references.

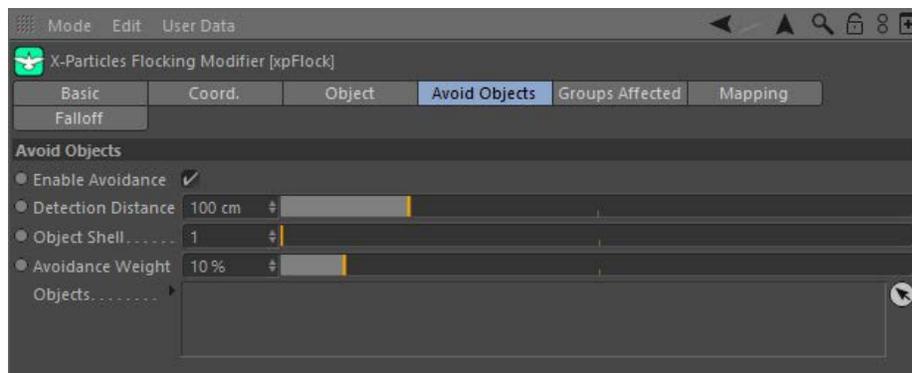
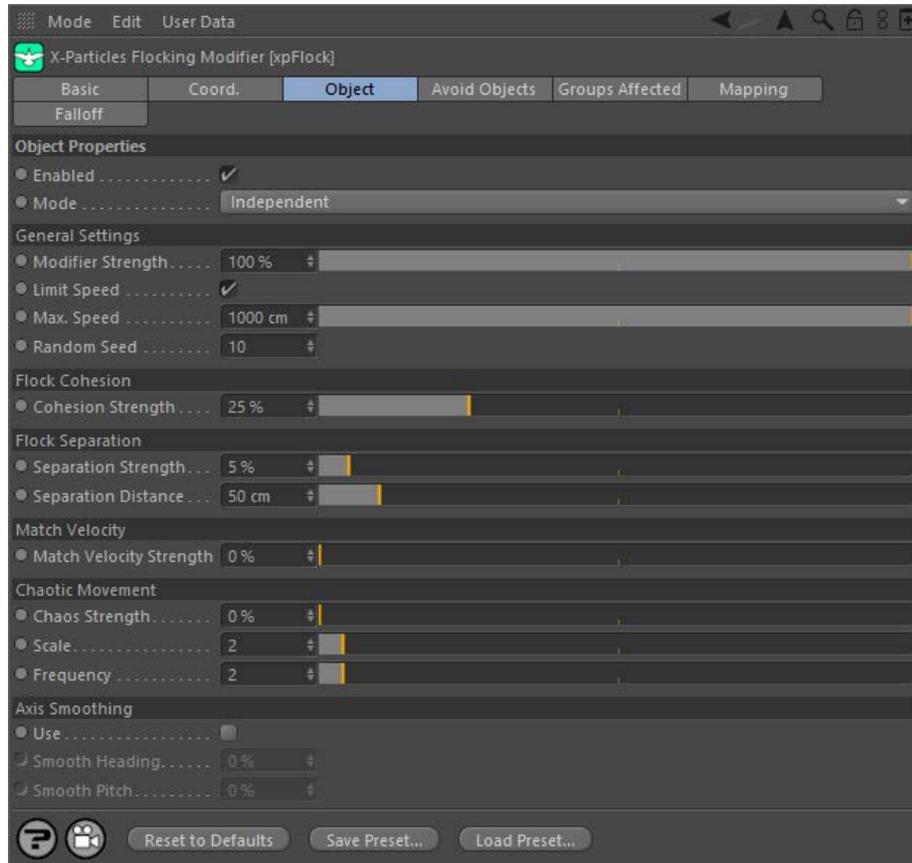
When using this modifier, it is strongly recommended that the emitter emits only a single pulse of particles or emits them over a short period – say 10-30 frames. If you use a continuous stream of particles, the existing particles will be influenced by the new ones being born and you will find that the flock becomes a swirling mass that doesn't really do anything.

Flock Helpers

Please also see the manual page for the [Flock Helper](#), which adds extra functionality to the flocking system.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Parameters - Object tab

Enabled

Uncheck this switch to disable the modifier.

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Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

General Settings

Modifier Strength

This is an overall strength setting for the modifier; the lower the value, the less effect the modifier will have. Values above 100% are permitted.

Limit Speed

The tendency of the modifier is to increase particle speed in an attempt to keep the flock together. You can limit the maximum speed of the particles by checking this switch.

Max. Speed

The maximum allowed speed of the particles if 'Limit Speed' is checked.

Random Seed

You can change the seed used by the random number generator in the modifier by using this parameter.

Flock Cohesion

Cohesion Strength

This is a weighting factor which affects the flock's tendency to stick together in a group. Increasing this will make the flock increasingly try to stick together in a small group. Lower values will allow the flock to spread out more loosely.

Flock Separation

Separation Strength

This setting controls the strength of the tendency to maintain distance from other flock members.

Separation Distance

This is the distance that individual particles will try to remain from each other. The smaller this is, the smaller and tighter the flock will become. If it is too small, you will get more of a vibration than a flocking effect; if too large, the particles will remain so far apart they don't look like a flock.

Match Velocity

Match Velocity Strength

This is the tendency of the members of the flock to match the speed and direction of other members. The higher this value is, the more uniform the flock movement will become.

Chaotic Movement

These settings can be used to add some additional chaotic movement to the flock if it is too uniform.

Chaos Strength

The higher this value, the more chaotic the movement.

Scale, Frequency

These values alter the underlying turbulence which is applied to the movement. They have the same effect as in the [Turbulence modifier](#).

Axis Smoothing

These settings can smooth the movement in terms of heading and pitch. The higher the value, the less variation is apparent in the movement.

Use

Check this switch to use axis smoothing.

Smooth Heading, Smooth Pitch

These settings govern the smoothing of the heading and pitch. They can be set independently of one another.

Note: if you turn both heading and pitch smoothing up to 100% you will abolish any direction change and the flocking behaviour will disappear.

Parameters - Avoid Objects tab

In this tab you can set which (if any) scene objects will be avoided by the modifier.

Enable Avoidance

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If this switch is checked, the objects in the 'Objects' list will be avoided by the particles. If unchecked, the particles will not avoid the objects.

Detection Distance

This is the distance in scene units at which the particle will detect that there is an object to be avoided. The shorter this distance, the closer the particle will get to the object before starting to turn to avoid the object. If you set this too low (e.g. less than the distance the particle will travel in one frame), the particle may fail to avoid the object altogether.

Object Shell

This applies a scaling factor to each object so as to create an 'invisible shell' around the object. This shell is what the particle will actually avoid. The default is 1, which sets the shell to be the same size as the object, meaning that the particles will only just avoid the object. Set to a higher number, the particle will avoid the object by a wider margin.

Avoidance Weight

The movement of the flock is a combination of various forces acting on its members (these are shown in the 'Object' tab). The requirement to avoid scene objects is another such force and is added to the overall particle direction after the various flock rules have been calculated. This parameter sets the weight which is given to the need to avoid the scene objects. The higher the value, the more 'wary' of scene objects the particles will become.

Objects

Drag the objects you want the particle to avoid into this list. You can add any kind of polygon object, or an object that would be a polygon object if it was made editable (e.g. object primitives, C4D generator objects, the Mograph cloner, etc.) but not objects without polygons (e.g. splines, lights, etc.).

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Follow Path Modifier

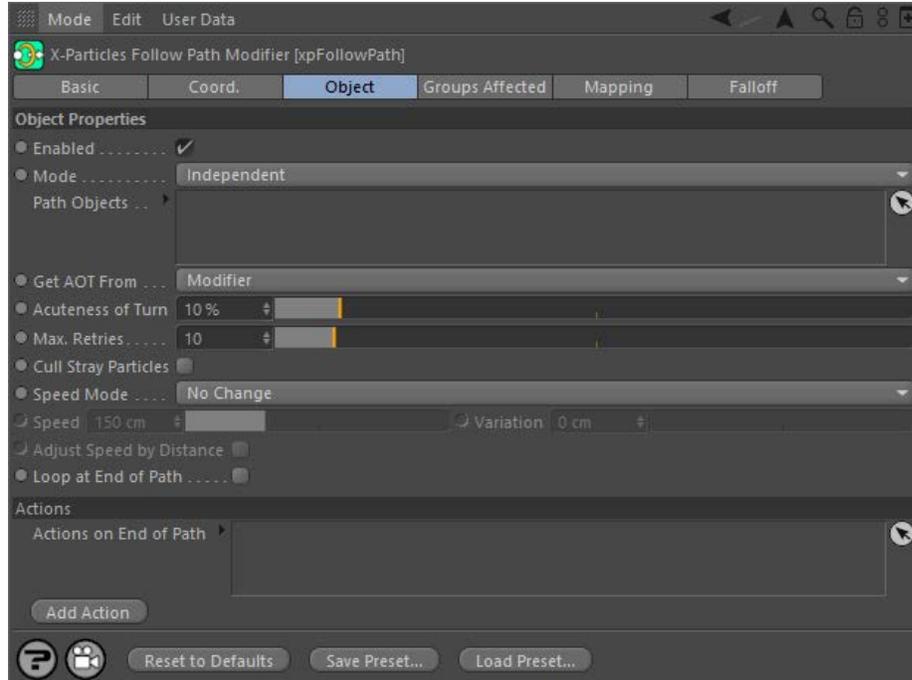
This modifier causes the particle stream to follow a path which is controlled by a sequence of path objects.

Path Data Tag

Please also see the manual page for the [Path Data Tag](#), which adds additional functionality to this modifier.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Path Objects

These objects set out the path the particle stream will follow. The stream will move to each object in the list in the order they are found there.

Each path object must have the following requirements:

- it must be a closed spline
- it must be coplanar
- its axis must be centred within it
- the profile must point along the Z-axis

 In this version, the modifier can now use a Mograph Cloner as the path object. Simply make a spline the child of a Cloner then drop the Cloner into the 'Path Objects' list. You can then use effectors to alter the position, scale, etc. of the clones and even animate them!

Open splines will not work at all; non-coplanar splines may work but the result is unpredictable. (Coplanar means that all the points of the spline lie on the same plane, but that can be any arbitrary plane.)

If your path objects are spline primitives which lie on the XY plane (the default setting) you will meet these requirements but for custom splines you must ensure that this is the case.

Splines which can be used include Circle, Rectangle, Star, Flower, etc., but not Helix, Arc, Formula and so on. Some (such as Arc) will work if you make it editable and close the spline. Helix can never work because it is never coplanar.

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Get AOT From

For each path object, when the particles turn to head towards it the sharpness of the turn is governed by the 'Acuteness of Turn' setting (AOT). In many cases you can use the same AOT setting for all the path objects, but it may be that for some objects you want a less or more acute turn. In that case, you can assign a **Path Data tag** to the object and set the AOT in the tag. This way, all the path objects can have different AOT settings if required.

The drop-down has two options:

Modifier

The acuteness of turn will be obtained from the modifier 'Acuteness of Turn' setting for all path objects, even if they have a Path Data tag.

Tag

If the object has a Path Data tag, the acuteness of turn will be obtained from the tag. If an object has no tag, the AOT setting in the modifier will be used.

Acuteness of Turn

This value controls how sharply the particle will turn to head for the next object. If it is too low, the particle may not reach the object in time, in which case it will circle back to try again. This setting is used if 'Get AOT From' is set to 'Modifier' or if it is set to 'Tag' and a path object does not have a Path Data tag.

Max. Retries

This is the number of times the modifier will try to find a target position in the path spline for a particle to aim for. Some very complex splines may take many attempts to find a target position; you can set the maximum number of attempts in this parameter. Large numbers may slow down the playback.

If no target position is found after the maximum retry count is reached, the particle will no longer follow the path and will simply continue travelling along its current direction. You can kill these stray particles with the 'Cull Stray Particles' switch.

Cull Stray Particles

If checked, particles which have not been assigned a target position inside a path object will be removed (see 'Max. Retries' above).

Speed Mode

This setting determines the particle speed between path objects. It has the following options:

No Change

The particle maintains its current speed.

Set Speed

The particle speed is set from the value in the 'Speed' setting (with added variation, if any).

Get Speed From Tag

If the object has a Path Data tag, the speed will be obtained from the tag. If an object has no tag, the speed will be unchanged.

Increment Speed From Tag

If the object has a Path Data tag, the speed value will be obtained from the tag and this will then be added to the current speed. If an object has no tag, the speed value will stay at its current value.

Speed and Variation

Only available in 'Set Speed' mode to set the particle speed. Variation in the speed can be added using the 'Variation' setting.

Adjust Speed By Distance

Only available in 'Set Speed' mode. When the particle stream turns to point to the next path object, they will all move at the same speed but particles on the outside of the curve will take longer to get there than those on the inside. Checking this switch will reduce that discrepancy by adjusting the speed to take account of the distance to be travelled.

If you choose 'Get Speed From Tag' the same setting is also available in the Path Data tag.

Loop at End of Path

If this switch is checked, when the particles have passed through the last path object, they will return to the first object and move along the path again. If it is unchecked they will simply follow the direction they had on exiting the path.

Actions on End of Path

Actions dragged into this list will be executed when a particle reaches the end of the path (i.e. passes the final path object).

Add Action

Clicking this button will add an action to the scene and drop it into the Actions list.

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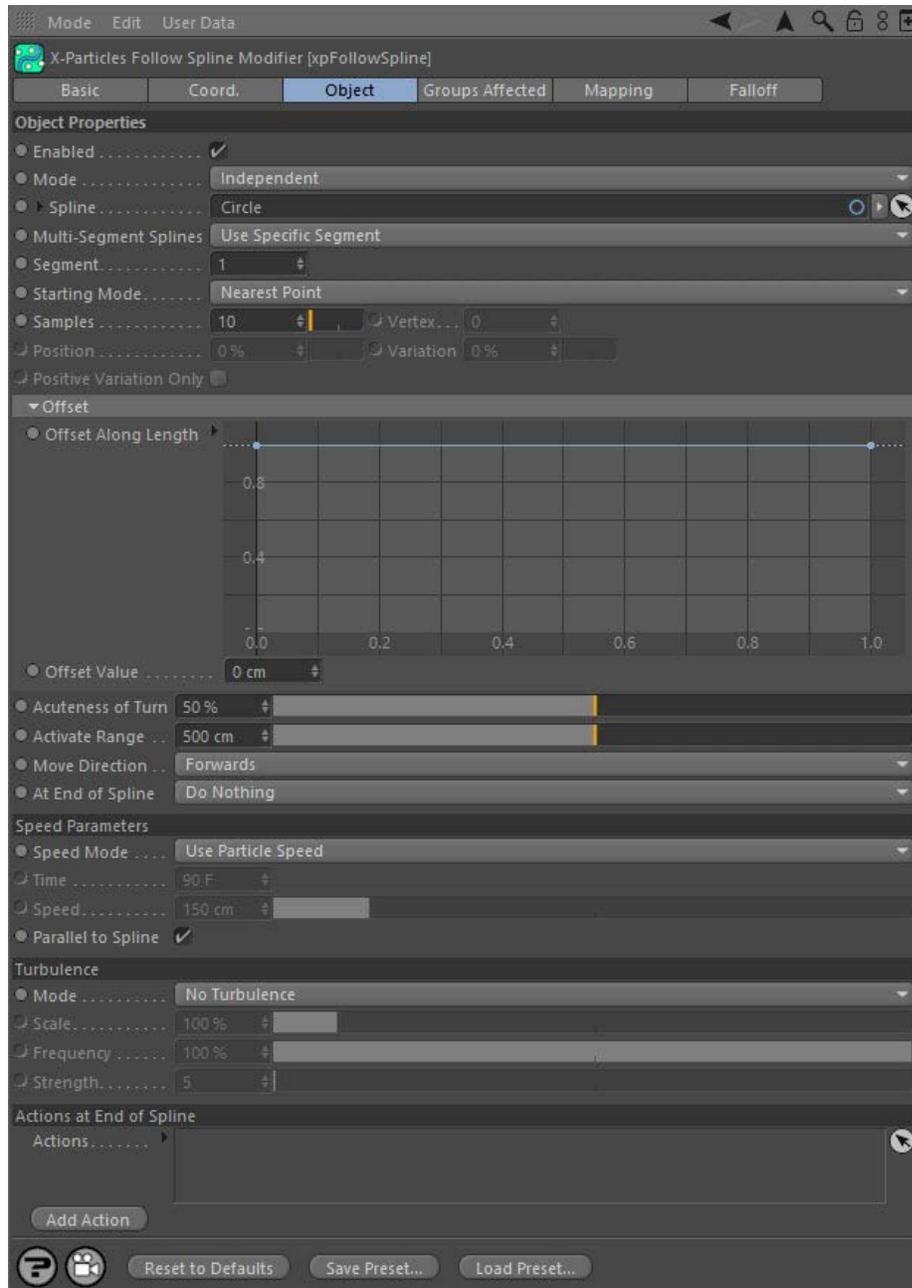
Follow Spline Modifier

Summary

This modifier moves a particle along a spline.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

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Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Spline

This is the spline the particles will follow. Spline primitives may be used in here as well as editable splines.

Multi-Segment Splines

If the spline has more than one segment, you can use this drop-down to choose which segment to use.

Use Any Segment

The modifier will randomly select from all the segments and send the particle to the chosen point on that segment.

Use Specific Segment

The modifier will use the segment you specify in the 'Segment' field.

Use Segments in Sequence

With this option, the modifier will send each particle to different segments in sequence. That is, if the spline has five segments, particle 1 will go to segment 1, particle 2 to segment 2, and so on. Particle 5 would go to segment 5, then particle 6 goes to segment 1 (since there are only 5 segments, the cycle is then repeated).

This option does NOT move particles along segment 1, then move them to segment 2, then segment 3, etc. You can do this but only with separate modifiers under action control.

Use Nearest Segment

 In this mode the modifier will find the nearest segment of the spline to the particle and use that segment.

Segment

This is the segment to use when 'Multi-Segment Splines' is set to 'Use Specific Segment'. It is up to you to enter a sensible value here. If the spline has three segments and you enter '4' in this field, the modifier will do nothing.

Starting Mode

When the modifier acts on a particle, the particles may initially be at some distance from the spline. So the first thing the modifier needs to do is move the particles to the spline. This setting determines where the particles will move to before moving along the spline itself. The options are as follows.

Nearest Point

The modifier will move particles to the point on the spline which is nearest to the particle. This is not a spline vertex, but a point in 3D space somewhere along the spline.

Nearest Vertex

The modifier will move particles to the vertex on the spline which is nearest to the particle.

Specific Vertex

The modifier will move particles to the spline vertex which is specified in the 'Vertex' setting. If a number is entered into 'Vertex' which exceeds the vertex count of the spline, the modifier does nothing.

Position Along Spline

The modifier will move particles to the point along the spline which is given in the 'Position' setting.

Note: if the emitter is positioned in the exact centre of a regular spline such as a Circle or Rectangle spline, and you choose 'Nearest Point' or 'Nearest Vertex' the modifier may send particles to more than one point on the spline, because all points are equidistant. If this happens, move the emitter slightly so that it is closer to one point on the spline than any other.

Samples

This is only available if the 'Nearest Point' option (see above) is chosen. To find the nearest point to the particle, the modifier checks the distance from the particle to a number of points along the spline. If this value is low, you may see different particles moving to very different points on the spline. You can reduce the gaps between sample points by increasing this value, but high values will slow the system down.

Vertex

This is the spline vertex used in the 'Specific Vertex' setting (see above). The first vertex in the spline is numbered 0. It is up to you to make sure that this value is a sensible one (i.e. that the spline really does have a vertex with that number. For editable splines, you can use the Structure Manager in Cinema to see how many vertices the spline has.).

Position

The position along the spline in percentage terms, used in the 'Position Along Spline' option (see above). 0% is the start of the spline; 100% is the end.

Variation

When 'Position Along Spline' is chosen, you can add some variation to the selected location with this setting. A value of 100% will distribute the particles along the entire spline.

Positive Variation Only

If you have added some variation to the starting point on the spline, the actual starting point will be somewhere either side of the chosen

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starting position. For example, if the starting position is set to 0% and the variation to 10%, the actual starting position will be somewhere between +5% and -5% along the spline. For a closed spline like a circle, -5% is the same as +95% along the spline, but what does -5% mean for an open spline? 95% of the distance along a closed spline is very close to the start of the spline, but that is often not the case for open splines. For this reason, you can select to have only a positive variation from the starting position so that you don't start somewhere which is not on the spline. To do that, check this switch.

Offset from the spline

Normally the particles stick closely to the spline path. To spread the particles around the spline, set the maximum offset in the 'Offset Value' setting.

You can also vary the offset along the length of the spline. To do this, use the 'Offset Along Length' spline control.

Offset Along Length

This spline control alters the particle offset along the spline length. This is a percentage value, so 100% gives a maximum offset (from the 'Offset Value' setting) and 0% is no offset at all. The leftmost point on the spline control gives the offset at the start of the spline and the rightmost point the offset at the end of the spline.

Offset Value

The maximum offset from the spline. The actual offset will be somewhere between zero and this value.

Acuteness of Turn

This setting is only used when the particles are moving to their starting position on the spline. A lower value results in a curved path to the starting position rather than an abrupt change of direction. However, if this is set too low, the particle may not be able to reach its starting position on the spline.

Activate Range

The modifier will start to move the particle to its starting position when its distance to the starting position is within this range. If some or all of the particles are failing to move to the spline, you probably need to increase this value.

Move Direction

The direction the particles move along the spline, Forwards or Backwards.

Speed Mode

 The speed mode chosen has a significant effect on particle movement around the spline. The particles will now remain parallel to the spline during travel around it. This differs from earlier versions where the particles would often cross over the spline being followed.

This drop-down has three options:

Use Particle Speed

The particle will travel around the spline with the speed it has when it starts to follow the spline and will remain fixed from then on. With this option the speed cannot be changed by other modifiers but can be altered using data mapping.

Complete Length in Time

With this setting, the particle may speed up or slow down so that the particle would travel along the complete length of the spline by the value in 'Time'. With this option the speed cannot be changed by other modifiers but can be altered using data mapping.

Set Speed

 The modifier will set the particle speed to the value found in the 'Speed' parameter. It cannot be changed from then on except by data mapping.

Time

The time to move along the length of the spline, when 'Speed Mode' is set to 'Complete Length in Time'.

Speed

The value to use when 'Speed Mode' is set to 'Set Speed'.

Parallel to Spline

 If this switch is checked, the speed of the particle will be adjusted to ensure it remains parallel to the spline being followed. Some particles may speed up a little and some will slow down, depending on their relative position to the spline.

When the switch is checked it gives the smoothest movement of the particles along the spline. When unchecked, you may see jitter in the particle's movement, which is especially noticeable if you are using a Trail object. It is therefore strongly recommended that you leave this switch checked (the default setting). However, if you want to alter the particle speed using another modifier, such as a Turbulence modifier, you can uncheck this switch, as otherwise you may see little effect from the other modifier.

Frames

The particle will change its speed so that it is moving fast enough to travel the full length of the spline in this number of frames.

At End of Spline

This setting determines what happens when the particle reaches the end of the spline (or if the particle is travelling backwards, when it reaches the start of the spline). There are four options.

Do Nothing

When the particle reaches the end the modifier will no longer affect it and the particle will continue to travel in its most recent direction. This is the default setting.

Loop

This setting causes the particle to carry on around the spline again. It is most useful when used with closed splines. If the spline is not closed then the particle cannot loop around the spline and will simply loop around the last point in the spline.

Repeat

This causes the particle to leave the spline and move to a new starting position (which may be the same as its original starting position), not by travelling back along the spline but in a direct line. It will then move along the spline as before. It is most useful when used with splines that are not closed but will work with closed splines too. Note that you may see no or little effect if the 'Nearest point' or 'Nearest vertex' options are selected, since the modifier will simply choose the nearest point or vertex to the particle - which is likely to be the start/end of the spline.

Reverse

This will cause the particle to reverse direction and travel back the way it came. With this you can set the particle to oscillate backwards and forwards along a spline.

Turbulence

These settings allow you to add some chaotic movement to the particles as they move along the spline.

Mode

This drop-down controls how turbulence affects particle movement. It has four options:

No Turbulence

The default setting. No turbulence is applied to the particles.

Affect Offset

The turbulence affects the offset from the spline (see 'Offset from the spline' above) but not its movement along the spline.

Affect Velocity

The turbulence affects the speed and direction of movement along the spline but does not directly affect the offset. Note that this mode has no effect if 'Speed Mode' is set to 'Complete Length in Time' or 'Set Speed' because then the modifier fixes the speed and turbulence will not change it.

Affect Both

Both offset and velocity are affected (but see 'Affect Velocity' above).

Scale, Frequency

These values alter the underlying turbulence which is applied to the movement. They have the same effect as in the [Turbulence modifier](#).

Strength

The higher this value, the more chaotic the movement.

Actions at End of Spline

You can drag any actions into this list and they will be executed when the particle reaches the end of its travel.

Add Action

Clicking this button will add an action to the scene and drop it into the Action list.

Hints and tips

1. Stopping a particle moving along a spline

Possible methods include:

a) Use keyframes (or Xpresso) to disable the modifier in the object manager, or to turn the 'Enabled' switch off.

This will work but suppose you want to turn one modifier off and have another take control of the particle. With this method, you will run into trouble. The spline modifier maintains a set of internal flags and data in each particle which must be reset before a spline modifier takes control of the particle. If you simply turn the modifier off, the internal data is unchanged and the new modifier will try to use the settings already in the particle; that will give results which are not what you expected! This method is very quick to set up but not recommended if you are using more than one modifier in succession. Also, this is a brute-force method which will turn the modifier off for all particles in the scene at once.

b) Use the 'Control Spline Modifier' action.

To do this, the modifier MUST be in 'Action-Controlled' mode. You will first need an Action at some appropriate point to turn the modifier on for a particle. Then you can use any question - including those which test for distance travelled along a spline - to turn the modifier off (i.e. the Action would set the 'Modifier Will NOT Affect Particle' setting for that particle). This will automatically reset all the internal data of the particle and you can then use a new modifier with a clean set of particle data.

c) Use the 'Stop Following Spline' action.

This action works in the same way as the above action and also resets the internal data, but has several other options to change the direction and speed of the released particles.

2. What is the 'start' or 'end' of a spline?

For closed splines, the start and end are the same point. You can find the starting point in any editable spline by looking at it in points mode and looking for the region of the spline where the spline colour changes abruptly from white to blue (these are the default colours). The vertex where that happens is the start and end point. You can move this around the spline by using the commands in the Mesh->Spline menu in Cinema 4D.

For open splines the start point is the one where the spline is white and the end point where it is blue. Again you can move the point sequence

around but this will change the shape of the spline.

You cannot alter the point order of primitive splines. Internally, X-Particles converts the primitive to an editable spline first, but that data is not changeable. Trial and error will show where the start/end points of closed primitives is located (make it editable and note the point position, then undo).

3. The problem of open splines

Many splines are closed, so that the start and end points are the same (e.g. Circle, n-Side, Rectangle) while others are open and the start and end points are in different places (e.g. Arc, Helix). The problem of the open spline and starting position variation has already been mentioned (see 'Positive Variation Only' above). Another issue is when you set the starting position to be 100% (which is the end of the spline) but forwards direction. The spline does not have a length of more than 100%, so where should the particles go? (This is not a problem for closed splines as the particles can just loop around the spline.)

In this case the modifier will reverse the direction of motion, so that the particles will move backwards. The opposite will be done if the starting position is 0% with backwards direction.

As a general rule, for open splines you should choose logical settings: the direction should make sense depending on the starting position and the action to take at the end should be either Repeat or Reverse (Loop does not work).

4. Using multiple spline modifiers

Suppose you want the particles to follow one spline, come to the end of it and do something else, then follow another spline. How you can do that? There are two options.

a) Use action-controlled modifiers

This is the recommended method since it gives you precise control over when the particle starts to follow a spline. You can leave the falloffs of the two splines set to Infinite, if you wish. Simply use actions to determine which modifier will affect the particle and when.

b) Use independent modifiers with falloffs

If you put two independent modifiers in the scene, both with Infinite falloff, the two will clearly conflict. In fact, what happens is that the modifier which is lower down in the object manager is executed last, so it is the one which will move the particle. For this reason, both modifiers must have falloffs other than Infinite. You can then arrange the scene so that the particles leave the falloff of the first modifier then enter the falloff of the second one. In between the falloffs the internal data structures of the particles will be reset. Be sure that the falloffs do not overlap so that the reset can occur!

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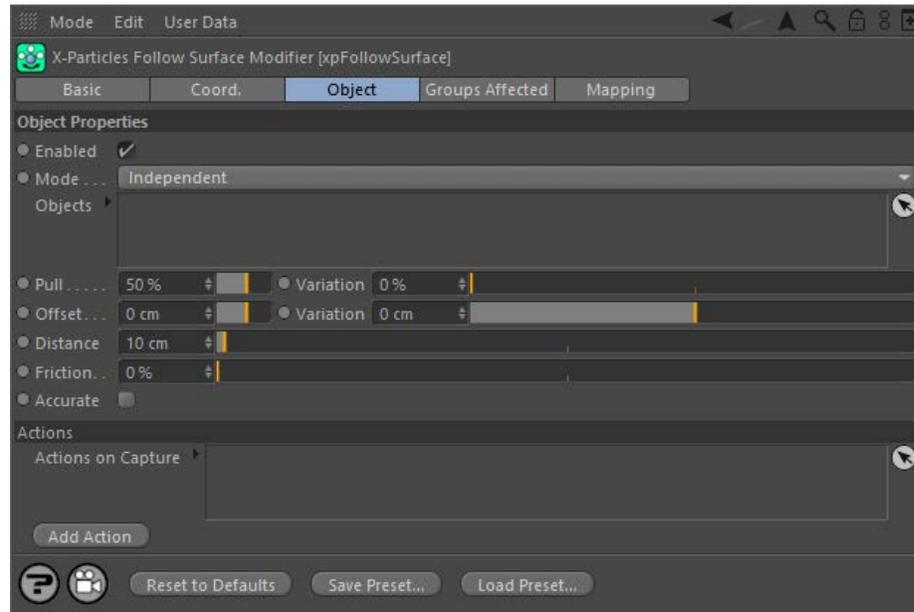
Summary

This modifier causes particles to flow over the surface of an object.

Note: due to the way this modifier works, you cannot render a single frame to the picture viewer. If you need to render a frame, you must render the entire sequence up to and including that frame. The best solution to this is to cache the scene; then you can render one frame, and this may well be much faster than rendering a frame sequence (depending on your scene, of course).

Interface

This is the modifier's interface:



For the 'Groups Affected' and 'Mapping' tabs, and for the buttons at the bottom of the interface, please see the [Common interface elements](#) page. Note that this modifier does not have a falloff tab.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Objects

Drag the objects the particles are to move over into this list.

Pull (and Variation)

The Pull is the strength with which the particle is pulled to the surface. A high pull will cause the particles to snap to the surface when they are within the value in the 'Distance' setting from the target. A low Pull will attract the particles very softly. You can vary this with the 'Variation' setting.

Offset (and Variation)

The particles will be offset from the surface by the value in this setting, which is useful to reduce interpenetration by particle geometry. You can vary this with the 'Variation' setting.

Note that the particle radius also affects the offset from the surface. If 'Offset' is zero and the particle radius is 5, the particle will be offset by 5 screen units from the surface. An offset and radius of zero will cause the particle to be located exactly on the surface.

Distance

The particle's distance from the surface must be equal to or less than this value before it is affected by the modifier.

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Friction

This setting will reduce the particle speed over the surface and eventually bring it to a halt.

Accurate

Turning this switch on may in some cases improve the accuracy of movement over a complex surface, but at the expense of increased computation time.

Actions on Capture

Actions dragged into this list will be executed when a particle is captured by the modifier and pulled to the object's surface.

Add Action

Clicking this button will add an action to the scene and drop it into the Actions list.

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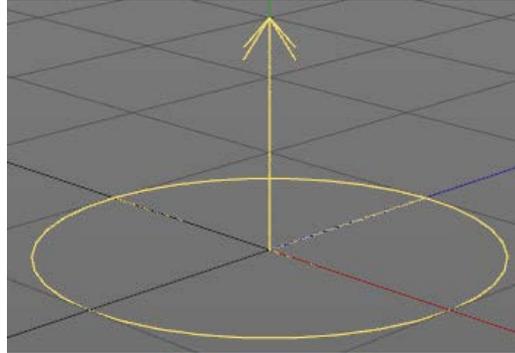
Gaseous Modifier

This modifier is used in conjunction with an xpDomain object to produce buoyancy and other effects when generating fire, smoke, etc. It can also be used without an xpDomain to give buoyancy only.

Important: if you are NOT using this modifier with an xpDomain object, you must give the particles a temperature above zero or no effect will occur. You can do this in the emitter's [Extended Data tab](#), or by using a [Physical modifier](#) to increase the temperature.

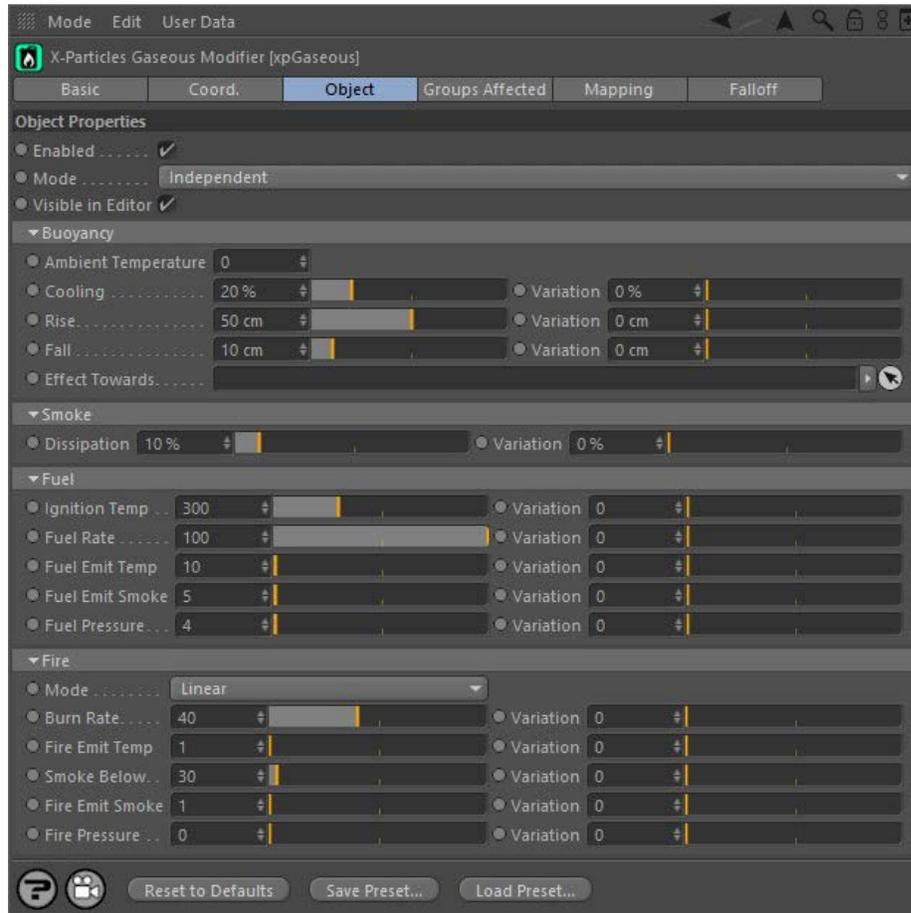
Editor appearance

This is the on-screen representation of this modifier:



Interface

The object's interface looks like this:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Object tab

Enabled

Uncheck this switch to disable the modifier.

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Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of effect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Visible in Editor

This modifier has a special representation in the editor. If you don't want to see that, but still want the modifier to be active, uncheck this switch.

Buoyancy section

Ambient Temperature

This is the base temperature from which the particle temperature will rise (so the temperature difference is the particle temperature minus the ambient temperature). The 'Cooling' parameter will cool to the ambient temperature.

Cooling & Variation

This is the rate at which the particles temperature will cool towards the ambient temperature. It is expressed as a percentage of the particle temperature per second.

Rise & Variation

This is the rate (in scene units per second) of the rise caused by having a higher particle temperature than the ambient temperature. The greater the 'Rise' value, or the greater the temperature difference between the particle temperature and ambient temperature, the faster the particles will move 'up'. In this case 'up' means in the direction pointed to by the modifier (see the screen shot at the top of the page).

Fall & Variation

Smoke and fuel cause the particles to fall. This parameter controls the fall rate (in scene units per second); the larger the smoke/fuel values, the faster they will fall, in turn depending on the value in the 'Fall' parameter.

Effect Towards

As well as being able to rotate the modifier to point in any direction, if you drop an object into this field the modifier will always point towards it. You can then animate the linked object and the modifier will point at it, causing the particle stream to move in that direction.

Smoke section

Dissipation & Variation

This parameter controls how much the smoke is reduced per second.

Fuel section

Ignition Temp & Variation

If the temperature of the particle is greater than or equal to this value then the fuel will burn and create fire and smoke, and increase the temperature.

Rate & Variation

The amount per second the fuel is used up (i.e. burnt and creates fire, smoke, etc.)

Fuel Emit Temp & Variation

As in the Fire section, this is the rise in particle temperature per unit of fuel burnt (turned into fire).

Fuel Emit Smoke & Variation

As in the Fire section, this is the increase in smoke per unit of fuel burnt (turned into fire).

Fuel Pressure & Variation

As in the Fire section, this is the rise in pressure per unit of fuel burnt (turned into fire).

Fire section

Mode

This drop-down controls how the amount of fire is reduced per second. It has two settings:

Linear

This is an absolute value. The fire is reduced by this amount each second.

Exponential

This is a percentage of the current fire value. The fire is reduced by this percentage each second.

Rate & Variation

The rate at which the fire burns (i.e. is reduced) per second. It is either an absolute value or a percentage, depending on the setting in 'Mode'.

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Fire Emit Temp & Variation

As the fire burns, this is the rise in temperature per unit of fire added.

Smoke Below & Variation

If the fire amount is below this value then smoke will be added. The amount of added smoke is given in 'Emit Smoke'.

Fire Emit Smoke & Variation

As with 'Emit Temp', this is the amount of smoke added per unit of fire burnt.

Fire Pressure & Variation

As with 'Emit Temp', this is the amount of pressure added per unit of fire burnt.

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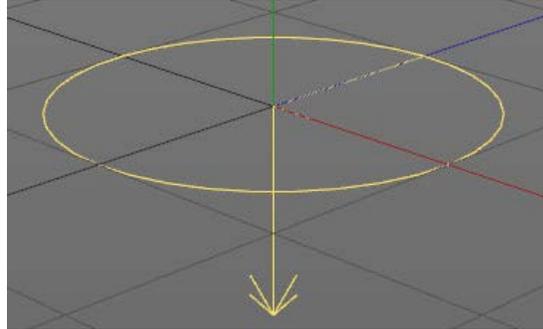
Gravity Modifier

Summary

This modifier works in identical fashion to the standard Cinema 4D gravity modifier. It is included here so that it can be controlled with an Action, which isn't possible for the standard modifier.

Editor appearance

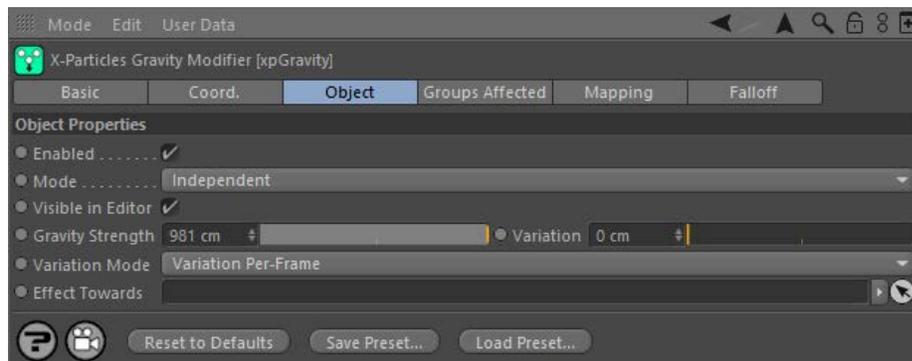
The on-screen representation of this modifier looks like this:



You can now rotate the modifier on any axis and the particles will now follow the direction in which the arrow points. By default this is along the negative Y world axis.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Visible in editor

The Gravity modifier has its own representation in the editor. If you don't want to see that, but still want the modifier to be active, uncheck this switch.

Gravity Strength and Variation

The strength of the gravity. By default the modifier always moves the particle 'down' – i.e. in the world negative Y direction. However, you can enter negative values here which will move the particle 'up' along the world positive Y axis.

You can add some random variation to the strength with the 'Variation' setting.

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Gravity variation can work in one of two ways. The options are:

Variation Per-Frame

In this mode, the gravity acting on each particle will vary each frame. This will cause each particle to follow a slightly 'wobbly' path as the change in direction will vary a little each frame.

Fixed Per-Particle

The alternative mode is that the force acting on each particle is fixed when the particle enters the field of effect, but it will vary between different particles (assuming that 'Variation' is greater than zero). Each particle will follow a smooth curve but the particle stream will fan out more than if 'Variation Per-Frame' is chosen.

Effect Towards

As well as being able to rotate the modifier to point in any direction, if you drop an object into this field the modifier will always point towards it. You can then animate the linked object and the modifier will point at it, causing the particle stream to move in that direction.

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Limit Modifier

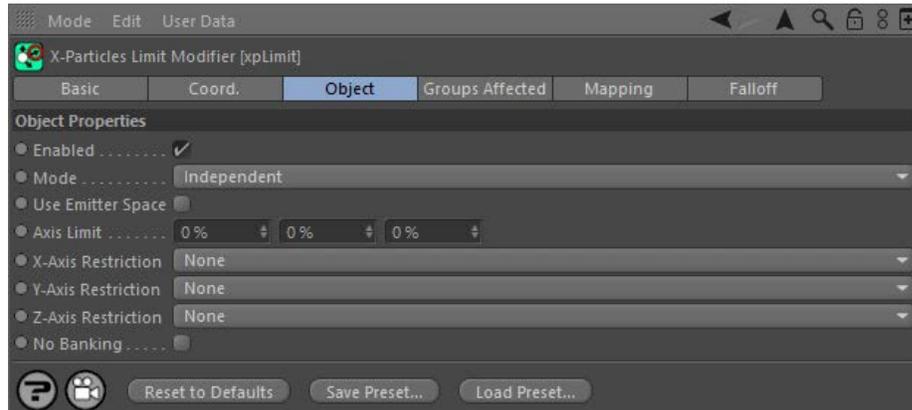
With this modifier you can limit the movement of particles by preventing them from moving in one or more planes. So for example, if you have a Turbulence modifier in the scene, the Limit modifier could be used to restrict movement to the X and Z axes, with no movement along the Y axis.

Note that if you set the limit to 100% in all three fields, the particles will not move at all!

This modifier was originally written by Paul Taylor in Python using the X-Particles API. Paul generously allowed us to convert his modifier into a full inbuilt modifier for the particle system.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Use Emitter Space

If this space is unchecked, the axes on which movement is limited will be the global, 3D world, axes. If it is checked the emitter axis is used instead. You will only see a difference if the emitter is rotated so its axes are not aligned with the world axes. Note that this setting has no effect if you are emitting from an object, only if you emit directly from an emitter.

Axis Limit

This is the limit, in percentage terms, of movement on the three axes. A value of zero means no limit, a value of 100% results in no movement at all on that axis.

X-Axis Restriction

This drop-down has three settings:

None

There is no restriction on the X-axis other than the value in 'Axis Limit' if that is greater than zero.

X+

X-axis movement is restricted to the positive axis. This can be combined with the 'Axis Limit' setting to reduce movement along the other axes.

X-

X-axis movement is restricted to the negative axis. This can be combined with the 'Axis Limit' setting to reduce movement along the other axes.

Y-Axis Restriction. Z-Axis Restriction

These operate in the same way as for the 'X-Axis Restriction'.

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No Banking

When particles turn to move in a different direction, the bank component of their rotation is often changed automatically. This looks natural for such things as birds, but if you watch a school of fish, they do not appear to bank on turning.

If you would prefer that the particles emulate that behaviour and don't bank when turning, you can use this modifier with 'No Banking' checked.

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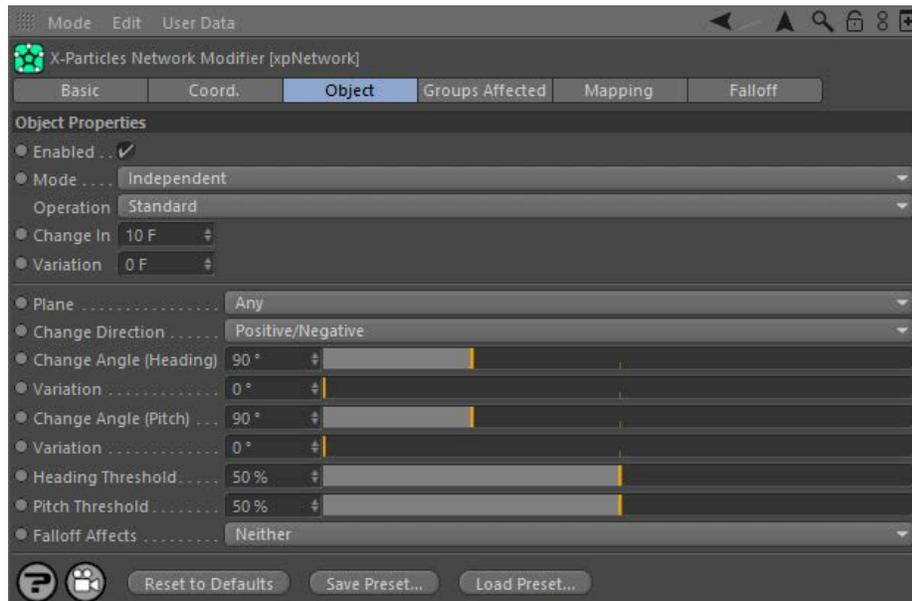
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Network Modifier

This modifier will cause the particles to move in a network or gridlike manner.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Operation

The Network modifier can operate in one of two modes, selectable from this drop-down:

Standard

The usual mode of operation, with particles outside of a closed object.

Inside Volume

In this mode, the particles stay inside a closed polygon object. More about this mode can be [found below](#).

Change In and Variation

This determines how often the particle will change direction. It relates to the particle age, not the actual frame number of the animation. For example, if set to 10 frames, each particle will change direction when it is 10, 20, 30, etc. frames old. However, this setting is also affected by the threshold settings (see below).

A random element can be introduced by using the 'Variation' setting.

Plane

This parameter lets you restrict the change in direction to a specific (global) plane. The options are:

Any

The particle will move in all 3 planes.

XY, YZ, XZ

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Particle movement is restricted to the selected plane.

Change Direction

This drop-down governs how the particle changes direction. It has three options:

Positive/Negative

When the direction changes, it will change by randomly choosing either to add or subtract the change angle to the heading and/or pitch.

Positive Only

The direction change will always add the change angle to the heading and/or pitch.

Negative Only

The direction change will always subtract the change angle from the heading and/or pitch.

Change Angle (Heading) and Change Angle (Pitch)

This is the angle by which the particle will change direction. The default is 90 degrees, so the particle will change direction by a right angle on heading and pitch.

A random element can be introduced to either heading and/or pitch by using the appropriate 'Variation' settings.

Heading Threshold and Pitch Threshold

In order to reduce the regularity of the changes in direction, the modifier will generate a random value between 0 and 100%. If this value falls below the threshold value, a direction change will not occur. This adds a degree of randomness to the changes in direction.

Note that if these values are set to 0%, a change in direction will always occur; if set to 100%, it will never occur.

For an interesting hexagonal effect, try setting the 'Change Angle (Heading)' to 60 degrees, set the 'Heading Threshold' to 0% and the 'Pitch Threshold' to 100%. Turn off sub-frame emission in the emitter, reduce the emitter size to zero, attach a Trail object to the emitter and play the animation.

Falloff Affects

This setting determines how the modifier's falloff will affect the change in direction. It has four settings:

Threshold

The two 'Threshold' values will be altered by the falloff.

Angle

The two 'Change Angle' values will be affected by the falloff.

Both

Both Threshold and Angle values will be affected by the falloff.

Neither

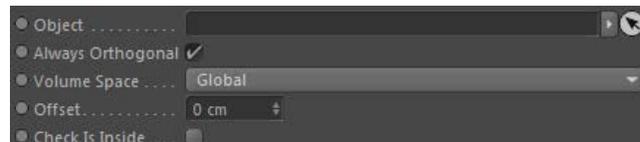
The falloff has no effect on either the Threshold or Angle values.

Parameters - Inside Volume

In this mode, the particles remain within a closed polygon object. This will cause the particles to bounce off the inside of the object, creating a grid inside it. To set this up correctly you need:

- an object which is a single, closed object, either an editable polygon object or an object primitive
- an emitter placed inside the object's volume
- a Network modifier with the 'Operation' set to 'Inside 'Volume'

In this mode some different settings are made available:



Object

Drag the object to be used into this field. Make sure you place the emitter inside this object.

Always Orthogonal

In this mode, the direction changes are always in 90 degree steps - there is no choice over the direction change angle. However, when emitted a particle may not be travelling along an orthogonal plane - for example, when emitted from a spherical emitter the direction is random. The modifier will force the particle to travel orthogonally as soon as it collides with the object interior. If this switch is checked the particles will travel orthogonally as soon as they are emitted.

In general it is recommended that you leave this switch checked, otherwise you may end up with something of a mess. But if you want the particles to travel in a random direction until the first collision, uncheck this switch.

Important: if this switch is unchecked, one effect is that the networking will not occur UNTIL the particle has collided with the inside of the mesh. This means that if a collision never occurs, there will be no network effect.

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What do we mean by 'travel orthogonally'? It means that the particles will always travel parallel to one of the three axis planes - XY, XZ, or YZ. But the axis could mean either the 3D world axis, or the axis of the object. This drop-down allows you to choose:

Global

The axis planes are always those of the 3D world, regardless of how the object itself is rotated.

Local

The axis planes are those of the object, so if the object is rotated, the particles will travel parallel to its axis planes and not those of the 3D world.

Offset

Using an offset greater than zero will leave a gap between the particles and the object's polygons, effectively shrinking the inside volume.

Check Is Inside

This switch forces the modifier to check if a particle really is inside the object before changing direction. If you place the emitter inside a closed object, and neither the emitter or the object move, then you don't need to use this switch. But if, for example, the emitter is initially outside the object, the particles can never enter it and bounce around inside - they will always bounce back off the outside of the object.

Turning this switch on will cause the particle not to bounce off the object if it is outside. Then it can enter the object, at which point it will bounce and remain inside.

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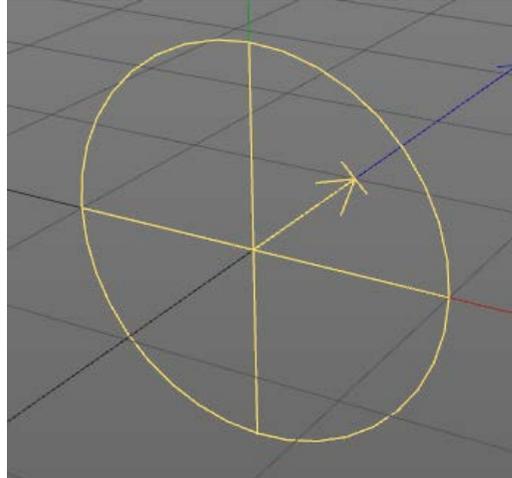
Rotator Modifier

Summary

This is similar to to the standard Cinema 4D Rotator modifier, with the advantage that it can be controlled by X-Particles Actions. It also has additional functionality over the standard modifier.

Editor appearance

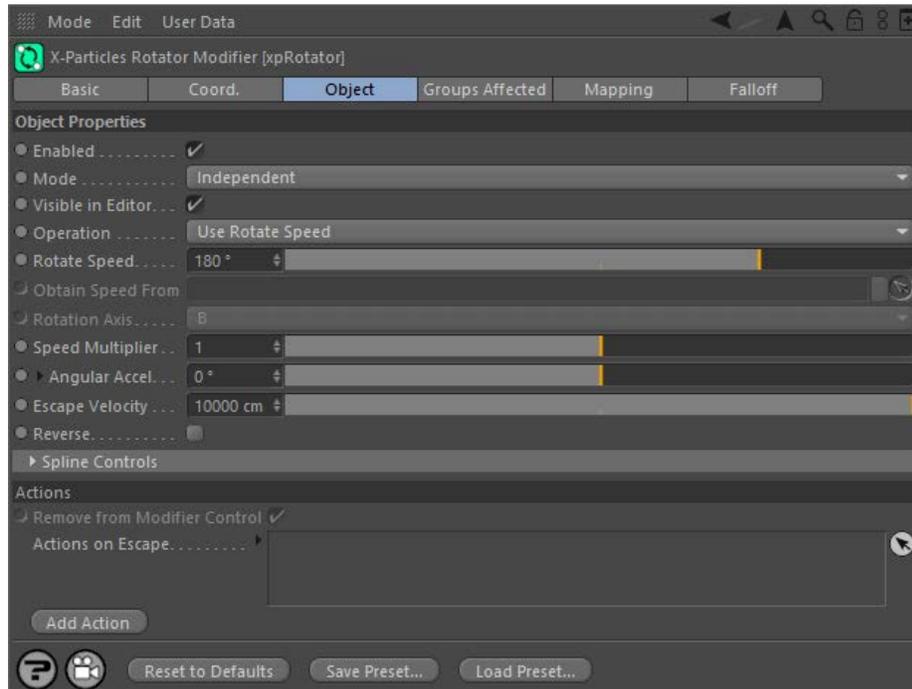
This is the on-screen representation of this modifier:



You can rotate the modifier on any axis and the particles will rotate around the axis shown by the arrow. By default this is along the positive Z world axis.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

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In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Visible in Editor

This modifier has a special representation in the editor. If you don't want to see that, but still want the modifier to be active, uncheck this switch.

Operation

This drop-down has three settings:

Use Rotate Speed

The particles will rotate with the speed given in the 'Rotate Speed' setting.

Use Object

With this setting, drop an object into the 'Obtain Speed From' link box. The particles will use the same rotation speed as the linked object. You can choose which rotation axis of the object to use to drive the particle rotation.

Use Spline

If this is selected, the rotation speed will be taken from the 'Rotate Spline' attribute.

Rotate Speed

The rotation speed to use, in degrees per second. This is only used if 'Operation' is set to 'Use Rotate Speed'.

Obtain Speed From

The object to take the rotation speed from should be dragged into this field. This is only used if 'Operation' is set to 'Use Object'.

Rotation Axis

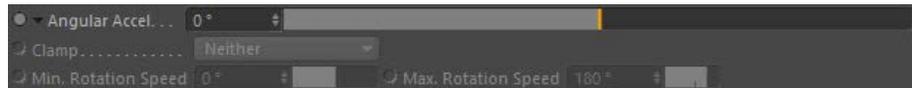
The axis of the object to use to set the rotation speed. This is only used if 'Operation' is set to 'Use Object'.

Speed Multiplier

The speed of rotation will be changed by multiplying it by this value. You could use it to rotate particles twice as fast as a linked object, for example.

Angular Accel.

This is a value which is added to the Rotate Speed each frame. This has the effect of speeding up the rotation over time (or, since negative values are allowed, slowing it down). Clicking the little black arrow next to this parameter will display additional settings:



Clamp

This drop-down menu allows you to clamp the maximum and minimum rotation speeds. The settings are:

- Neither: neither the maximum or minimum speed are clamped
- Both Min and Max: both speeds are clamped
- Minimum: only the minimum speed is clamped
- Maximum: only the maximum speed is clamped

Min. Rotation Speed

The minimum rotation speed permitted when this is clamped.

Max. Rotation Speed

The maximum rotation speed permitted when this is clamped.

Escape Velocity

As the particles rotate, they are forced out from the centre of the rotation axis, just as if they were being influenced by centrifugal force. This will cause them to travel at ever-increasing speed. If the particle speed exceeds the value in the 'Escape Velocity' setting, they will cease to be affected by the modifier and will fly off with their current speed and direction. The lower this value, the lower the speed the particles must reach to 'escape' the modifier.

Note that if you slow the particles down again, e.g. by using a speed modifier, they may become slow enough to be 'caught' by the modifier again.

Reverse

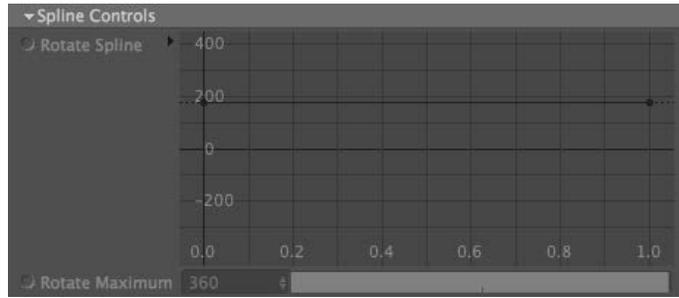
If checked, this switch will reverse the direction of rotation.

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The rotation speed will be set by the value in this spline, over the particle's lifespan. Only available if 'Operation' is set to 'Use Spline'.

Rotate Maximum

By default the maximum Y value in the spline is 360 degrees. You may want to rotate the particle more than that. To do that, use the 'Rotate Maximum' setting (you can reduce it as well, of course, for finer control over the value). This parameter is only available if 'Operation' is set to 'Use Spline'.

Actions on Escape

You can drag any Action, or multiple Actions, into the Action list. These Actions will be carried out when a particle reaches escape velocity. Note that you don't need an accompanying Question to trigger this Action. The Action is triggered directly by the modifier.

Remove from Modifier Control

This setting is only available if the modifier is in Action-Controlled mode. If checked, the particle is automatically removed from control of the modifier when it reaches escape velocity. This is a convenience function which has exactly the same effect as if you put a 'Control Rotator Modifier' action in the list which set the modifier to 'Modifier Will NOT Affect Particle'.

Add Action

Clicking this button will add an action to the scene and drop it into the Action list.

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Sound Modifier



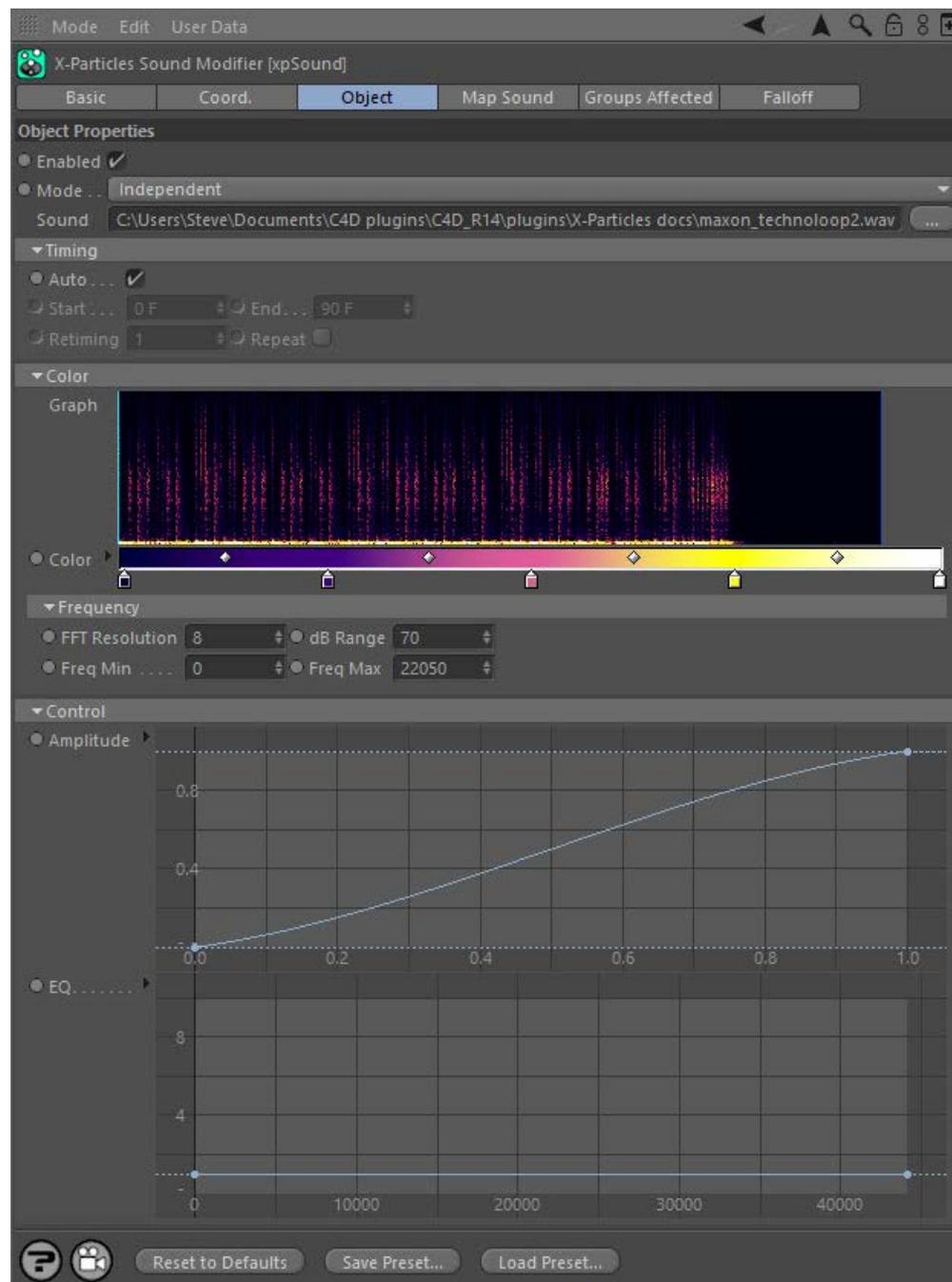
This new modifier replaces the Sound tag in earlier versions of X-Particles. The tag is now deprecated and will be removed in future versions of X-Particles.

Before using this modifier for the first time please read the section '[Using the Sound Modifier](#)' below.

Note: this modifier doesn't actually play the sound file! This is due to the way Cinema 4D implements sound playback. To play the sound you must add a sound track to the timeline window; full details are contained in the C4D reference documentation.

Interface

This is the modifier's interface:



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For the 'Groups Affected' and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Important: for particle groups, please see the note '[Limitation with particle groups](#)' at the end of this page.

Parameters - Object tab

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Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Important: this modifier can affect particle emission and also change particles during the animation. Activating this modifier to work on a specific particle will only have an effect if 'Birth Only' in the mapping tab is unchecked.

Sound

The sound file to use. Click the button with three dots to load a sound file, which must be in .wav format.

Timing section

This section controls the mapping of the sound file time onto the particles.

Note: the controls in this section do NOT affect the actual audio playing of the sound file. Remember that this modifier does not generate an audible sound, Cinema controls this separately. If you want the sound to loop in the same way as the modifier, you will have to set this up manually.

Auto

If this switch is checked, the modifier uses the sound in time with the scene timeline. 'Auto' must be unchecked for the following settings to become available.

Start, End

These are time values which control when on the scene timeline the audio is mapped to the particles. For example, if 'Start' is zero and 'End' is three seconds, the audio file will play for three seconds and then stop. (This is influenced by the 'Retiming' value, see below.)

Retiming

This allows the audio's timing to be changed. For example, suppose 'Start' is zero and 'End' is three seconds. With 'Retiming' at the default value of 1, the audio file will play for three seconds and then stop. You can see that the cyan bar in the graph stops at a specific point. If 'Retiming' is increased to 2, the audio file will still only play for three seconds, but it will play twice as fast, as you can see from the position of the cyan bar.

Repeat

Checking this switch will loop the sound file. So if you have set the 'Start' to zero and the 'End' to three seconds, the sound file will run for three seconds then loop back to the beginning.

Color

Graph

The graph is a representation of the complete sound file. It is a graph of frequency intensity (on the vertical or Y axis) over time (on the horizontal or X axis). The frequency ranges from the minimum frequency at the bottom (i.e. bass frequencies) to the maximum frequency at the top. This range (minimum to maximum) can be changed by adjusting the 'Freq Min' and 'Freq Max' settings (see below).

The cyan vertical line on the graph is the current time in the sound file.

Color

This is the color gradient used for the graph. It is only used for the graph colour, so you can change it to anything you like without affecting the output. The colour used depends on the intensity (amplitude) of each frequency, low amplitudes using the colour on the left of the gradient and high amplitudes the colours on the right.

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Other:

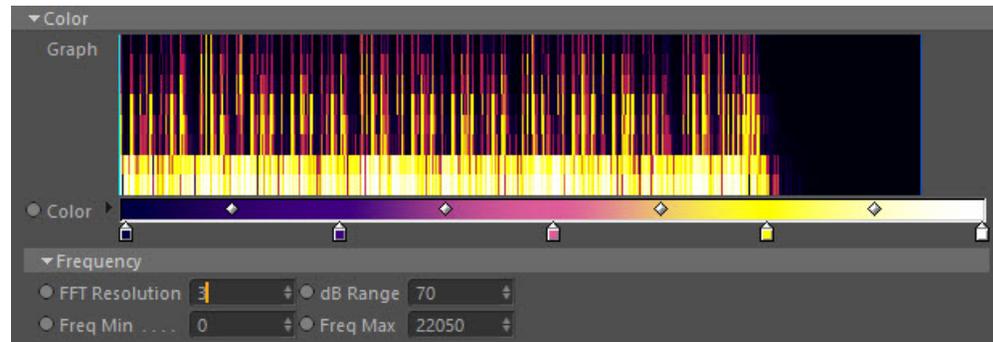
- [Online updater](#)
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Frequency section

This section controls how the frequencies in the sound are analysed. It uses a process called Fast Fourier Transform (FFT) to do this; this is a complex subject but you don't need to know how it works to use this modifier! If you are interested much more detail can be found on the net, for example see https://en.wikipedia.org/wiki/Fast_Fourier_transform

FFT Resolution

This controls how many discrete chunks (FFT bins) the frequency range is split into. Lower values give a coarser result. For example, the above screenshot shows the graph with an FFT resolution of 8. If that is reduced to 3, this is the result:



You can see that the lower resolution has resulted in a much smaller number of FFT bins. This will affect the degree of control the modifier can exert over the particles.

Be careful when increasing this value. If you increase it too much the time taken for the calculation will increase greatly and it may even appear that Cinema has frozen. If that happens, wait until the calculation finishes and reduce this value.

However, if you have a very narrow frequency range (as determined by the 'Freq Min' and 'Freq Max' settings) you will need to increase the FFT resolution otherwise it will not have sufficient frequency resolution. However, increasing the frequency resolution reduces the time resolution so you end up with a slower calculation (needs a bigger chunk of the sound) and changes in the audio over time become smeared together.

dB Range

The audio intensity is converted into decibels (dB). Reducing this value will start to remove low-amplitude sound and you will see the colours in the graph move towards the left hand side of the gradient. Lower it too much and the frequency graph may become almost black (with the default colours) and the modifier will have little or no effect. If you increase this value, more low amplitude sound is used and the effect is greater.

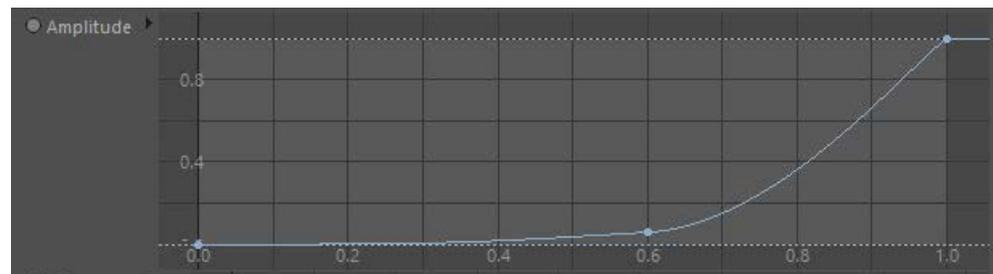
Freq Min, Freq Max

These values control the frequency range used. Increasing 'Freq Min' will cut out lower frequencies, increasing 'Freq Max' will bring in higher ones. Whether you need to change these values will depend on the nature of the sound file. However, note that these values are used after the FFT has been applied, so if the range is narrow you may need to increase the FFT resolution, as explained above.

Control section

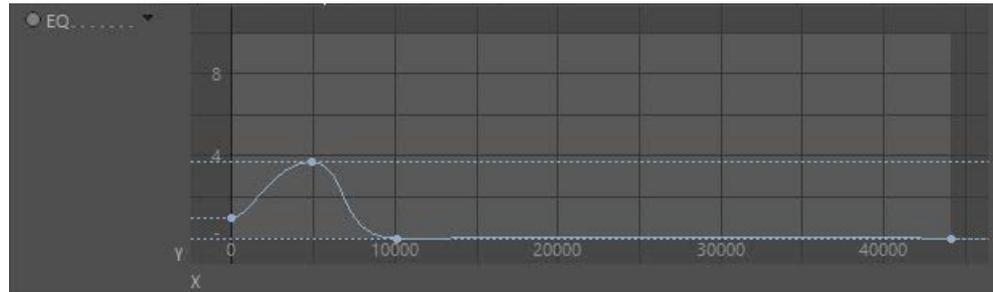
Amplitude

This spline control allows you to map the amplitude values returned from the FFT. You can think of it as acting like an audio filter. For example, this spline would ignore the effect of any low volume sound:



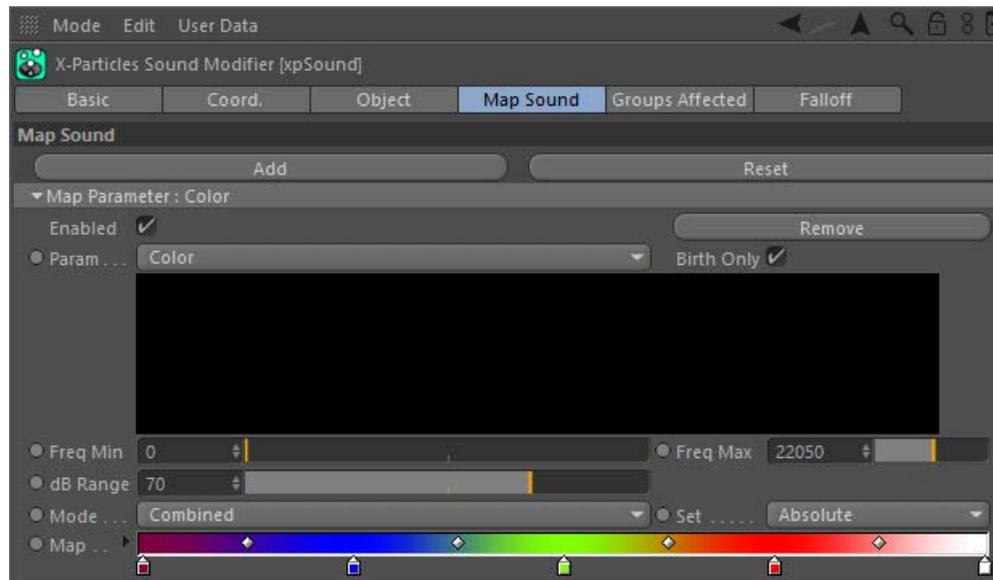
EQ

This is the same as the 'Amplitude' spline but for frequencies rather than amplitude. This spline would boost the effect of bass frequencies and ignore any higher ones:

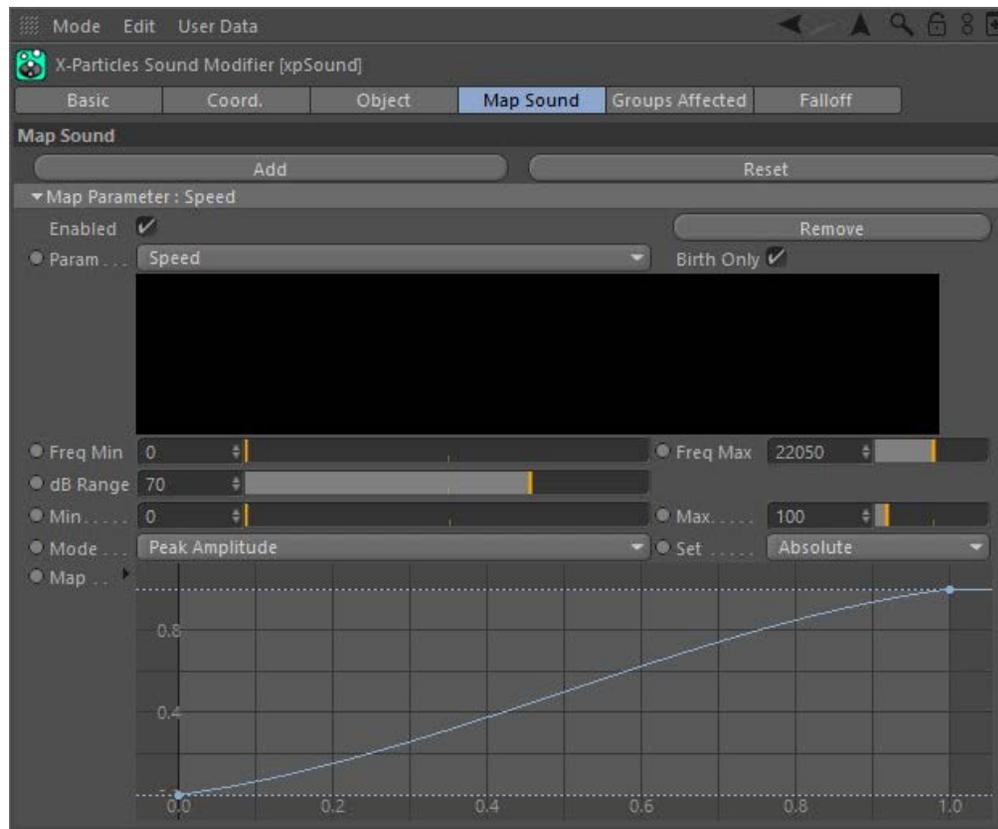


Parameters - Map Sound tab

This tab is initially empty, but you can map various particle data items to the sound parameters. Click the 'Add' button to add a map. This interface is then shown:



This is the default map, but most others use a spline to control the mapping rather than a gradient, such as the Speed map:



Add

Click this button to add a map.

Reset

Click this button to remove all maps. You will be asked to confirm this before the maps are deleted.

Enabled

Uncheck this switch to disable the map. This is convenient for testing combinations of maps since you can then turn maps on and off to see what difference they make.

Remove

Click this button to remove this map (but leave all others intact).

Param

The particle or emitter parameter to map. The options are:

Parameter	Comment
Color	The particle colour
Custom	A custom data item added by the user
Emission	The emission rate (birthrate) of any emitter affected by this modifier
Fire	The particle fire value

Fuel	The particle fuel value
Mass	The particle mass
Radius	The particle radius
Smoke	The particle smoke value
Speed	The particle speed
Temperature	The particle temperature value
Velocity.x	The X axis component of its velocity (not the speed but the normalised direction of the particle)
Velocity.y	The Y axis component of its velocity (not the speed but the normalised direction of the particle)
Velocity.z	The Z axis component of its velocity (not the speed but the normalised direction of the particle)

Birth Only

If this switch is checked, the particle parameters will only be set when they are first created. If it is unchecked, the parameters will also be changed during playback, as with most other modifiers. This is not available if 'Param' is set to 'Emission'.

Freq Min, Freq Max

When using 'Mode' set to 'Peak Frequency' (or to 'Combined' for Color maps only) this is the frequency range used to map the parameter. For example, if using a Color map (see screenshot above) when the peak frequency during playback approaches the 'Freq Max' value the particle colour is white; when it approaches the 'Freq Min' value, it is a dark red.

Altering these values will change the spread of values along the colour gradient or the spline control.

dB Range

This is the same as for the 'Freq Min' and 'Freq Max' settings but for use when 'Mode' is set to 'Peak Amplitude' (or to 'Combined' for Color maps only). It is the range of amplitudes used to map the parameter to the colour gradient or spline. The minimum value is always zero, so if this setting has a value of 70, the actual range is 0 to 70.

If the peak amplitude in the sound file during playback is zero, the particle parameter will be mapped to the left-hand end of the colour gradient or the leftmost point in the control spline. If the peak amplitude reaches or exceeds the value in this setting, the particle parameter will be mapped to the right-hand end of the colour gradient or the rightmost point in the control spline.

Mode

The mapping mode to use. There are three options:

Combined

This uses a combination of the other two options. It is only available for Color maps.

Peak Amplitude

The particle parameter (e.g. colour, speed, etc.) depends on the peak amplitude in the sound file at the time of playback. The range of amplitudes used is controlled by the 'db Range' setting.

Peak Frequency

The particle parameter (e.g. colour, speed, etc.) depends on the peak frequency in the sound file at the time of playback. The range of frequencies used is controlled by the 'Freq Min' and 'Freq Max' settings.

Set

This drop-down menu determines how the calculated mapped value is used. It has four options:

Absolute

The calculated value is used without further change.

Add

The calculated value is added to the current parameter value.

Multiply

The calculated value is multiplied by the current parameter value.

Subtract

The calculated value is subtracted from the current parameter value.

Map

This can be either:

A colour gradient which is only available in Color maps. The particle colour will be mapped to this gradient.

Or a spline control used for all other map types. The particle parameter will be mapped to the range specified by the 'Min' and 'Max' values using this spline.

Min, Max

These settings are not available in Color maps. For all others, they represent the range of mapped values for the selected parameter. For example, if Speed is the mapped parameter, the particle speed will be set to somewhere between these values. The actual value which is set depends on the mapping mode and the selected range for amplitude and/or frequency.

The nature of the value will clearly vary depending on the mapped parameter. For example in an Emission map this represents the particle birthrate of an emitter. For a Radius map, it is the particle radius. These values will therefore need to be changed depending on the parameter being mapped.

Name

Only available in Custom maps. This is a name you can give to your custom data item.

Using the Sound Modifier

This modifier is slightly different to most other modifiers in that it can do two things. Firstly, it can change the emitter to influence emission rate and change particle parameters when they are first created. It can also change particles during the course of the animation as with any other modifier.

Using the modifier

To use the modifier, you first need to choose a sound file in .wav format. Without that, nothing will happen.

Having done that, you need to map the sound file to at least one particle or emitter parameter. If this isn't done the modifier won't change anything and you won't see any effect. You can do this in the 'Map Sound' tab by clicking the 'Add' button and then choosing the parameter to affect from the drop-down list.

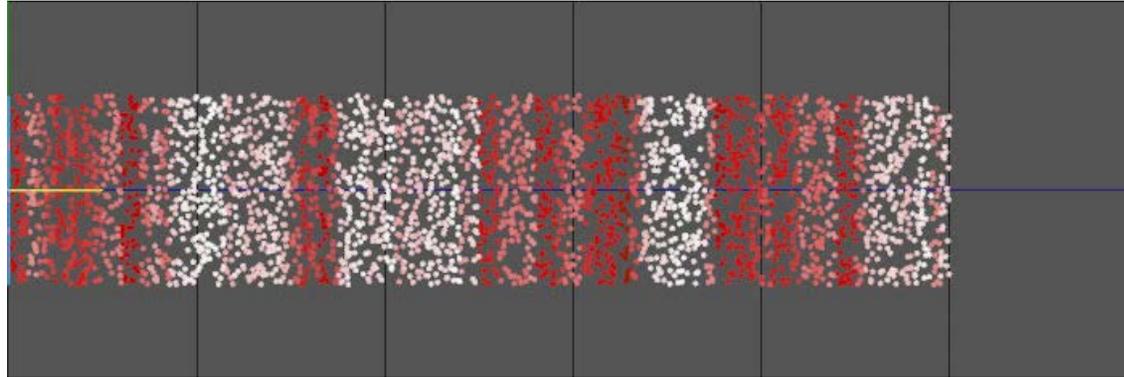
You can add as many maps as you like and the effects of each will be combined to give the final result.

Color mapping

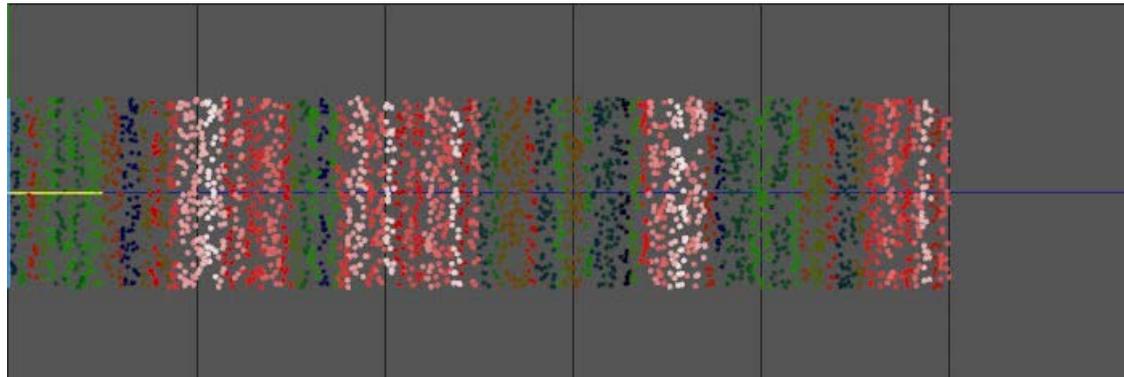
In this example a sound file has been loaded and a map added. This will map the particle colour to the peak amplitude in the sound file:



Note that 'Birth Only' is checked so that the colour is only set by the modifier on particle birth and not altered thereafter. At 100 frames the particle stream looks like this:



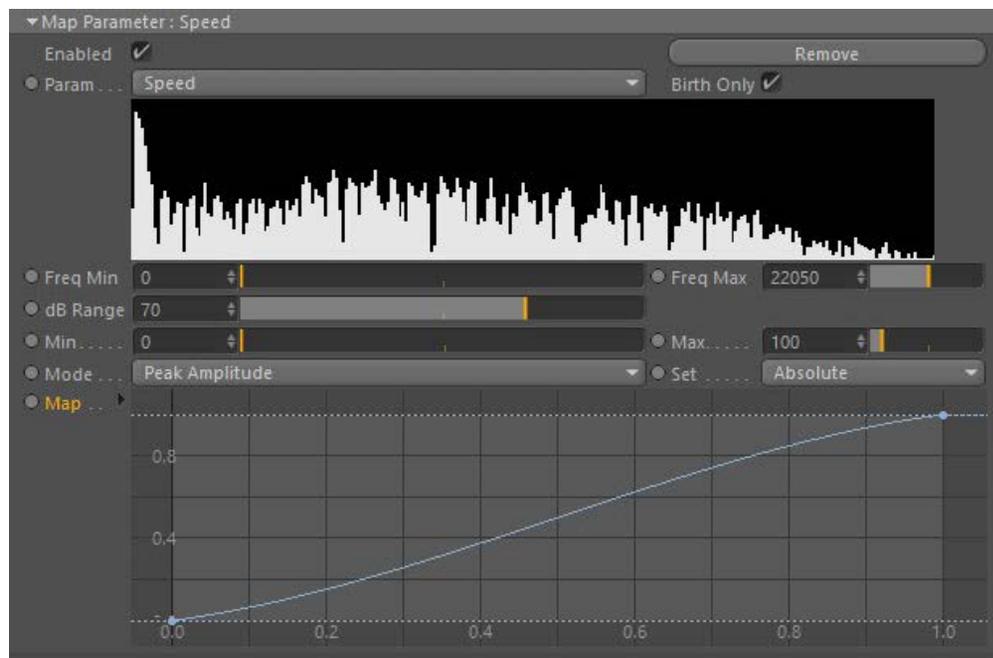
You can see that most particles are coloured using colours from the right-hand side of the 'Map' gradient. To get a better colour spread, we can change the 'dB Range' setting. The default value is 70dB but by reducing this to 30 we can force more colours from the left-hand end of the gradient to be used:



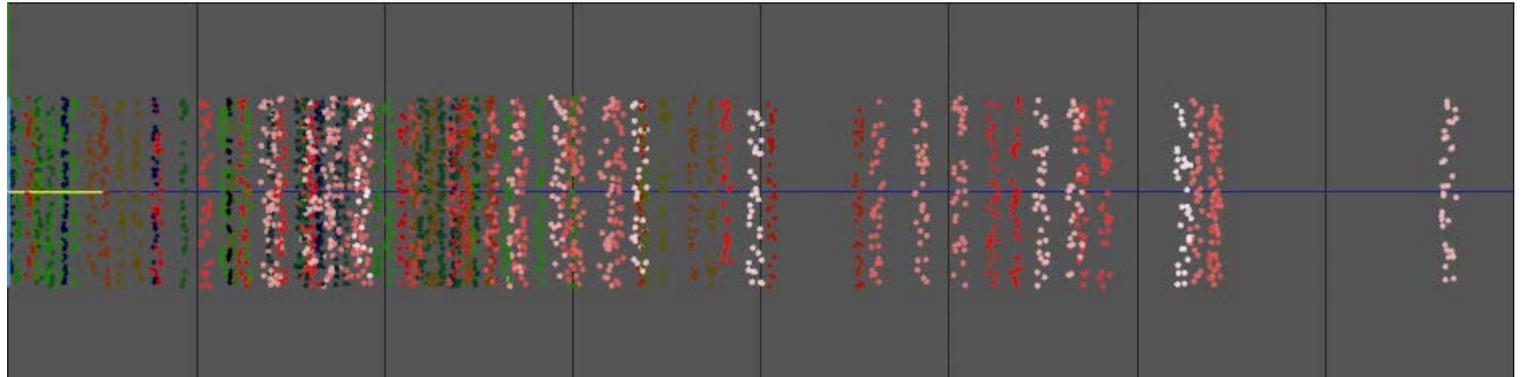
Remember, what this is showing is the peak amplitude of the sound file at the moment the particles were generated.

Speed mapping

We can add another map to make the particles faster if the amplitude was greater on emission:



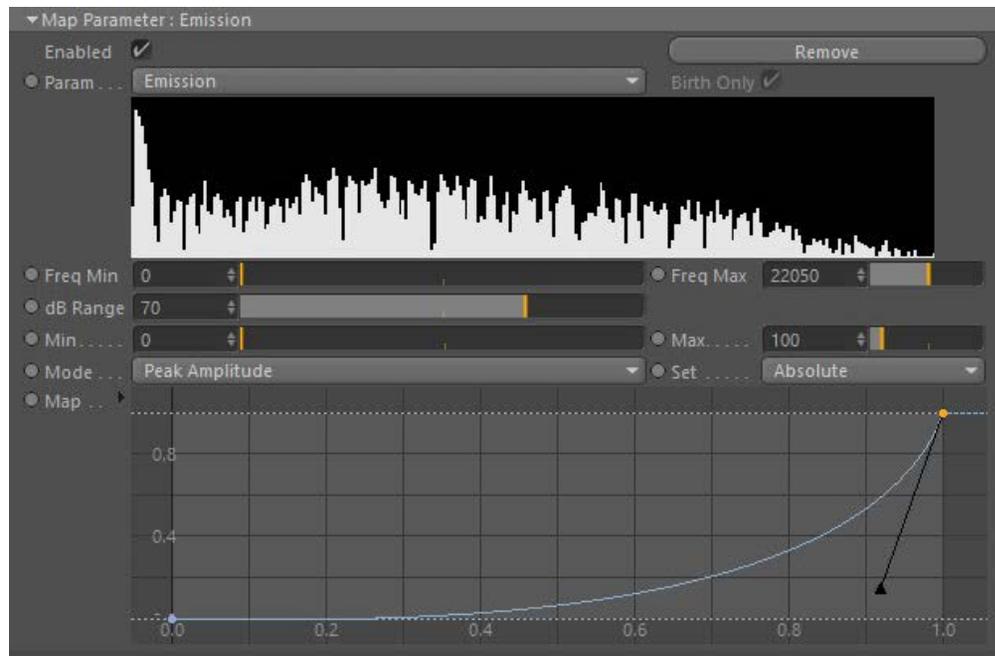
The 'Map' spline is adjusted so that the speed is greater for higher amplitudes than lower, up to a maximum of 300 units/second. At 100 frames we see this, where the two maps - colour and speed - are combined:



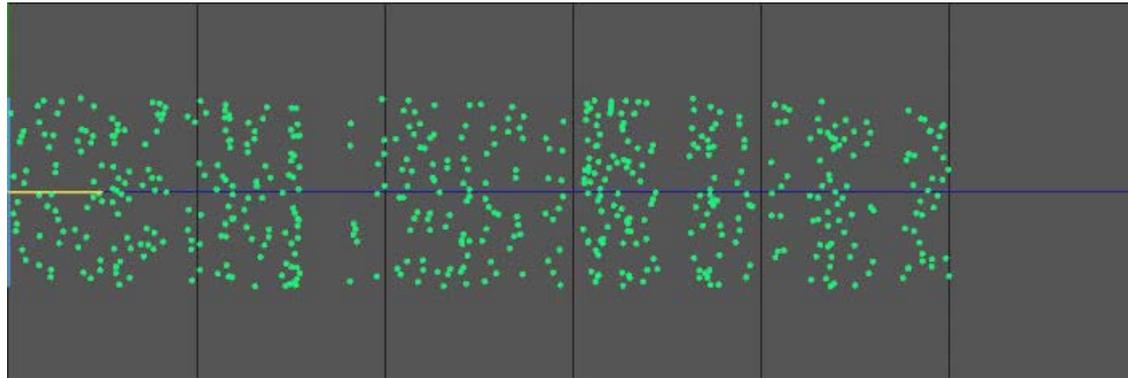
It's difficult to see from a still but the particles emitted when the amplitude was highest are the ones with the highest speed.

Mapping the particle emission

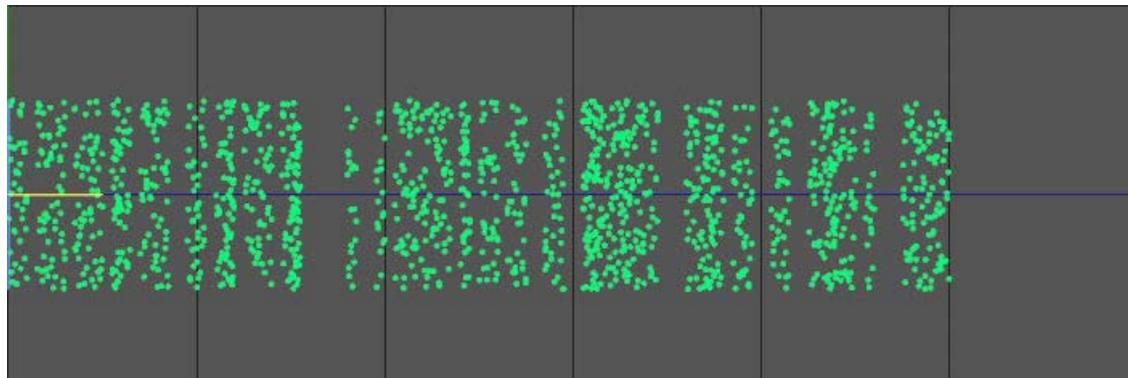
You can also change the rate of emission from the emitter by adding a map for emission mapped to peak frequency:



On playback the emission looks like this:



This isn't very dramatic, and it's due to the 'Freq Min' and 'Freq Max' settings. The highest emission rates will be achieved when the frequency approaches the 'Freq Max' value. By default this is 22050 Hz, but in this sound file that is rarely reached as it's quite a bass sound. Lowering this to 10,000 will produce a more obvious effect:



This only uses one map, but combining the emission control with other maps can produce some very dramatic effects.

Limitation with particle groups

Like all other modifiers, the Sound modifier can be set to affect only certain particle groups. However, it cannot do this when controlling particle emission. If you set up two emitters, each emitting a different group, and you use the 'Groups Affected' tab to only affect one of those groups, this will work as expected for all mapped parameters EXCEPT 'Emission'. This is because particles don't have a group until they are emitted, so there is no group (or particle, for that matter) to test - and once it has been emitted, it is too late. You should be aware of this limitation with regard to groups.

This is only a brief look at the sound modifier. You can see that the effect you get depends very much on the sound file being used, and on tweaking the parameters in the sound maps. Experimentation is recommended!

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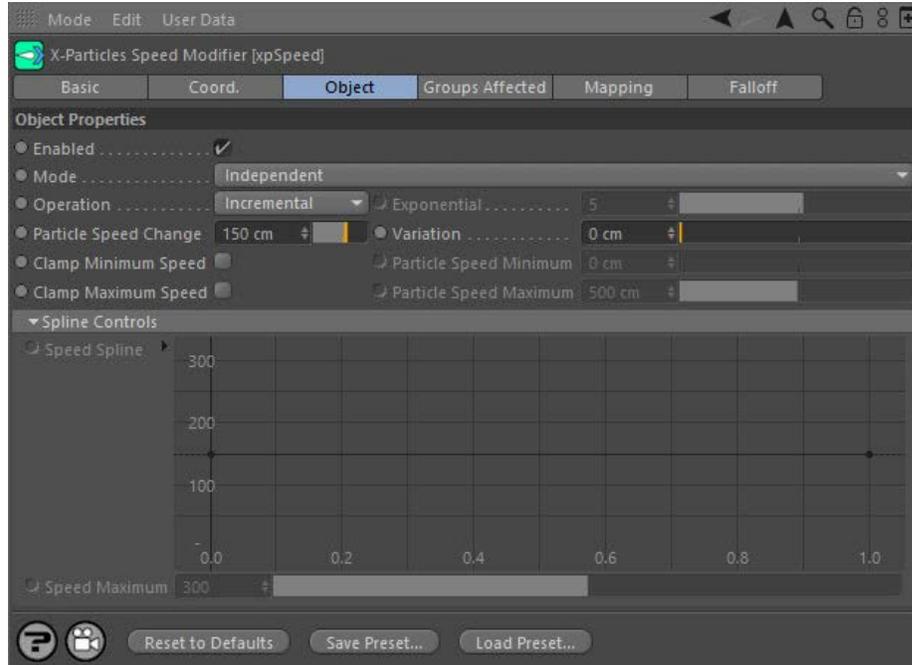
Speed Modifier

Summary

This modifier changes the speed of particles passing through it.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Operation

This drop-down has four settings:

Incremental

With this option, the speed of the particles changes each frame by a value given in the 'Particle Speed Change' field.

Use Spline

This allows you to alter the particle speed over the lifetime of the particle by using the spline interface in 'Speed Spline'. The incremental value and clamp settings are ignored. The initial speed is set by the Y value of the leftmost point on the spline. Also be aware that negative Y values will be clamped at zero.

Absolute

When you select 'Absolute', 'Particle Speed Change' becomes 'Particle Speed' and this is then used as the new speed of the particle.

Acceleration

In this mode, the only available control is 'Exponential'. This is a factor by which the speed is increased (or decreased, if 'Exponential' is negative) each frame. The difference from the 'Incremental' setting is that this is a multiplication factor instead of a simple increment. If the 'Exponential' value is negative, the particles will slow but never actually come to a halt.

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Exponential

This is the acceleration/deceleration value used if 'Operation' is set to 'Acceleration'.

Particle Speed Change (or Particle Speed in 'Absolute' mode)

This is the change to the particle speed: this change will occur each frame, as long as the particle is still being influenced by the modifier. Note that this is not the absolute speed; a value of 20 cm will increase the speed of the particle by up to 20 cm each frame that the particle is influenced by the modifier. In general, keep the values small as speeds can rapidly become very great. Negative values can be entered to reduce the particle speed. If the speed is not clamped this will eventually cause the particles to come to a halt. (Hint: to stop a particle immediately, set a very high negative speed and clamp the minimum speed to zero.)

As usual the actual speed change applied is influenced by the strength of the modifier falloff and for how long the particle remains in the modifier's field of effect.

Note that in 'Absolute' mode, 'Particle Speed Change' becomes 'Particle Speed' and this is then used as the new speed of the particle.

Variation

This parameter allows you to introduce some random variation into the speed change.

Clamp Minimum Speed, Particle Speed Minimum

This is useful if you want to slow a particle down but don't want the speed to fall below a certain value. Check this switch then enter the required minimum speed in the 'Particle Speed Minimum' field.

Clamp Maximum Speed, Particle Speed Maximum

This is useful if you want speed a particle up but don't want the speed to exceed a certain value. Check this switch then enter the required maximum speed in the 'Particle Speed Maximum' field.

Speed Spline

Deprecated Use this spline interface to control the speed of the particle over its lifetime. The speed of the particle at particle birth is given by the Y value of the point at the left of the spline (whose X value is zero) and the speed at the end of the particle's life is given by the Y value of the rightmost point (where X = 1).

Although you cannot set a point on the spline to be less than zero, the spline shape may make some points along its length have negative Y-values. These will all be clamped at zero (i.e. the particle will have zero speed).

When using this spline, you should be aware of one issue. Suppose the speed of the object is set to 150 in the emitter object but the leftmost point on the spline has a Y value of 75. What you will see is that for the first frame the object has a speed of 150, then in the next frame the speed immediately drops to 75. This is inherent in the way modifiers work - they are called after the initial particle generation - and the way round this is simply to ensure that the particle speed in the emitter is set to the same value as in the Y-value of the leftmost point in the spline.

Speed Maximum

By default the maximum Y value (i.e. speed) in the spline is 300. You may want the maximum speed to be higher than that. To do that, use the 'Speed Maximum' setting (you can reduce it as well, of course). This parameter is only available if 'Operation' is set to 'Use Spline'.

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Spin Modifier

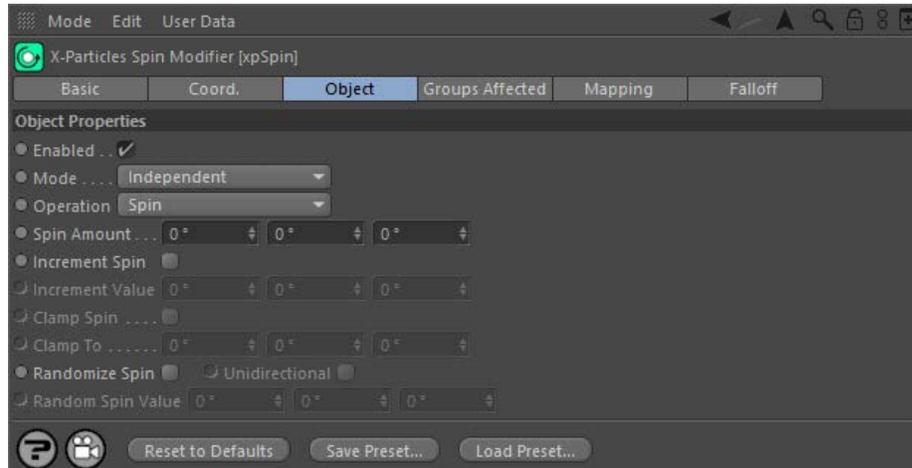
Summary

This modifier spins or rotates the particles.

Note that this modifier is not required if all you want to do is set a particle spinning. For this, it is much simpler to use the 'Simple Spin' settings in the emitter's Emission tab.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Operation

 This modifier now has two modes of operation. The default is 'Spin' and with this selected it will behave as it did in previous versions of X-Particles. The other mode is 'Rotate' which as its name suggests does not spin a particle but rotates it to a specified value.

The drop-down menu therefore has two options:

Spin

The modifier spins the particles. Note, however that the 'Simple Spin' setting in the emitter is now overridden by a Spin modifier set to this mode. That is, if simple spin is enabled but this modifier is present, then the particles spin using values from the modifier rather than the emitter, even if the modifier spin values are zero (no spin).

Rotate

The modifier will rotate particles to a specific rotation, but does not spin them continuously. Different options are available in this mode (see below).

Parameters when Operation is set to Spin

Very important: to use this modifier in 'Spin' mode, you must first ensure that the particle has created the necessary data structure to handle particle rotations. You do this by turning on 'Use Rotation' in the [Emitter object Extended Data tab](#), 'Particle Rotation' section. This sets up a data structure that all particle rotations require. This data structure is not set up by default in order to save memory (very important with millions of particles!). These are shown in the screenshot above.

Spin Amount

This is the change to apply to the rotation of the object whose associated particle passes into the modifier's field of effect. These values represent the change in rotation each frame, so in general should be kept quite small; 10 degrees per frame is quite fast. Negative values can be entered to spin the objects in the opposite direction. The full amount of spin is applied to particles passing through the modifier's red zone;

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those in the yellow zone have their spin altered in a reduced amount, depending on the strength of the falloff.

Increment Spin

This button and the 'Increment Value' parameter can be used to increase the amount of spin as the particle passes through the modifier, making it spin faster and faster (or slower, if the increment is a negative value). Check this button to gain access to the increment value field and to increase the spin each frame.

Increment Value

If the 'Increment Spin' button is checked, the particle spin will increase by the value in this field each frame. You can use this to speed up or slow down a particle spin, for example. The values you can enter are limited to 45 degrees as values higher than this can give rise to incorrect results, such as the particle appearing to spin slowly backwards instead of very fast forwards!

Note: you should use very small values in this field! Typically values of 0.1 to 0.3 degrees give good results (negative values are allowed). If the value is too high, the change in spin will appear to be instantaneous (which might be what you want, of course).

Clamp Spin, Clamp To

If 'Clamp Spin' is checked, the amount of spin is limited to the value in 'Clamp To'.

Randomise Spin, Random Spin Value

To give a particle a random spin, check this box. The particle will then spin in either direction by a random value.

Unidirectional

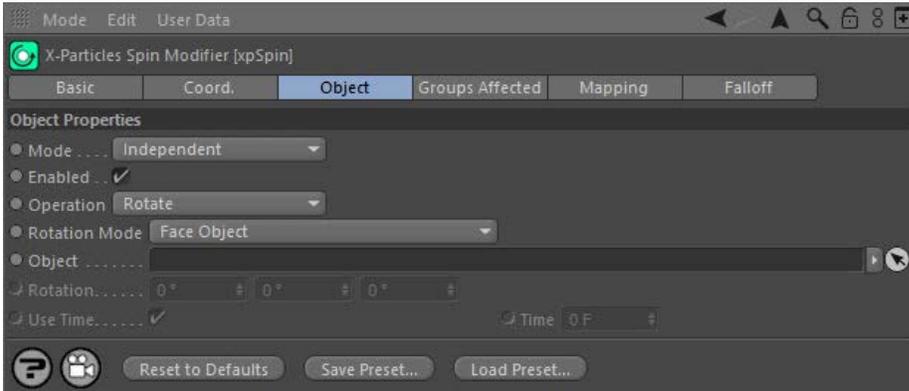
This option is only available if 'Randomise Spin' is selected. By default the object may spin in either direction, so some spin forwards and others backwards. If you only want the random spin to take place in one direction, check this switch. The spin can be reversed by using a negative value in 'Random Spin Value'.

Parameters when Operation is set to Rotate



Note: this mode does NOT require that 'Use Rotation' is enabled in the emitter. Unlike 'Spin' mode, this will work whether or not that option is checked.

In this mode these parameters are shown:



Rotation Mode

This drop-down has four options:

Absolute

The particles will be rotated to the value in the 'Rotation' field.

Relative

The particles will be rotated to a value which is their current rotation plus the value from the 'Rotation' field.

Face Camera

The particles will be rotated so their Z-axis points to the current scene camera. As they move, the rotation will be updated so they always point at the camera.

Face Object

The particles will be rotated so their Z-axis points to the object specified in the 'Object' field, if there is one. As they move, the rotation will be updated so they always point at the object.

Object

The object to point at, in 'Face Object' mode.

Rotation

The rotation value used in 'Absolute' or 'Relative' modes.

Use Time

This switch is only available in 'Absolute' or 'Relative' modes. If checked, the change in rotation will take place over the time given in the 'Time' field.

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This switch is only available in 'Absolute' or 'Relative' modes and when 'Use Time' is checked. It gives the amount of time taken to change the rotation. A value of zero will cause the change to take place immediately (just as if 'Use Time' was unchecked).

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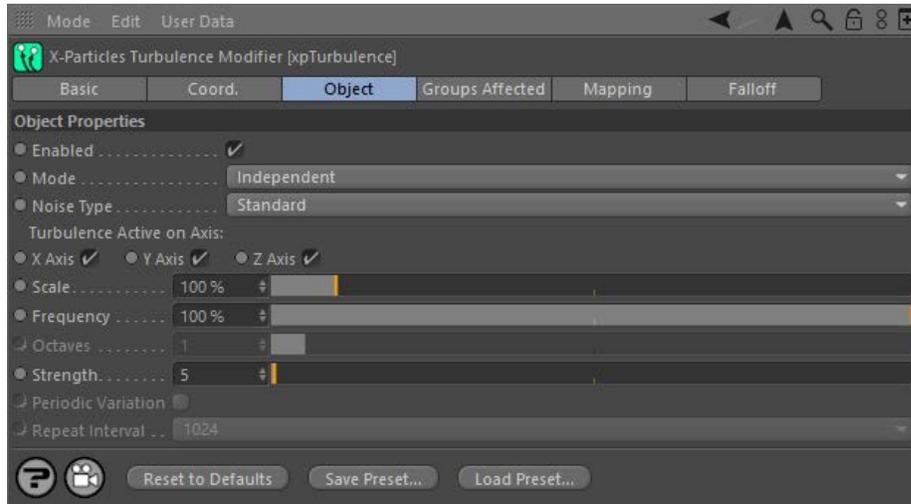
Turbulence Modifier

Summary

This is similar to the standard turbulence modifier in Cinema 4D, but with some additional options. The effect of the various options can be quite subtle. The best way to see what they do is to create a pair of emitters with identical settings, and link a separate turbulence modifier and trail object to each emitter. Now you can leave one modifier unchanged and alter the settings on the other to see the effect. If you use a different XP material to render each trail object, you can get a clear comparison between the two modifiers.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Noise Type

This drop-down has five settings:

Standard

This gives the same turbulence effect as the standard Cinema 4D modifier.

Turbulence, Wavy Turbulence and fBm

These add different types of turbulence to the particle stream. Generally, Wavy Turbulence gives a smoother effect but this and Turbulence are fairly similar.

fBm (fractal Brownian motion) produces a more irregular, chaotic movement, especially at lower scale and higher octaves (e.g. try a Scale of 50% and Octaves of 5).

Curl

Selecting 'Curl' brings up the following settings:

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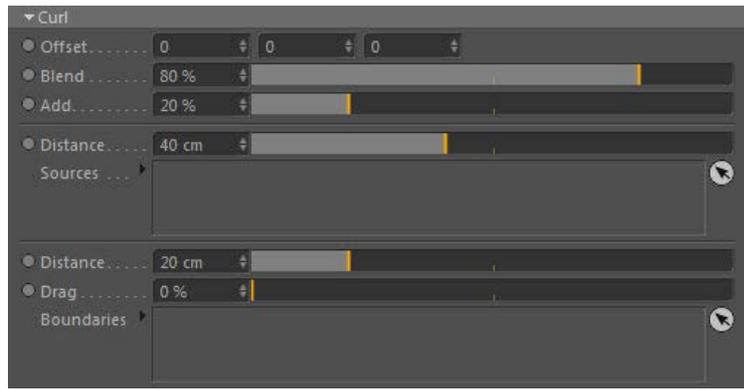
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Offset

This setting offsets the noise field used by Curl (results in a different curl velocity).

Blend

The setting is a blend between the particle's velocity and the curl velocity.

Add

This is the percentage of the curl velocity to add to the particle's velocity.

Distance

This setting controls the curl noise field distance from the sources.

Sources

Drop curl noise sources into this list (these can be geometry, other particles, particle groups or an emitter).

Distance

This is a falloff from the distance over which the velocity field of the curl is affected (squashed to reduce the velocity along the normal to the surface).

Drag

This setting slows the velocity field around the surface (tangential, so over the surface).

Boundaries

Drag geometry objects (primitives or polygons only) into this list to act as boundaries that "squash" the curl velocity field (it becomes tangential to the surfaces).

Turbulence Active on Axis

By default the turbulence effect works on all three axes. You can choose which axes the effect should work on by checking or unchecking the 'X axis', 'Y axis', and 'Z axis' switches.

Scale

In Standard mode this has the same effect as in the standard Cinema 4D turbulence modifier. In the other modes, larger scales tend to damp down the movement of the particle, giving smoother movement. By contrast a smaller scale will produce more chaotic movement.

Frequency

This is only available in Standard mode when it has the same effect as the standard Cinema 4D turbulence modifier.

Strength

As you might expect, the higher the strength value the greater the effect, that is, the greater the change in particle velocity (speed and direction).

Octaves

This parameter influences the frequency of the turbulence. It is not available for the 'Standard' turbulence mode. A value of zero will result in no change in direction; larger values will result in more frequent and dramatic changes.

Periodic Variation

Only available in 'Turbulence' noise type. When checked, the turbulence will repeat itself over a period of time. The time taken to repeat is controlled by the 'Repeat Interval' parameter.

Repeat Interval

If 'Periodic Variation' is checked, you can select how often the noise repeats with the 'Repeat Interval' drop-down ('Turbulence' noise type only). The smaller the number, the shorter the time between repeats. Try a value of 2 or 4 and watch the particle stream - after a certain amount of time, you see that the stream repeats itself.

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Vortex Modifier

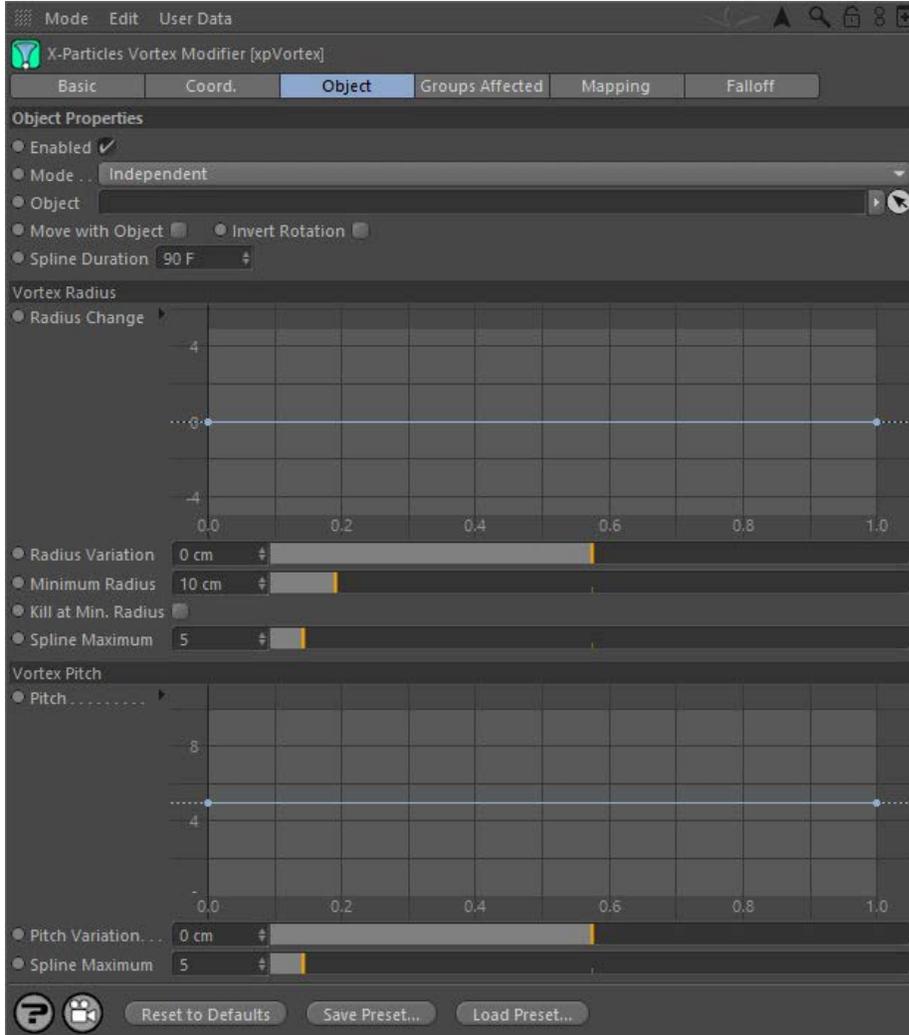
Summary

This modifier allows you to move particles to form a whirling vortex, making the creation of tornadoes, etc. very simple.

Please read the section '[How to use the Vortex modifier](#)' before using it for the first time.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Object

If this field is clear, and you are emitting directly from an emitter rather than an object, the vortex axis is along the Z-axis of the emitter. If you drop an object into this field, the vortex axis will be along the Z-axis of the object in the field. If the object is not at the same location as the emitter, or has a different rotation, the particles will move in a (possibly large) circle around the linked object. This can be a useful effect if

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required.

If you are emitting from an object, it is recommended that you drop the emission object into this field. If you don't, the axis of the vortex will be along the Z-axis of the emitter. If the emitter is not at the same location as the emitting object, or has a different rotation, the particles will move in a (possibly large) circle around the emitter.

Move With Object

If you are emitting from an emitter (not an object) and you move the emitter, what happens? New particles are generated from the emitter position but existing ones stay where they are. This isn't very good if you want a tornado to move over the ground, so check this switch to make the existing vortex move with the emitter. In this case, make sure the 'Object' field is clear.

If you are emitting from an object, you can get the same effect with this switch but ensure that the 'Object' field contains the object you are emitting from.

Invert Rotation

If you are looking along the vortex axis from the emitter (or emitting object) the particles travel in a counter-clockwise rotation. To make it clockwise instead, check this switch.

Spline Duration

This is the length of time over which the radius and pitch splines extend. The longer the time, the more gradual the change in radius and/or pitch.

Vortex Radius

Radius Change

This spline governs the rate of change of the vortex radius. It is not an absolute setting for the radius - see ['How to use the Vortex modifier'](#) below.

Variation

Adding variation to the change in radius will add some 'thickness' to the vortex and make it more realistic.

Minimum Radius

If you reduce the radius using the spline, you can set this value, which is the minimum radius the vortex can have.

Kill at Min. Radius

If checked, this switch will cause the modifier to kill any particles which reach the minimum vortex radius.

Spline Maximum

This is the maximum value allowed by the spline. You can change it to allow larger values if required.

Vortex Pitch

Pitch

This spline governs the pitch of the vortex - how fast the particles move along the axis of the vortex. Unlike the radius spline, this is an absolute setting.

Variation

This setting allows some variation to be added to the pitch for each particle.

Spline Maximum

This is the maximum value allowed by the spline. You can change it to allow larger values if required.

How to use the Vortex modifier

The emitter

How you emit particles will have a major effect on the result. For a nice vortex, try emitting from an emitter with a Circle shape, and turn on 'Ring Only' in the emitter so that particles only emit from the edge of the circle. You could also try emitting from a Disc primitive with a wide Inner Radius to give a thin ring of polygons; that will give some 'thickness' to the vortex.

Very important: the axis of the vortex is along the Z-axis of the emitter! If you are emitting from an object, it will still be along the Z-axis of the emitter unless you drag the object into the 'Object' field of the modifier. Then the object's Z-axis is used for the axis of rotation.

Therefore, if you are emitting from an object, we recommend that you do the following:

1. make sure the Z-axis of the object is pointing in the correct direction - that is, the direction of the particle stream
2. drag the object into the 'Object' field of the modifier - then the orientation and position of the emitter do not matter

If you find that the particles are rotating around the wrong axis, make sure that the axis of rotation (i.e. the object's axis) is aligned correctly and that the modifier is linked to it. The object's Z-axis should point along the initial direction of travel of the particle stream.

Movement of particles

The default behaviour of the modifier is to move the particles in a circle. That's not very exciting because for a tornado you want the particles to travel in a spiral shape. To get the shape you want, the modifier has two controls, Radius and Pitch.

Effect of Radius

The Radius control determines how fast the radius of the circle the particle is travelling around increases over time. The Radius Change spline control is used for this. The default setting is to return a constant value of zero. This does NOT mean that the radius of the circle is zero, it means that there is zero change in the radius over time. Left like this, the particles will always travel in a circle.

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To make the particles expand their radius to produce a typical vortex cone shape, set the spline to return a positive value. If set to always return 1, for example, the radius will increase by 1 scene unit per frame. This is a very gentle change but a value of 5 will increase the radius dramatically. You can have different rates of change at different times by adding more spline points and/or changing the spline point tangents. For example you might set the value at the start to be 5, then later on change to zero. Remember, this won't give a radius of zero, it will stop the from radius increasing. You can have negative values in the spline to shrink the radius over time; if you do that, you can use the 'Minimum Radius' setting to prevent the vortex radius from shrinking right down to zero, if you need to.

Effect of Pitch

The Pitch is how fast the particles move along the axis of the vortex. A value of zero will result in the particles moving only in a circle (the radius of which is set, or changed by, the Radius controls).

Higher values make the particles move faster. Again, you can use the Pitch spline control to adjust the speed, so you can have fast movement at the start and slow at the end.

Getting the exact shape you want will probably take some trial and error. When you do, you might want to save it as a preset so you can easily recreate it.

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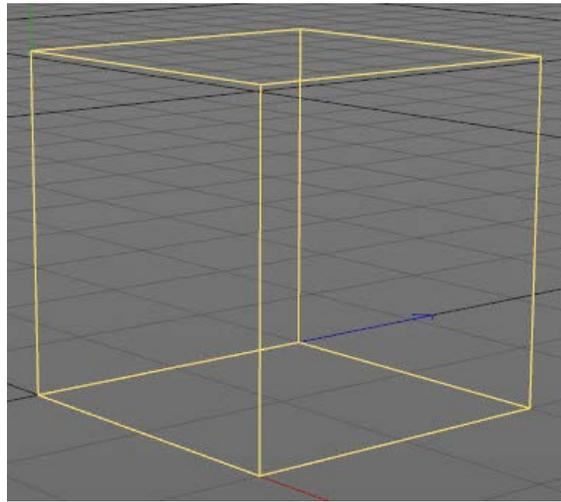
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Vorticity Modifier

This modifier is mainly intended for use with the Domain object, but can also be used outside the domain. It acts rather like a Turbulence modifier but unlike that modifier the effect of Vorticity is cumulative depending on how long the particle remains in its field of effect.

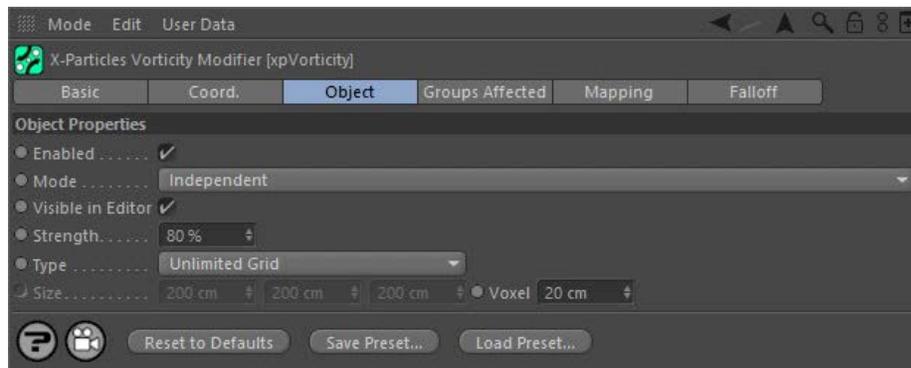
Editor appearance

This is the on-screen representation of this modifier in 'Limited Grid' mode:



Interface

The object's interface looks like this:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Object tab

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Visible in Editor

This modifier has a special representation in the editor. If you don't want to see that, but still want the modifier to be active, uncheck this switch.

Strength

The strength of the modifier. Quite high values may be required, do not be afraid to set values in the thousands!

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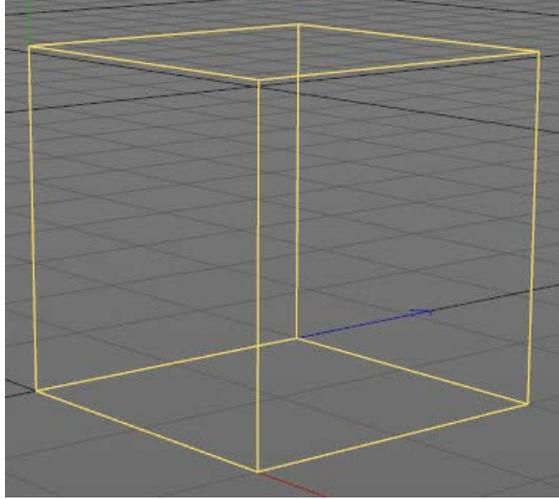
The modifier can operate in one of two modes, selected from this drop-down:

Unlimited Grid

The modifier will affect particles wherever they are in the scene.

Limited Grid

The modifier will only affect particles which are inside the defined box seen in this screenshot:



The actual effect may be seen only after the particle leaves the grid, however.

Size

The size of the box in 'Limited Grid' mode.

Voxel

The size of the invisible grid the particles move through. Larger voxels result in larger, more wave-like movements; small ones in small, more chaotic movement. Note that smaller voxels also means there are more of them, requiring more calculations and longer playback times.

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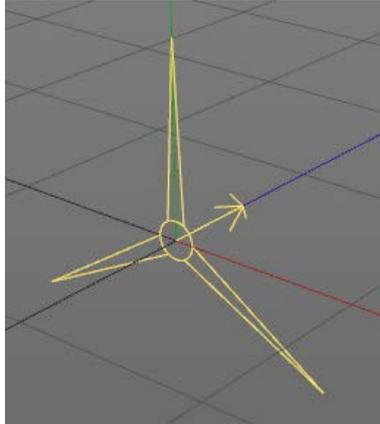
Wind Modifier

Summary

This is equivalent to the standard Cinema 4D wind modifier, but with the advantage that it can be controlled by X-Particles Actions.

Editor appearance

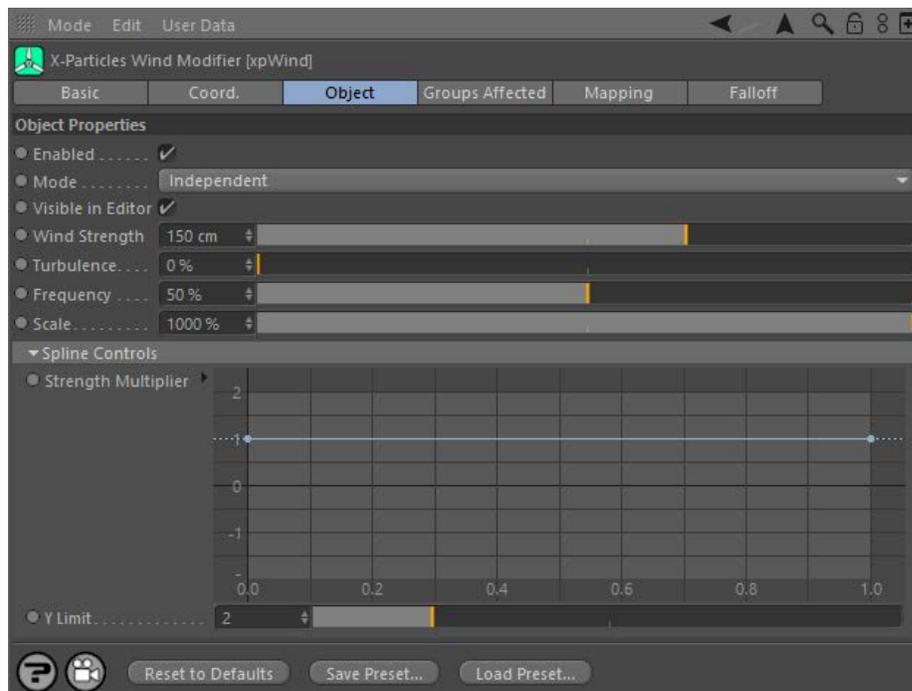
This is the on-screen representation of this modifier:



You can rotate the modifier on any axis and the particles will be blown along the axis shown by the arrow. By default this is along the positive Z world axis.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

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In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Visible in editor

This modifier has a special representation in the editor. If you don't want to see that, but still want the modifier to be active, uncheck this switch.

Wind Strength

The strength of the wind effect. Negative values are permitted and will reverse the wind direction.

Turbulence

The amount of turbulence in the wind, as with the standard Cinema 4D modifier.

Frequency, Scale

The turbulence frequency and scale, as in the [Turbulence modifier](#).

Strength Multiplier

Deprecated This spline interface lets you vary the strength of the wind over the lifetime of the document, so you can use this to vary the wind direction and speed with time. The values returned are used to multiply the 'Wind Strength' setting, so a value of 1.0 will have no effect; a value of zero will result in no wind at all.

Y Limit

By default the maximum Y value in the spline is 2.0. You may want the maximum multiplier to be higher than that. To do that, use the this setting (you can reduce it as well, of course).

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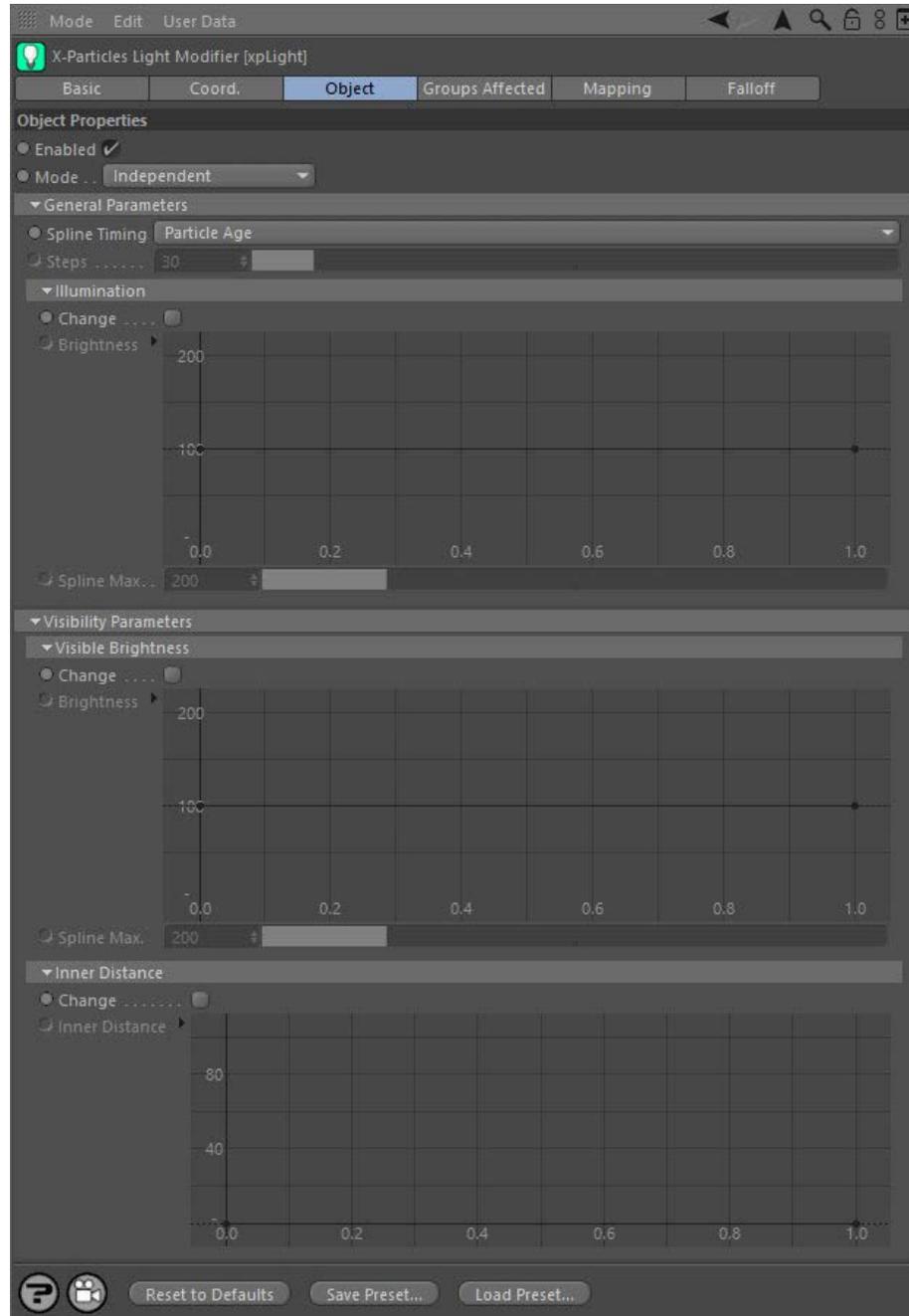
Light Modifier

Summary

This modifier works in conjunction with a Sprite object which is generating lights. It has undergone significant changes in X-Particles 3. Note that the light outer distance can no longer be altered with this modifier, since that parameter is now derived from the particle radius. Therefore, to alter the outer distance, you must change the particle radius (e.g. with a [Scale modifier](#)).

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

[Independent](#) [default setting]

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In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Spline Timing

All the parameters which can be changed with this modifier are controlled by splines. How the splines are used depends on this setting, which has two options:

Particle Age

Newly-created particles take the value from the leftmost point of the spline. Particles at the end of their lifespan take the value from the rightmost point.

Step Count

When entering the modifier's field of effect particles will take the value from the leftmost point of the spline. After the number of steps in the 'Steps' parameter, each of which is equivalent to 1 frame, the particles will take the value from the rightmost point.

Illumination

These settings change the brightness of illumination from the light (not the visible light brightness).

Change

Check this switch to change the light illumination.

Brightness

This spline is a percentage value so a value of 100 = 100% illumination. Values of greater than 100 are valid, as with any light.

Spline Max.

Alter this setting to change the maximum value allowed in the spline, if required.

Visible Brightness

These settings change the brightness of a visible light (not the illumination from the light).

Change

Check this switch to change the light brightness.

Brightness

This spline is a percentage value so a value of 100 = 100% brightness. Values of greater than 100 are valid, as with any light.

Spline Max.

Alter this setting to change the maximum value allowed in the spline, if required.

Inner Distance

Change

Check this switch to change the inner distance setting of a visible light.

Inner Distance

The spline values are in scene units. The modifier will not set the inner distance to be higher than the light's outer distance (i.e. the particle radius).

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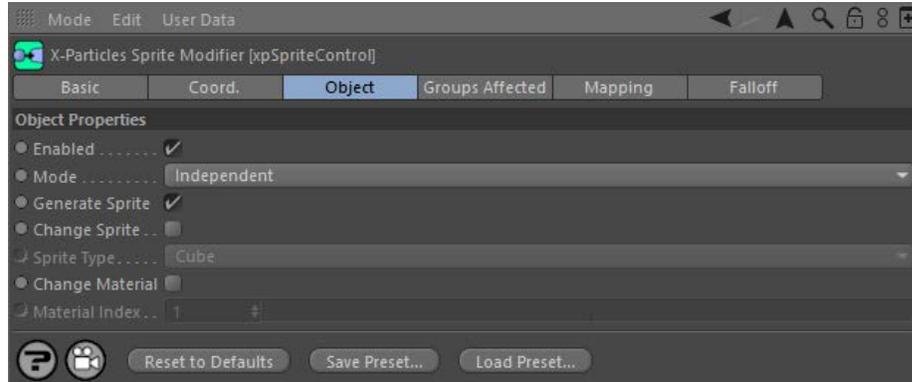
Sprite Modifier

Summary

This modifier lets you change which object is generated by an X-Particles Sprite object, and which material the sprites use.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Generate Sprite

If this switch is unchecked, the Sprite object will not generate an object for the particle.

Change Sprite and Sprite Type

If the 'Change sprite' button is checked, you can use the 'Sprite type' drop-down to select which object is generated by the Sprite object. So for example, you could use this to change spheres to lights. If you do this, be sure to set up the parameters of the new type of sprite in the Sprite object before using the modifier.

Change Material and Material Index

If the 'Change material' button is checked, you can use the 'Material Index' field to select which material is applied to objects generated by the Sprite object. The index refers to the material list in the [Textures tab](#) of the Sprite object. It is up to you to make sure that the index refers to a valid material. For example, if you specify an index of 2, and there is only one material in the materials list of the Sprite object, no material will be applied to the sprite.

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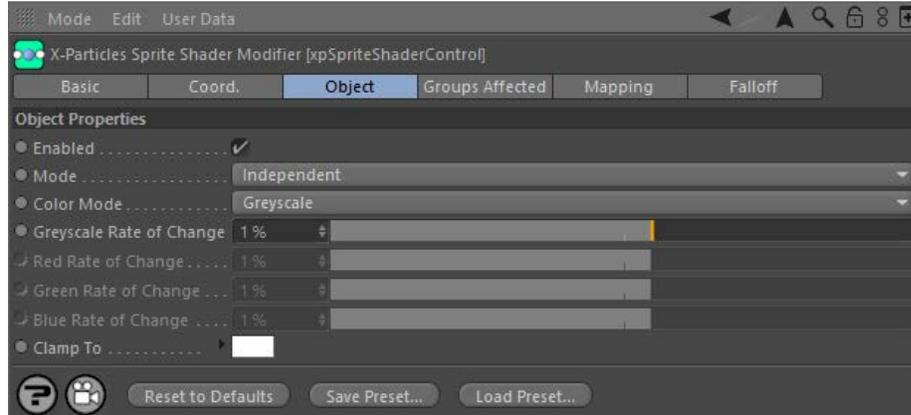
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Sprite Shader Modifier

Summary

This modifier works in conjunction with the Sprite Shader to produce effects such as fading out sprites over time (or fading them back in again!). You can use it to alter any channel which has a 'Texture' field in it, including Color, Bump, Reflection, Alpha, etc.

Before using the modifier for the first time, please read the section '[How to use the modifier](#)' below.



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Color Mode

This drop-down list has two settings:

Greyscale, Greyscale Rate of Change

The colour value returned by the Sprite Shader will be increased or decreased by the same amount in the red, green, and blue components of the color. This is most useful when you need a greyscale value to affect something like transparency or reflection. The change in value each frame is given in the 'Greyscale Rate of Change' parameter.

RGB, Red/Green/Blue Rate of Change

The red, green, and blue components of the returned colour will be altered independently of one another; the change in values each frame are given in the Red/Green/Blue 'Rate of Change' parameters. This is used when you want to alter a real colour value such as in the Color channel of a material.

Clamp To

The colour set by the modifier will be clamped to this colour value. By default this is 100% white.

How to use the modifier

To use this modifier is a little complex. It has the following requirements:

- a material with a Sprite Shader in at least one channel
- the Sprite Shader 'Mode' setting must be set to 'Modifier Sets Value'
- a Sprite object, with the above material applied to it

As a particle passes through the modifier, the modifier changes an internal color value held by the particle; the rate of change depends on the settings in the modifier - the higher the values, the more rapid the change. This value is then used by the Sprite Shader at render time to alter the color returned by the material channel.

An example may make this clearer. Suppose we have a scene with a Sprite object generating cubes. A plain red material has been applied to the sprites. We would like the particles to fade out when they enter the field of effect of the Sprite Shader modifier. To do this we will use the Alpha channel, so we put a Sprite Shader into the alpha channel of the material:

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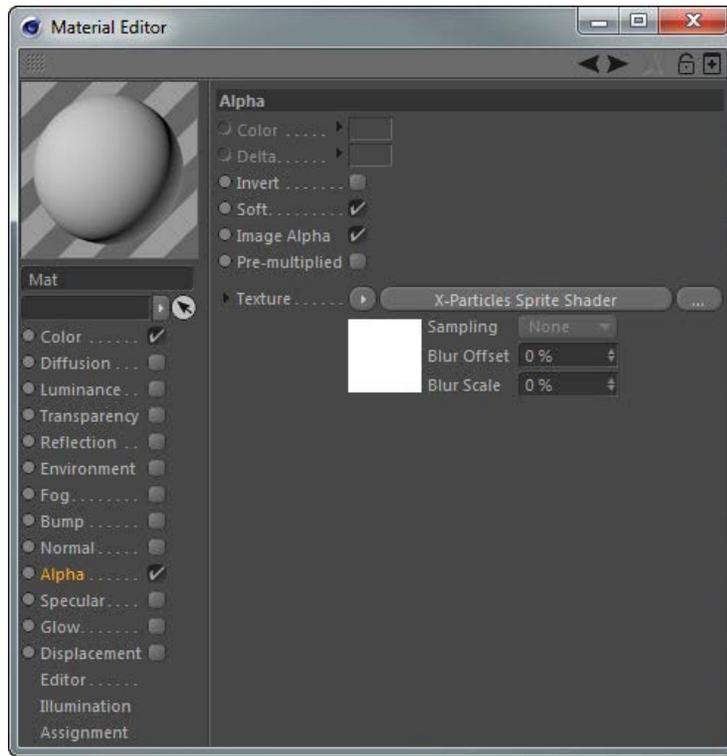
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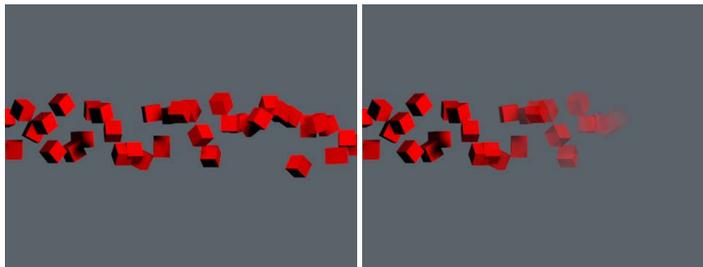
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At this point the sprites will always be visible, since the shader always returns white. What we need is for it to change to black to make the sprites invisible.

In the Sprite Shader, we make one change: 'Mode' is set to 'Modifier Sets Value'. Next, we add a Sprite Shader Modifier to the scene. Change the 'Greyscale Rate of Change' value to -2% and (very importantly) change the 'Clamp To' colour to black. What this means is that as each particle passes through the modifier, the value returned from the alpha channel is gradually reduced to black, which causes the object to fade and eventually disappear. The results are as follows:



Before the modifier is used

After the modifier is used

You could reverse this process and fade the particles back in again by using another modifier with the delta set to a positive value and 'Clamp To' set to white.

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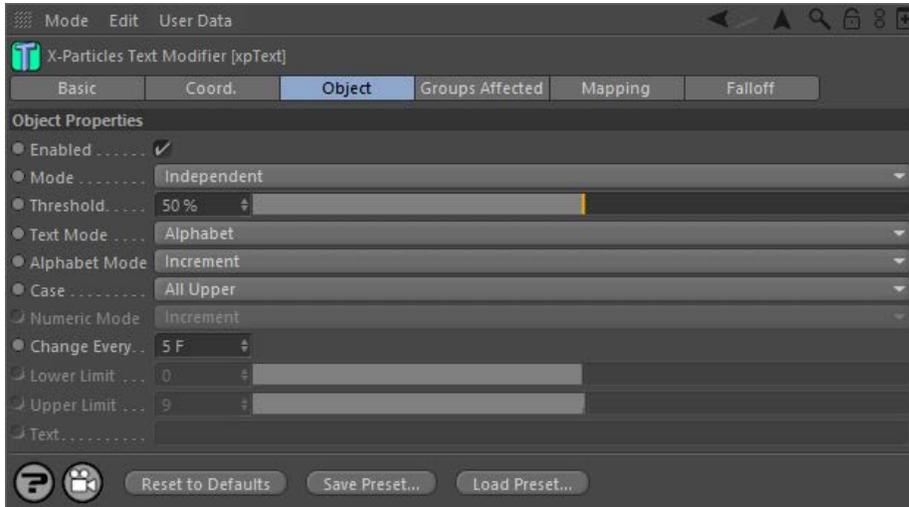
Text Modifier

Summary

This modifier is used to control the generation of text sprites. It has no effect on sprites which are not text.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Threshold

When the particle enters the field of effect of the modifier, the effect of the modifier is dependent on the falloff. The Threshold setting is the value of the falloff which must be met for the modifier to have any effect. For example, if set to 0%, the modifier will affect the sprite as soon as it enters the field of effect. If it is 100%, it will only have an effect when the particle enters the falloff's 'red zone', at which point the effect is at 100%.

Text Mode and Case

These settings are the same as those found in the Sprite object text settings. Please refer to the [Sprite object](#) for details.

Note that these settings will override those in the Sprite object! For example, if the Sprite object is set to 'User Text' and the modifier is set to 'Numbers', the text will change to a number when the modifier affects the particle. Unless this is what you want, make sure that the 'Text Mode' setting is the same in both the Sprite object and modifier.

Alphabet Mode

This drop-down has two settings:

Increment

The modifier will increment the text sprite (A becomes B, and so on). Only available in 'Alphabet' and 'Alphabet and numbers' modes.

Decrement

The modifier will decrement the text sprite (Z becomes Y, and so on). Only available in 'Alphabet' and 'Alphabet and numbers' modes.

Numeric mode

This drop-down has two settings:

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Increment

The modifier will increment the text sprite (1 becomes 2, and so on). Only available in 'Numbers', 'Alphabet and numbers', and 'User text and numbers' modes.

Decrement

The modifier will decrement the text sprite (2 becomes 1, and so on). Only available in 'Numbers', 'Alphabet and numbers', and 'User text and numbers' modes.

Change Every (Frames)

This setting determines how often the modifier will change the text (in terms of particle age, not the actual scene frame number).

Lower Limit, Upper Limit, Text

These settings are the same as those found in the Sprite object text settings. Please refer to the [Sprite object](#) for details.

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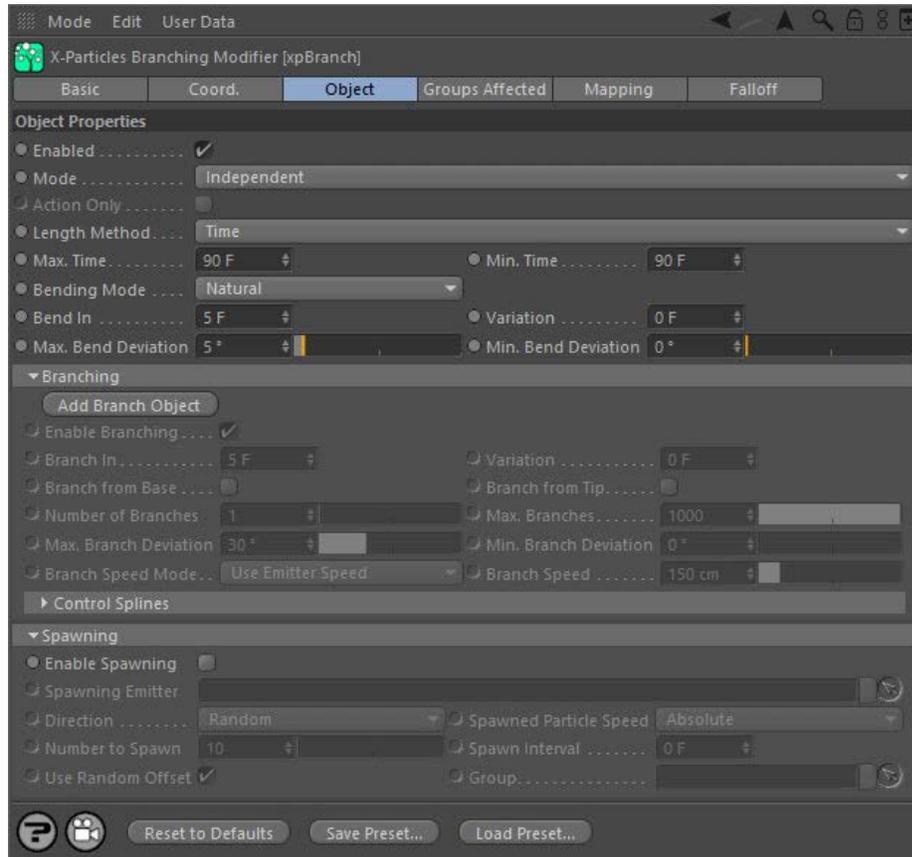
Branching Modifier

This modifier creates branching structures which can be used in a trail object or rendered with the X-Particles Branch Mesher.

Please see the [notes below](#) on using the Branching modifier before using it for the first time.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

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Using the Branching Modifier

The Branching modifier is a complex modifier. Please read these notes if you are not familiar with its use.

Concept

Think of the modifier as producing something like a plant structure. It has a stem, which has branches coming from it, and these branches may themselves have branches, and so on. The number, position, length, rotation around the stem, etc. may all be set.

Objects

The Branching modifier itself only produces data used for the stem of the branched object. To generate actual branches you need a Sub-Branch object to be added to it as a child object. This can easily be done by clicking the 'Add Branch Object' button. The Sub-Branch object has a similar button which you can click to add a sub-branch to the branch - there is no limit to how many levels are generated. Usually from one to three is all that is needed.

Although the hierarchy can have any number of levels, each one can contain just one Branch object. There is nothing to prevent you from duplicating the Branch objects but they will do nothing - only the first one on each level is used.

Particles

The modifier will create an extra particle for each branch that is generated. This can result in quite a lot of extra particles! So if you have limited the number of particles that can be emitted from the emitter, you may not see any branches if the emitter has reached its limit. This is important if you only want to generate a small number of branched systems - don't do it by reducing the maximum particle count, instead use the Start/End emit settings in the emitter, or use Shot or Pulse or Defined Emission modes.

Visualising your branches

To see the branched structure, link a Trail object to the emitter. This will generate a branched structure which you can render with the XP material, or use in the X-Particles Spline Mesher object, or use in a Sweep object.

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Enabled

If this button is unchecked, the modifier will be disabled (inactive).

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of effect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Action Only

This switch is only available in 'Action-Controlled' mode. It will force a branch to be generated when a Branching Modifier action is triggered which has the 'Force Branch' switch checked. By setting the 'Branch In' setting to longer than the 'Max. Length' setting, you can make the modifier only generate a branch when such an action is triggered.

Length Method

The modifier will set the maximum length of the initial 'stem' of the branched object using the method in this drop-down. The stem will have a length randomly selected between the 'Max. Length' and 'Min. Length' parameters. These length settings can be expressed in terms of time or distance. The settings therefore are:

Time

The length is expressed in terms of elapsed time. The default is set to 3 seconds.

Distance Units

The length is expressed in terms of scene units. The default is set to 450 units (the distance travelled by a particle in 3 seconds at the default speed of 150 units/second).

You can use whichever setting meets your needs, it only changes the units used - there is no effect on the final result.

Max. Time, Min. Time (or Max. Distance, Min. Distance)

These are the upper and lower limits of the stem length. The units of these parameters will change depending on the 'Length Method' setting.

Bending Mode

The stem will deviate from its initial course as it grows. This is either done naturally or in a zigzag style. This drop-down will let you choose between them.

Bend In, Variation

The time between bends in the stem. The smaller the value, the more bends occur. Variation to the time can be added with the 'Variation' setting.

Max. Bend Deviation, Min. Bend Deviation

The degree of bending is randomly chosen between these values. The maximum possible value is 90 degrees. Set these values to zero to remove any bending.

Branching

This section contains the parameters for the branches from the initial stem

Add Branch Object

This button will add a Sub-Branch object to the Branch modifier. You must do this before any branches are generated. Once you have added a sub-branch this button is unavailable since only one Sub-Branch object per branch level is permitted.

Enable Branching

Unchecking this switch will disable branching from the stem and branching from any sub-branches (the entire hierarchy is disabled, in other words).

Branch In, Variation

The time between branches from the stem. The smaller the value, the more often a branch is generated. Variation to the time can be added with the 'Variation' setting.

Branch From Base, Branch From Tip

These switches, if checked, force the modifier to branch from the base and/or the tip of the stem. If they are unchecked, branching from the base will never occur; branching from the tip may occur but only if the animation time happens to coincide with the time the modifier would branch at anyway.

Number of Branches

This is the number of branches that will be generated (at the same starting point on the stem or parent branch) each time branching occurs.

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The maximum number of branches that will be generated. Most of the time you can leave this setting alone.

Max. Branch Deviation, Min. Branch Deviation

The degree of deviation of the branch from the stem is randomly chosen between these values. The maximum possible value is 90 degrees.

Branch Speed Mode

This drop-down controls the speed of the newly-generated particle which forms the new branch. The options are:

Use Emitter Speed

The speed given by the emitter will be used. If a particle group is specified in the sub-branch object, the speed given in that group will be used; otherwise the speed given in the emitter itself is used.

Source Particle Speed

The speed will be set to the same as the particle which generated the branch.

Set Speed

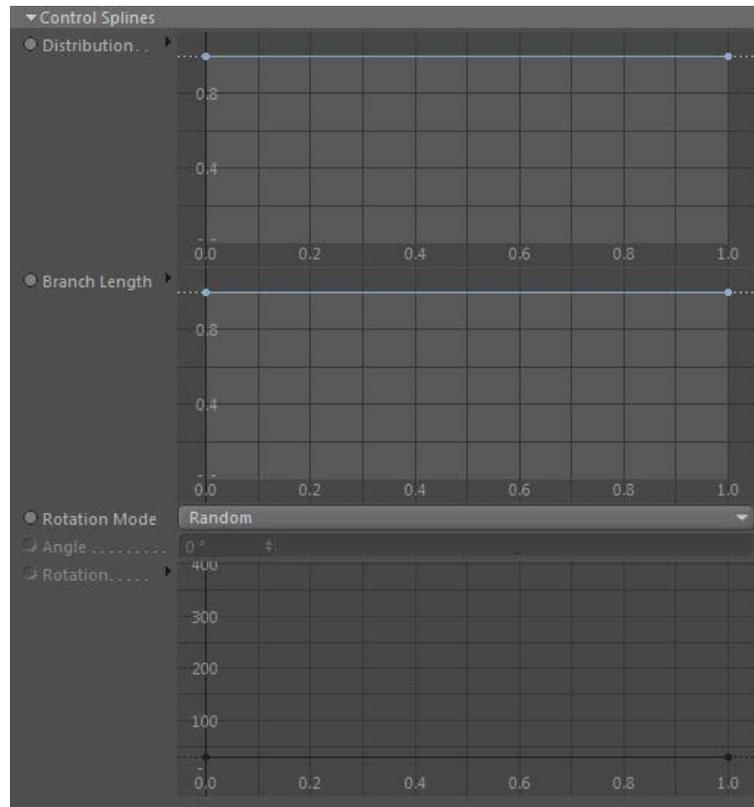
The value in the 'Branch Speed' parameter will be used.

Branch Speed

The speed of the branch particle, if 'Branch Speed Mode' is set to 'Set Speed'.

Control Splines

There are three splines to control branch distribution, length, and angle of rotation:



Distribution

This spline controls the distribution of branches along the stem. A value of zero means that no branch will occur at that point; a value of 100% means that a branch will occur, IF the time given in 'Branch In' indicates that a branch should be generated. Any other value is a probability that a branch will occur, again if the time in 'Branch In' would cause a branch to be generated at that point.

Branch Length

This is a scale spline which affects the length of the branches. It scales the value given in the branch length setting in the Sub-Branch object (not this modifier). You can use this to have long branches near the base and short ones at the tip, for example.

Rotation Mode

This governs the angle around the branch at which the branch emerges from the stem. This is NOT the deviation angle of the branch. If you imagine a 360 degree circle around the stem, this is the point on that circle where the branch originates. The drop-down has the following settings:

Random

The branches will be generated from a random angle around the stem.

Use Spline

The spline will control the angle completely. The spline angle at the point the branch occurs is not an absolute value; it is an incremental value, added to the previous angle. For example, if you set the spline to have a constant value of 30 degrees, each time a branch is generated it will be rotated 30 degrees around the stem from the previous branch. This allows you to generate a completely regular structure around the stem.

Random Then Spline

The modifier will first select a random angle around the stem and will generate a branch. For all subsequent branches the angle will be incremented by the angle in the spline at that point along the stem.

Set Angle

The angle is given by the value in the 'Angle' parameter.

Set Angle Then Spline

The modifier will first set the angle around the stem from the 'Angle' parameter and will generate a branch. For all subsequent branches the angle will be incremented by the angle in the spline at that point along the stem.

Angle

The angle used in the 'Set Angle' and 'Set Angle Then Spline' modes.

Rotation

The control spline used for controlling rotations.

Spawning

You can spawn from the particle used in the stem with these settings. If you also want to spawn from the branched particles, these same settings are used but you will also need to enable spawning in the Sub-Branch object.

Enable Spawning

Check this switch to enable spawning from the stem particle.

Spawning Emitter

The emitter used to generate spawns. This should NOT be the same emitter whose particles are generating the branches.

Direction

This is how the direction of the spawned particles is determined. There are two options:

Random

The direction of the spawned particles is set to a random value, which in practice means that the spawns adopt a spherical distribution.

Source Particle

In this mode the direction of the new particles is the same as the source particle.

Spawned Particle Speed

This option controls the speed of the spawned particles. There are two options:

Absolute

The spawned particle speed is determined by the spawning emitter.

Relative

The spawned particle speed is the sum of the source particle speed and the speed from the spawning emitter. If the spawning emitter sets a speed of zero, the spawns will have the same speed as the source particle.

Number to Spawn

The number of particles to spawn each frame.

Spawn Interval



The time interval between spawns. Set this to zero to spawn new particles each frame.

Use Random Offset



If checked, a small offset (derived from the particle radius) is applied along the spawned particle's direction of travel. This is to prevent a too-regular appearance of the spawns. If in fact you prefer the appearance to be regular, uncheck this switch.

Group

Spawned particles can be assigned a new group. Drag the Group object you want to use into this link field.

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Dynamic Particles Modifier

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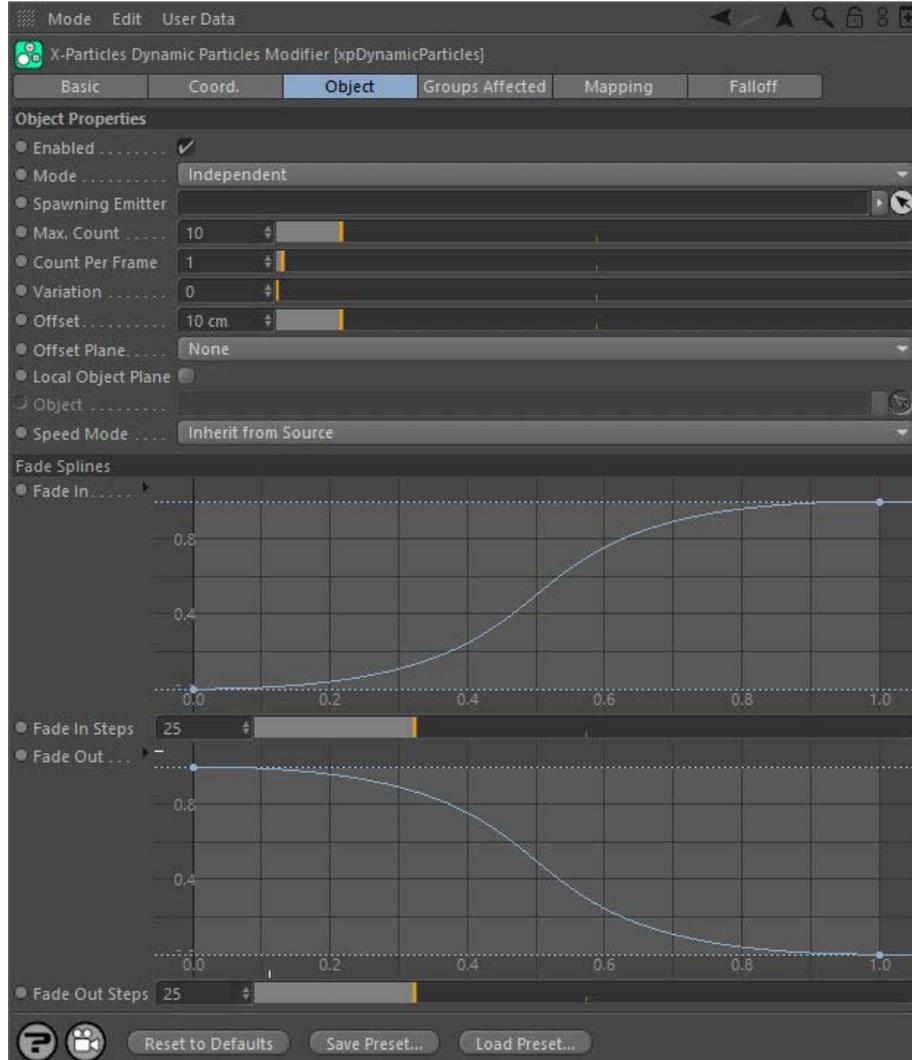
This modifier allows you to add and remove particles dynamically. It works in this way. For each source particle, the modifier will cause additional particles to be generated (from a separate emitter) until the maximum number specified in the modifier is reached. If the maximum number is subsequently reduced (by keyframing the value) these extra particles are removed until that smaller number is reached.

In addition, rather than just popping particles in and out the modifier can fade them in or out over time by altering the particle radius. One that reaches zero, the particle is deleted.

The purpose of the modifier is to allow additional 'filler' particles to be added to a scene when needed, then removed when no longer required.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

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Spawning Emitter

Drop a second emitter which will generate the dynamic particles into this field. Do not use the emitter which generates the source particle for this - it will not work if you do. The second emitter will automatically be switched into spawn-only mode.

Max. Count

The maximum number of dynamic particles which can be generated per source particle. They will be generated at a rate found in the 'Count per Frame' parameter until the maximum is reached.

You can keyframe this value to remove the dynamic particles when no longer required.

Count per Frame, Variation

The rate at which dynamic particles are generated. For example, a value of 1 will generate one dynamic particle per frame until 'Max. Count' is reached. If this value is set to be the same as or greater than 'Max. Count' all the particles will be generated in one frame.

The 'Variation' setting can be used to add some variation to the count per frame for different source particles.

Offset

When generated, each dynamic particle will be positioned at a distance from the source object of between 0 scene units and this value.

Offset Plane

This is the plane in which the dynamic particles will be placed. There are four options:

None

The particles are not restricted to any plane, so they will adopt a spherical distribution around the source particle.

XY, YZ, XZ

The dynamic particles will be restricted to the selected plane. Note: this is a global (3D world) plane. To use a plane local to an object, see 'Local Object Plane' below.

Local Object Plane

Check this switch for the offset plane to be local to an object rather than global.

Object

The object whose plane will be used if 'Local Object Plane' is checked. You can use the source particle emitter if you have rotated it and want the dynamic particles to conform to its plane.

Speed Mode

This determines the speed of the dynamic particles. There are two options:

Inherit From Source

The dynamic particles have the same speed as the source particle.

Absolute

The dynamic particles' speed is set by the spawning emitter.

Fade Splines

These splines control how particles are faded in when generated or out when removed. Fading in/out is done by altering the particle radius. For example, with the default 'Fade In' spline, the radius will start at zero and be 100% of the source particle radius by the time the fade in is complete. The time taken is given by the 'Steps' setting where each step represents one frame.

Conversely the default 'Fade Out' spline reduces the radius from 100% to zero over 'Steps' frames. When the radius reaches zero the dynamic particle is automatically deleted.

Fade In, Steps

The spline to control fading in of new particles.

Fade Out, Steps

The spline to control fading out of existing dynamic particles.

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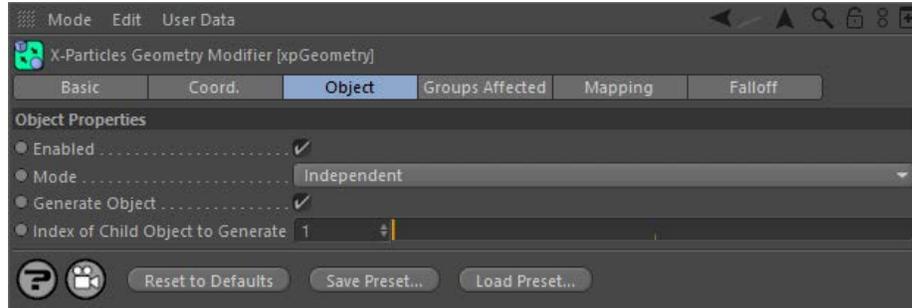
Geometry Modifier

Summary

This simple modifier lets you change which object is generated by an X-Particles Generator.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Generate Object

If this switch is unchecked, the Generator will not generate an object for this particle.

Index of Child Object to Generate

This refers to the index of the child object of the generator (see the Generator object for more details). It is for you to ensure that this index is valid. If you enter '3' into this field, and the Generator only has two child objects, nothing will be generated and the object will seem to just disappear.

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Morph Modifier

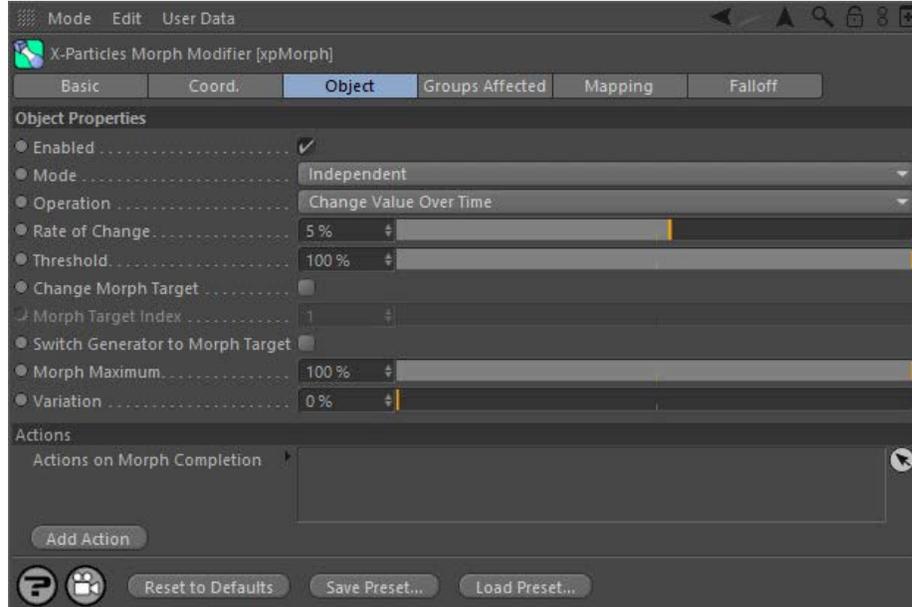
Summary

This modifier works in conjunction with the Generator to morph objects from one to another.

Before using this modifier please see the page '[Morphing generated objects](#)' which contains details of how to carry this out.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of effect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Operation

 This drop-down menu controls the operation of the modifier. It has two options:

Change Value Over Time

This is the default method and is the same as in previous versions of X-Particles. The rate at which the object changes shape is controlled by the 'Rate of Change' setting.

Set Value

In this mode the modifier simply sets the morph value but does not change it over time. When this is selected, the 'Rate of Change' setting is removed and a new setting, 'Morph Value' appears. You can use this mode to control the 'Morph Value' using data mapping.

Rate of Change

Only available if 'Operation' is set to 'Change Value Over Time'. This is the rate at which the generated object will be morphed, in a percentage change per frame. The final amount of morphing will depend on the 'Morph Maximum' setting.

Morph Value

Only available if 'Operation' is set to 'Set Value'. This is a percentage value representing the amount of change between shapes. The actual value which can be set is governed by the 'Morph Maximum' setting.

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Threshold

When the particle enters the field of effect of the modifier, the effect of the modifier is dependent on the falloff. The Threshold setting is the value of the falloff which must be met for the modifier to have any effect. For example, if set to 0%, the modifier will affect the sprite as soon as it enters the field of effect. If it is 100%, it will only have an effect when the particle enters the falloff's 'red zone', at which point the effect is at 100%.

Change Morph Target

If checked, this will allow you to change the value of 'Morph Target Index'.

Morph Target Index

The Generator object sets the morph target for each particle, but the morph modifier can alter this by changing this value, so the object will morph to a different target object.

Set this to the index of the object in the Generator's 'Morph Targets' list you wish to morph to. This starts at 1 (the first object in the list). It is up to you to make sure that the index is a sensible one. If you set it to '3' and there are only two morph targets in the list, no morphing will occur.

Switch Generator to Morph Target

The use of this switch is explained on the page '[Morphing generated objects](#)'. Please refer to that page for details.

Morph Maximum and Variation

This is the maximum amount of morphing that will take place; variation between particles can be added with the 'Variation' setting. If 'Morph Maximum' is set to 100%, the modifier will morph the generated object completely into its morph target. Any smaller value will result in an incomplete morph. This can be very useful if you need to see some variation in the amount of morphing which is occurring, e.g. a flower opening: not all flowers will open to the exactly the same degree.

On Morph Completion

This section determines what happens when the morph is complete - i.e. when the amount it has morphed reaches the 'Morph Maximum' value.

Actions

Any Actions dropped into this list will be triggered on morph completion.

Add Action

Clicking this button will add an action to the scene and drop it into the Actions list.

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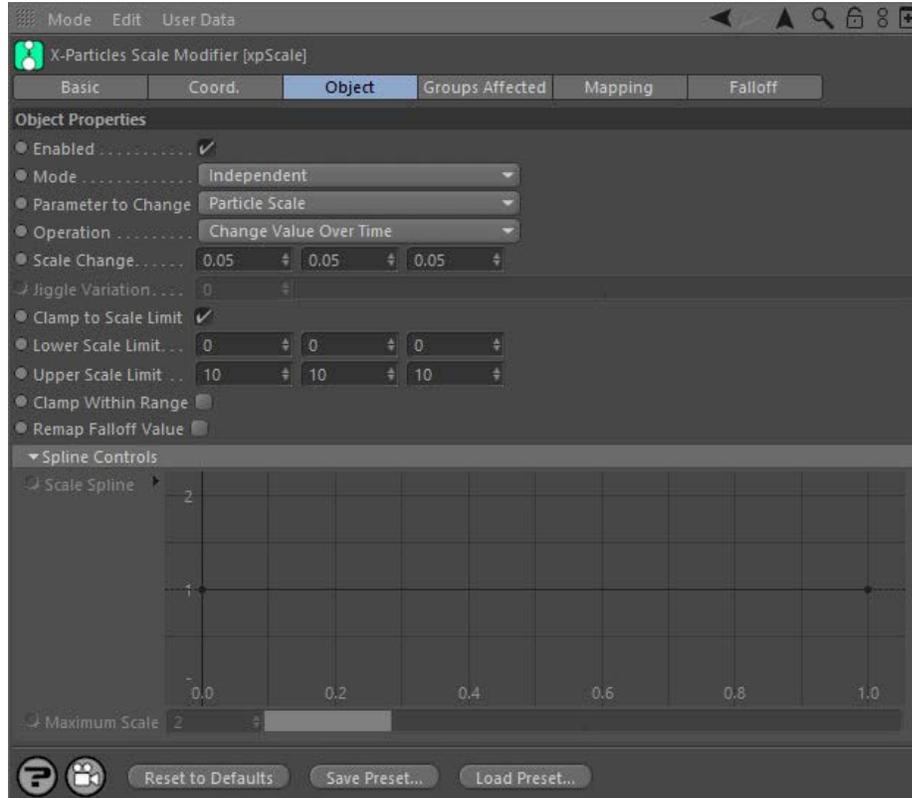
Scale Modifier

Summary

This modifier increases or decreases the scale (or radius, or mass) of a particle.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Parameter to Change

This drop-down menu has two settings.

Particle Scale

The modifier will affect the particle scale value. If there is any geometry associated with the particle and it is set to use the particle scale as the geometry scale, the geometry scale will be altered in this mode.

Particle Radius

The modifier will affect the particle radius. It will not then affect the geometry scale (if there is any geometry associated with the particle). However, the Generator, Sprite, and Fragmenter objects all have options to set the geometry scale from the particle radius. If that option is turned on, the geometry scale *will* be affected in this mode.

Particle Mass

The modifier will increase or decrease the particle mass.

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Operation

This drop-down has three settings:

Change Value Over Time

With this option, the selected parameter changes each frame by a value given in the 'Scale Change' field (for particle scale), the 'Radius Change' field (for particle radius) or the 'Mass Change' field (for particle mass).

Set Value

 If this option is selected, the modifier will simply set the scale (or radius, or mass) value but will not change it over time. In this case, the relevant 'change' field is removed and a 'value field appears instead. You can then control the value using data mapping.

Jiggle

As for 'Change Value Per Frame' but with random variation added. The amount of variation is set in the 'Jiggle Variation' field. This results in a constantly changing scale each frame, giving a jiggle effect. It is only available for scale, not radius or mass.

Use Spline

This allows you to alter the object scale over the lifetime of the particle by using the spline interface in 'Scale Spline'. The 'Scale Change' value is ignored. You can use the spline to change the scale by a factor where a scale of +1 is no change in scale, +2 is twice the scale, and 0 is an object with zero scale - i.e. it will be invisible. The initial scale is set by the Y value of the leftmost point on the spline. Also be aware that negative Y values will be clamped at zero.

Scale by Speed

As for 'Change Value Per Frame' except that the particle speed is used as a multiplier of the scale change. Effectively, the faster the particle, the greater the change in scale, radius, or mass.

Scale by Acceleration

As for 'Scale by Speed' except that the particle acceleration (i.e. the change in speed over successive frames) is used as a multiplier of the scale change. Effectively, the more the particle speeds up or slows down, the greater the change in scale, radius, or mass.

Scale Change

This parameter is not available if 'Operation' is set to 'Use Spline' or 'Set Value'.

This is the change to apply to the scale of the object whose associated particle passes into the modifier's field of effect. Negative values will cause the scale to decrease, positive values will increase the scale. Note that it is possible to set different changes in scale on different axes of the particle, if desired.

The full increment is applied to particles passing through the modifier's red zone; those in the yellow zone have their scale altered in a reduced amount, depending on the strength of the falloff.

Jiggle Variation

A random variation applied to the particle scale (not radius or mass) if 'Operation' is set to 'Jiggle'.

Clamp to Scale Limit

If this switch is checked, the scale of the object will be clamped at the values given in the 'Lower Scale Limit' and 'Upper Scale Limit' fields. This option is not available if 'Operation' is set to 'Use Spline'. Regardless of this setting, the modifier will never set the particle scale to be less than zero.

Lower Scale Limit, Upper Scale Limit

The minimum and maximum possible scales of the object. Not used if 'Operation' is set to 'Use Spline'. 'Clamp to Scale Limit' must be checked to change these settings. The lower scale limit cannot be less than zero.

Scale Value

This is only available if 'Operation' is set to 'Set Value'. It is the scale value which will be set by the modifier.

Radius Change, Clamp to Radius Limit, Lower Radius Limit, Upper Radius Limit and Radius Value

These are the same as the scale parameters 'Scale Change' etc., and are only available if 'Parameter to Change' is set to 'Radius'.

Mass Change, Clamp to Mass Limit, Lower Mass Limit, Upper Mass Limit and Mass Value

These are the same as the scale parameters 'Scale Change' etc., and are only available if 'Parameter to Change' is set to 'Mass'.

Clamp Within Range

 If this switch is checked, instead of a scale (or radius, or mass) value being clamped to the upper or lower limits given in the lower and upper limit parameters, it will be clamped to a randomly-selected value between those two settings. The effect of this is that the modifier will increase (or decrease) the scale until the scale reaches the random limit, thereby resulting in particles having different final scales, rather than them all having the same final scale.

Remap Falloff Value

The effect of the modifier is dependent on the falloff. If the falloff value is zero, it will have no effect; if the falloff value is 1, the effect is at its maximum. A modifier falloff normally returns a value ranging from 0 to 1 - i.e. the value is always positive and negative values are not possible. If this switch is checked, the falloff value is remapped to a range of -1 to 1. This allows interesting effects when the particle passes through a modifier's field. With low falloff values this switch will remap them to negative ones, causing the scale to decrease, then as the falloff strength increases, the value becomes positive, increasing the scale. Note that the switch will have no effect if the falloff type is set to 'Infinite' as the value returned then is always 1.

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Use this spline interface to control the scale of the generated object over the particle's life. The scale of the object at particle birth is given by the Y value of the point at the left of the spline (whose X value is zero) and the scale at the end of the particle's life is given by the Y value of the rightmost point (where $X = 1$). The range of values is 0 to +5.

Although you cannot set a point on the spline to be less than zero, the spline shape may make some points along its length have negative Y-values. These will all be clamped at zero (i.e. the object will have zero scale).

When using this spline, you should be aware of one issue. Suppose the scale of the object is set to 1 in the generator (or sprite) object but the leftmost point on the spline has a Y value of 0.5. What you will see is that for the first frame the object has a scale of 1, then in the next frame the scale immediately drops to 0.5. This is inherent in the way modifiers work - they are called after the initial particle generation - and the way round this is simply to ensure that the object scale in the generator is set to the same value as in the Y-value of the leftmost point in the spline.

Also note that If 'Parameter to Change' is set to 'Particle Radius' the spline will then set the particle radius directly. That is, a value of '2' in the spline will result in a particle radius of 2 units. If you are using a Generator or Sprite object with 'Scale from Particle Radius' checked, this will cause the objects to be very small, because they now take their scale from the particle radius. To alter this, you will need to increase the spline's 'Maximum Scale' parameter and adjust the spline as required.

Note that the Change Scale Action does not control the spline, so if you set 'Operation' to 'Use Spline' the action will no longer be able to control the object scale. In action-controlled mode the spline will still control the scale, but the modifier will have no effect until an action sets the particle to be affected by the modifier.

Maximum Scale

By default the maximum Y value in the spline is 2. You may want to scale up the objects more than that. To do that, use the 'Maximum Scale' setting (you can reduce it as well, of course, for finer control over the value). This parameter is only available if 'Operation' is set to 'Use spline'.

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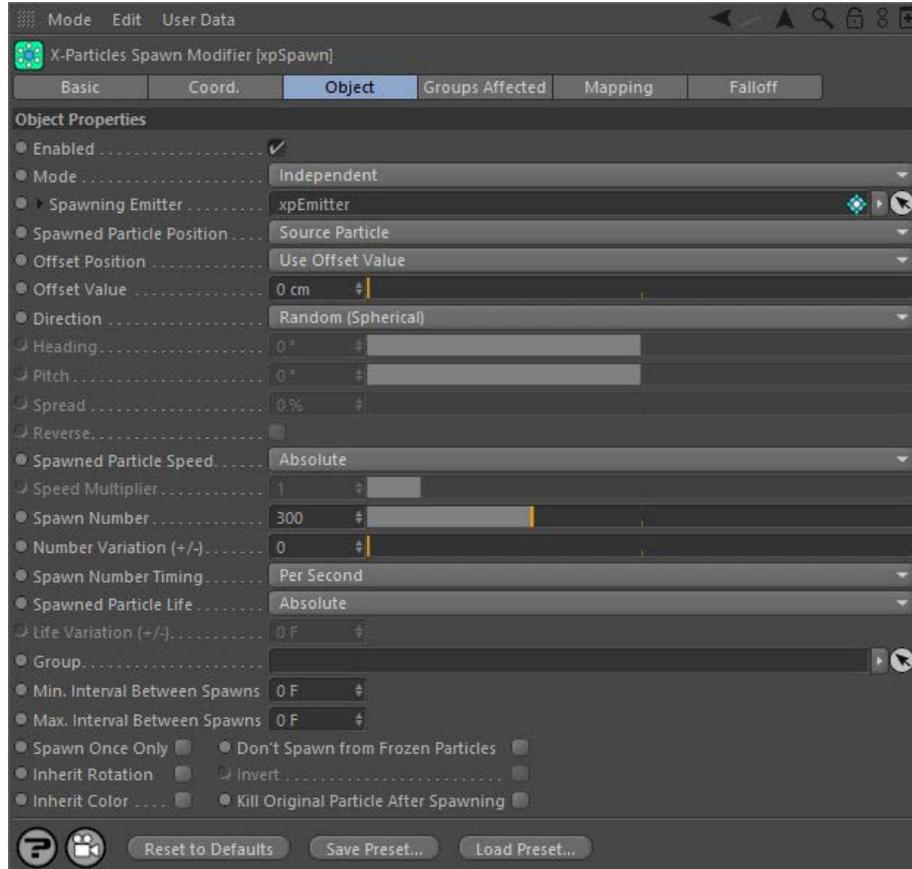
Spawn Modifier

Summary

This modifier will cause particles to spawn from existing (source) particles.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Spawning Emitter

This is the emitter which will generate the spawned particles. Without an emitter in this field you cannot access any of the other parameters and the modifier will have no effect.

In general, it is recommended that you use a second emitter for this purpose. It has the advantage that you can set the parameters of the spawned particles to be quite different from the source particles. You CAN use the same emitter which also generates the source particle, but it is usually a bad idea. Here's why.

Self-spawning

Suppose you have a spawn modifier set up to spawn 10 particles from the source particle each frame that the source particle remains in the field of effect of the modifier, using the same emitter which generates the source particles. The first source particle which enters the modifier will spawn 10 particles. No problem. But, next frame, each of the 10 spawned particles will spawn 10 more particles. And the next frame, those 100 particles will spawn as well. Pretty soon you have a zillion particles and your computer has come to a halt (that really can happen!).

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So, use a separate emitter which is not affected by the spawn modifier and this won't be an issue.

Using a separate emitter does have one small problem though. That emitter will itself start to emit particles as soon as the animation starts. You probably don't want that, so in the spawning emitter, check the switch 'Emitter only spawns'. This will cause the emitter to emit no particles until instructed to do so by the modifier. To save a little time, as soon as you drag an emitter into this link field, the 'Emitter only spawns' switch is automatically turned on in that emitter. Also, the spawn modifier is automatically dropped into the Exclude list of the spawning emitter. Together these options will always prevent the phenomenon of 'self-spawning'. If you need to, you can turn the switch off again and/or remove the modifier from the Exclude list manually.

Spawned Particle Position

This drop-down determines where the particle will be emitted. It has two choices.

Source Particle

The spawned particles will be emitted from the position of the particle which gave rise to the spawns. In this mode, the direction of the spawned particles is determined by the Direction setting (see below).

Determined by Emitter

In this mode the spawning emitter decides where the particles are emitted. So you can have the spawning emitter emit particles from an object which may be at a completely different position from where the source particle is located. The spawning emitter also determines the direction of the spawned particles.

Random Position Offset

When spawned particles are created, if this switch is checked they are given a small random offset from the calculated position. This prevents banding of the particle stream and is therefore usually desired, so this switch is enabled by default.

However, if you want to ensure that the particle is emitted exactly at the calculated position (e.g. the source particle position) then uncheck this switch and the random offset will not be applied. Remember though that the spawning emitter will also add an offset based on the particle's initial speed setting. To avoid that, also set the spawning emitter speed to zero. To get the spawned particles moving you can use a modifier such as Speed, Wind, or Turbulence, all of which will start moving particles with an initial speed of zero.

Offset Position



This drop-down menu replaces the 'Random Position Offset' setting from previous versions of X-Particles. It controls the offset of the spawned particles from the source particle, and has two options:

Use Offset Value

This allows you to enter a value into the 'Offset Value' field. The actual offset applied will be a random value between zero and the value in the 'Offset Value' field.

Use Particle Radius

The offset applied will be a random value between zero and radius of the source particle.

Direction

This is how the direction of the spawned particles is determined. It is only available if 'Spawned Particle Position' is set to 'Source Particle'.

Random (Spherical)

The direction of the spawned particles is set to a random value, which in practice means that the spawns adopt a spherical distribution.

Relative to Source Particle Direction

In this mode the direction of the new particles is the same as the source particle (but can be modified by the Heading, Pitch, Spread and Reverse settings - see below).

Relative to Source Particle Rotation

The direction of the new particles is relative to the source particle's rotation. The source particle direction has no effect; the spawned particle direction is derived from the rotation of the source.

Custom (Absolute)

With the Custom mode selected, you can access the Heading and Pitch settings and give the spawned particles any specific direction you like. The direction is the direction in 3D world space, not object space.

Heading, Pitch

These settings are only available in Relative or Custom direction modes. 'Heading' is the particle heading (corresponding to the 'H' angle in an object rotation). 'Pitch' is the particle pitch (corresponding to the 'P' angle in an object rotation). A 'Bank' setting (the 'B' angle in an object rotation) is not required to set the direction.

In Relative direction mode, these angles are deviations from the direction of the source particle. In Custom direction mode they are absolute directions in 3D world space.

Spread, Reverse

These parameters are only available if the 'Spawned Particle Position' is set to 'Source Particle' and the 'Direction' parameter is set to 'Relative to Source Particle' or 'Custom'.

If Direction is set to 'Source Particle', the spawned particles have the same direction as the source particle which spawned them. This isn't very useful, so you can modify the direction with these parameters. 'Spread' is a deviation to the particle heading, in percentage terms, from the direction of the source particle. Given a low value of, say, 10%, this causes the spawns to follow a narrow cone along the path of the source particle; set to 100%, you will get a hemisphere of particles.

The 'Reverse' setting, if checked, will reverse the direction of the spawned particles so that instead of following along the path of the source particle they head directly away from it (useful for rocket trails, for example).

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There are three settings in this drop down:

Absolute

With this option, the spawned particles will have the speed given in the spawning emitter.

Relative to Source Particle

If you select this option, the speed in the spawning emitter is added to the current speed of the source particle. For example, if the spawning emitter has a speed of 50 and the source particle has a speed of 150, the new particles will have a speed of 200 (150 + 50). This is a really a convenience function so you don't have to calculate the speed the spawned particles should have.

Inherit

In this mode the spawned particles will have the same speed as the source particle. In addition, you can multiply the spawned particle speed by a factor contained in the 'Speed Multiplier' setting.

Speed Multiplier

This is only available if the 'Spawned Particle Speed' is set to 'Inherit'. The source particle speed will be multiplied by this value to set the spawned particle speed. For example, if you set the multiplier to 0.5, the spawned particle will have half the speed of the source particle.

Spawn Number

This is the number of particles to be spawned from the source particle. The actual number spawned is, of course, also influenced by the strength of the falloff.

By default this is the number to be spawned per second. You can change this to be the number per frame by changing the 'Spawn Number Timing' setting.

Number Variation (+/-)

A random value will be added to or subtracted from the spawn rate, within a range given by this setting. For example, if the spawn rate is 30, and the variation is 5, the actual number spawned per second will be somewhere between 25 and 35 (30 +/- 5).

Spawn Number Timing

This drop-down determines whether the number of particles in 'Spawn Number' will be emitted each second or each frame. It has two options:

Per Second

The number of particles in 'Spawn Number' will be emitted each second. So if that number is 300, and the frame rate is 30 frames per second, 10 particles will be emitted each frame.

Per Frame

The number of particles in 'Spawn Number' will be emitted each frame. So if that number is 300, 300 particles will be emitted each frame.

Note that this drop-down takes its initial setting from the [X-Particles preferences](#) 'Birthrate Timing' setting. If that is set to 'Per Frame' the spawn modifier will be created with 'Spawn Number Timing' set to 'Per Frame'.

Spawned Particle Life

This drop-down has three options:

Absolute

The life of the spawned particles is that given in the spawning emitter.

Relative to Source Particle

The life of the spawned particles will be that of the source particle plus that given in the spawning emitter.

Inherit

The life of the spawned particles will be the same as that of the source particle. In addition this can be varied using the 'Life variation (+/-)' value.

Life Variation (+/-)

This is only available when 'Spawned Particle Life' is set to 'Inherit'. A random value within the range given by this parameter will be added to or subtracted from the source particle life. For example, if the source particle life is 90 frames and this value is set to 20, the spawned particle life will vary between 70 and 110 (90 +/- 20).

Group

This allows you to specify the group to which the spawned particles will belong. If there is nothing in this field, the group is determined by the spawning emitter. To specify the group, drag the desired Group object into this field.

This setting is useful if you want to ensure that the spawned particles are, or are not, affected by a specific modifier, for example.

Min. Interval Between Spawns and Max. Interval Between Spawns

By default, the Spawn modifier will spawn new particles from the source particle every frame. This is not always desirable. You might want new spawns to be produced only every 10th frame, for example. Using these two fields you can specify how often spawns are produced.

The default setting for both parameters is zero. This means that there will be no interval between spawns - that is, spawning will occur each frame. If you set both parameters to 10 (for example) spawning will take place every 10th frame.

However, this can be a little too regular. By setting different values in these two fields, you introduce a degree of randomness into the spawning interval. As an example, suppose you set the minimum interval to 5 and the maximum to 10. Now spawning will take place somewhere between 5 and 10 frames after the previous episode of spawning. This looks much less regular and can give a more natural appearance.

You cannot set the minimum interval to be greater than the maximum interval, or the maximum interval to be less than the minimum.

Spawn Once Only

If this switch is on, the modifier will only spawn once from a specific source particle.

Don't Spawn from Frozen Particles

If this switch is checked, no spawning will occur from any particle which has been frozen using a Freeze modifier or Action.

Inherit Rotation

If this switch is checked, the spawned particles will inherit their rotation from the source particle. Note that rotations must be enabled in the spawning emitter for this to work and cannot be set to tangential, face object, or face camera since then the spawning emitter will override the inherited rotation.

Invert

When checked, the spawned particle rotation will be inverted (e.g. if the source particle points along the positive Z-axis, the spawned particles will point along the negative Z-axis).

Remember that particle rotation and particle direction are independent of one another, unless the rotation is set to tangential, face object, or face camera. In all other cases the particle may seem to point in one direction but actually move in another.

Inherit Color

If this switch is checked, the spawned particles will have the same colour as their source particle.

Kill Original Particle After Spawning

This switch, if checked, will remove the source particle from the scene after it has spawned. This can be used to ensure that each source particle spawns only once.

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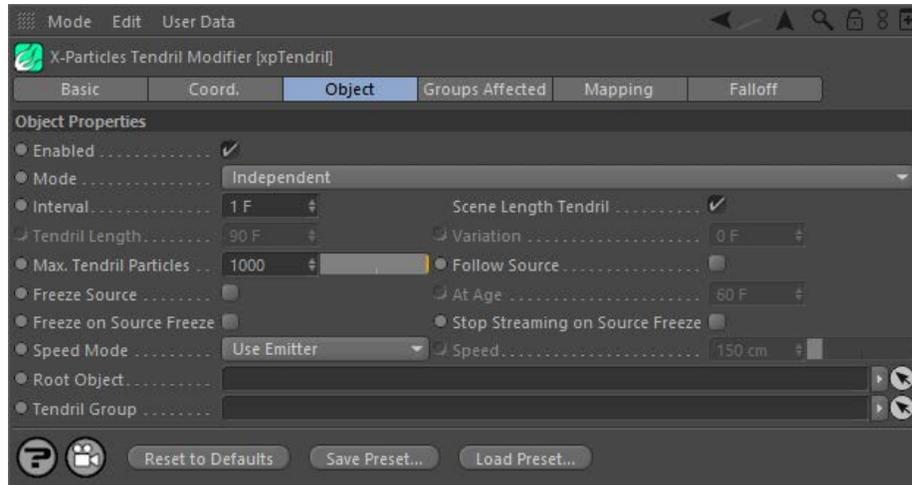
Tendrils Modifier

This modifier creates 'tendrils' of particles which follow the source particle. It can be used (for example) for the construction of waving tentacles.

Important: before using this modifier for the first time, please read the notes on [Using the Tendril modifier](#) below.

Interface

This is the modifier's interface:



For the 'Groups Affected', 'Mapping', and 'Falloff' tabs, and for the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Using the Tendril modifier

This is not a simple modifier and it may take some experimentation and reading these notes before you are familiar with its use.

Concept

The Tendril modifier, like the Branching and Spawn modifiers, generates additional particles (though unlike Spawn, it doesn't need a separate emitter). You can think of the various particles as either being source particles (the ones generated independently by the emitter) or tendril particles (the extra ones generated by the modifier to create a tendril).

For each source particle, the modifier generates a stream of tendril particles which start at the same point as the source and follow it. They can either follow it slavishly (if the 'Follow Source' switch is checked) or move independently but in the same general direction.

It is crucial that you understand that the modifier is not producing a series of static particles! It is generating a constant stream of them, each of which lasts as long as the 'Tendrils Length' setting and are then replaced with a new one; and they can all move independently (if 'Follow Source' is unchecked) so they can be influenced by modifiers in the scene. For example, if used with a Turbulence modifier, this gives a wavelike, undulating stream of particles.

Using the tendril

Once you have a tendril what can you do with it? You could just render the particles, and this can look very effective. Or, you can create a spline from each tendril. To do this, add a Trail object to the scene and set its connection algorithm to 'Tendrils'. Then you can use the Trail object in a Sweep object or the X-Particles Spline Mesher.

Tendrils length

Finally, note that the parameter 'Scene Length Tendril' is very important. Checking or unchecking it has a significant effect on several other parameters in the scene.

Parameters

Enabled

Uncheck this switch to disable the modifier.

Mode

Independent [default setting]

In this mode, the modifier will work in the same way as a standard Cinema 4D particle modifier: particles will be affected if they come into the field of affect of the modifier. X-Particle Actions have no effect on the modifier in this mode.

Action-Controlled

In this mode, the modifier will only act on a particle when told to do so by an Action. Until that point, the particle will not be affected, but once activated for a particular particle, the modifier will continue to influence it as long as it is in the field of effect of the modifier. The modifier's effect on a particle can be halted by means of another Action, if desired.

Interval

This is the time interval before a new tendril particle is generated for a particular tendril. The default is set to 1 frame, that is, a new tendril particle will be generated each frame.

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Scene Length Tendril

If this switch is checked, the tendrill will continue to grow for as long as the scene length. So if your scene is 120 frames long, the tendrills will grow continually for the 120 frames.

If it is unchecked, the tendrill will only grow until the setting in 'Tendrill Length' is reached. At that point the tendrill will stop growing in length, but it will continue to exist. Particles whose age is greater than the 'Tendrill Length' setting are removed and are replaced by new ones, so the stream is constantly refreshed.

This switch is important because the behaviour of the tendrill is quite different if it is unchecked. This is particularly so if the three 'freeze' options are used.

Tendrill Length and Variation

This is the length of time the tendrill will grow for, if 'Scene Length Tendril' is unchecked. You can add some variation into the lengths with the 'Variation' setting.

Max. Tendril Particles

For each tendrill, this is the maximum number of particles which will be generated.

This setting can produce useful effects. Suppose 'Scene Length Tendril' is checked and 'Max. Tendril Particles' is set to 50. The modifier will grow the tendrill until it reaches the limit of 50, at which point the tendrill will become 'detached' from its point of origin and will fly off on its own. It may or may not follow the source particle, depending on the 'Follow Source' setting.

If on the other hand, 'Scene Length Tendril' is unchecked, and the 'Tendrill Length' is set to 90 frames, the same will happen until the length is exceeded, at which point the tendrill will shrink down to nothing.

Follow Source

If this switch is checked, the tendrill particles will follow the source completely. They will not be moved independently by other modifiers. If it is unchecked, the tendrill particles will follow the source particle but if there are other modifiers in the scene, the tendrill particles will be moved by them and the tendrill may become detached from its source particle. For waving tentacles, leave this switch unchecked.

Freeze Source

When checked, this switch will freeze the movement of the source particle at a time given in the 'At Age' parameter.

What will happen to the tendrill? If 'Follow Source' is unchecked, nothing - the tendrill will continue to move independently unless 'Freeze on Source Freeze' is checked. What happens then depends on the 'Scene Length Tendril' setting. See below for details.

This setting can be quite useful. Suppose 'Scene Length Tendril' is unchecked, 'Tendrill Length' is 60 frames, 'Follow Source' and 'Freeze Source' are checked and 'At Age' is 30 frames. What will happen is that the source particle will freeze at 30 frames. However, the tendrill will keep growing as its length is 60 frames. At that point it will stop growing. The tendrill particles younger than 30 frames will be frozen but those between 30 and 60 are free to move, for example under the influence of a Turbulence modifier. In practice a combination of settings like this lets you ensure that only the tips of the tendrills move - the rest are static.

At Age

The age at which the source particle will be frozen if 'Freeze Source' is checked.

Freeze on Source Freeze

If this switch is checked, and 'Scene Length Tendril' is also checked, the tendrill will freeze completely and no further growth or movement will take place for the length of the scene.

However, If this switch is checked, and 'Scene Length Tendril' is unchecked, then the tendrill will not grow or move any more but will continue to exist until the time in 'Tendrill Length' has elapsed. At that point the tendrill will shrink back to its origin and eventually disappear.

Stop Streaming on Source Freeze

If this switch is checked, and 'Scene Length Tendril' is also checked, the tendrill will stop growing and will become detached from its point of origin; it will then move independently in the scene for the remainder of the scene length.

However, If this switch is checked, and 'Scene Length Tendril' is unchecked, the same will happen but when the time in 'Tendrill Length' has elapsed, the tendrill will shrink and eventually disappear.

Speed Mode

This drop-down determines the speed of the tendrill particles. It has three options:

Use Emitter

The particle speed is derived from the speed setting in the emitter.

Inherit From Source

The speed will be obtained from the source particle.

Set

The speed can be set directly using the value in the 'Speed' parameter.

Speed

The tendrill particle will have the speed in this parameter when 'Speed Mode' is set to 'Speed'.

Root Object

This is used if you want to anchor the tendrills to an object then move them by moving that object. Drag any scene object into the link field. When that object moves or rotates, the tendrills will conform to its movement.

Any object can be used. If you are emitting particles from an object, you can use the emitting object. Or you can use some completely independent object, such as a Null, to move them.

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Tendrill Group

This allows you to specify the group to which the tendrill particles will belong. If there is nothing in this field, the group is determined by the emitter. To specify the group, drag the desired Group object into this field.

This setting is useful if you want to ensure that the tendrill particles are affected by a specific modifier, for example.

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X-Particles Noise Falloff

This is an additional falloff for particle modifiers. Its use is not restricted to X-Particles; it can also be used elsewhere in Cinema 4D if required.

Interface

The falloff appears in the Falloff tab of any object in Cinema which can use falloffs. To use it, select 'xpNoiseFalloff' from the 'Shape' drop-down menu in the Falloff tab. The available settings are shown here:



This falloff returns a value obtained by sampling a noise function. Instead of the smoothly variable falloff value which is returned by other falloff types, the value returned can vary widely over small distances.

Parameters

Shape

This drop-down has three options:

Universal

The falloff is not restricted in size but works across the entire 3D world (equivalent to choosing 'Infinite' from the 'Shape' menu).

Box

The falloff has the shape of a box. Its size can be adjusted with the drag handles in the editor, or by changing the 'Size' values in the main falloff tab.

Sphere

The falloff is spherical. Its size can be adjusted with the drag handles in the editor, or by changing the 'Size' values in the main falloff tab. Note that only the first of the 'Size' values has any effect, the others are not used.

Important: this drop-down has no effect in Cinema 4D R16, the shape will appear as a box regardless of the selected option. This appears to be due to a bug in Cinema itself, which hopefully will be fixed soon.

Random Seed

The seed value for the noise.

Noise

This drop-down lets you select the noise type to use. These are the standard noise types you will see elsewhere in Cinema 4D.

2D Sampling

Enable this switch for 2D sampling of the noise. Disabling it will result in 3D sampling.

Sample Radius

The sample radius used when sampling the noise.

Periodic Variation

When checked, the turbulence will repeat itself over a period of time. The time taken to repeat is controlled by the 'Repeat Interval' parameter.

Repeat Interval

If 'Periodic Variation' is checked, you can select how often the noise repeats with the 'Repeat Interval' drop-down ('Turbulence' noise type only). The smaller the number, the shorter the time between repeats.

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Particles Falloff

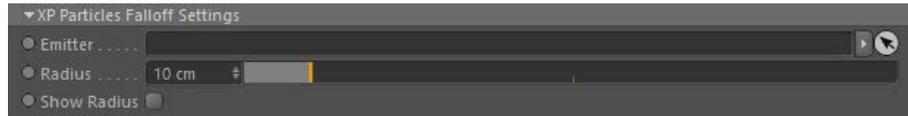
This is an additional falloff for the X-Particle particle modifiers.

Note: this falloff may not work correctly other than with the X-Particle modifiers; for example, it may not do anything in Cinema 4D deformers or Mograph effectors. This is currently a limitation.

Most falloffs use a defined area for the falloff, such as the volume of a cube or sphere. The particle falloff, however, treats each particle from an emitter as its own individual falloff. This allows a modifier to affect particles only when they are within the required distance of a particle from another emitter.

Interface

The falloff appears in the Falloff tab of any object in Cinema which can use falloffs. To use it, select 'xpParticlesFalloff' from the 'Shape' drop-down menu in the Falloff tab. The available settings are shown here:



Parameters

Emitter

Drag the emitter which is to be the source of the falloff particles in here.

Radius

This is the sphere surrounding each particle from the falloff emitter within which the modifier will have an effect on other particles. The strength of the effect is determined by how close the particles are. For example, if the 'Radius' is set to 10 units, and the distance between two particles is 9 units, the strength of the effect is multiplied by 0.1 (1.0 - distance/radius is the actual formula used, in this case that is 1.0 - 9/10). The closer the particles, the stronger the effect, up to 100% strength.

A particle may be within the 'Radius' distance of more than one particle from the falloff emitter. In this case, the strongest possible effect is the one used (i.e. the closest of all possible particles from the falloff emitter).

Show Radius

Check this box for a visual representation of the radius value around each particle from the falloff emitter.

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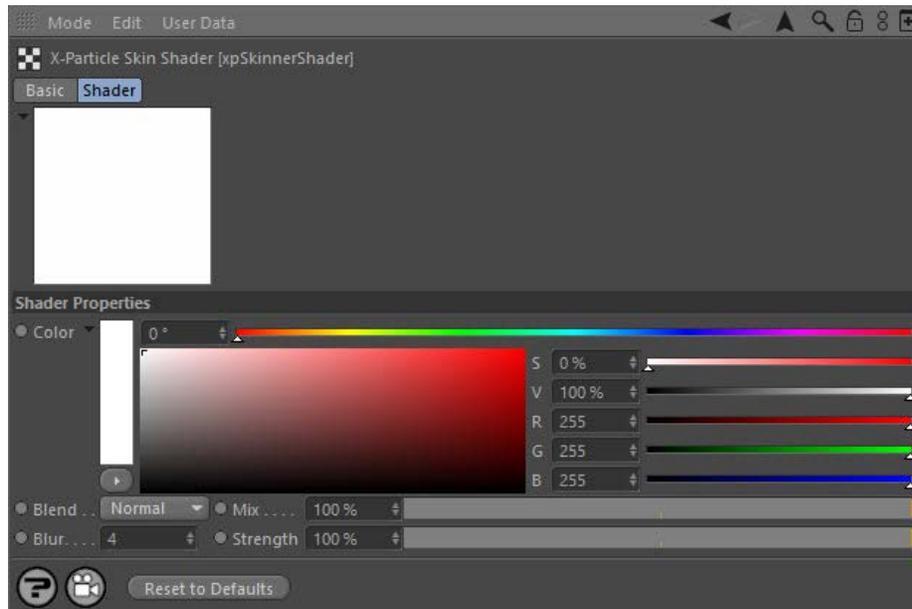
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Skin Shader

This is a channel shader that would typically be added to the Color or Luminance channels of a material. The material is applied to a Skinner object.

Interface

This is the shader's interface:



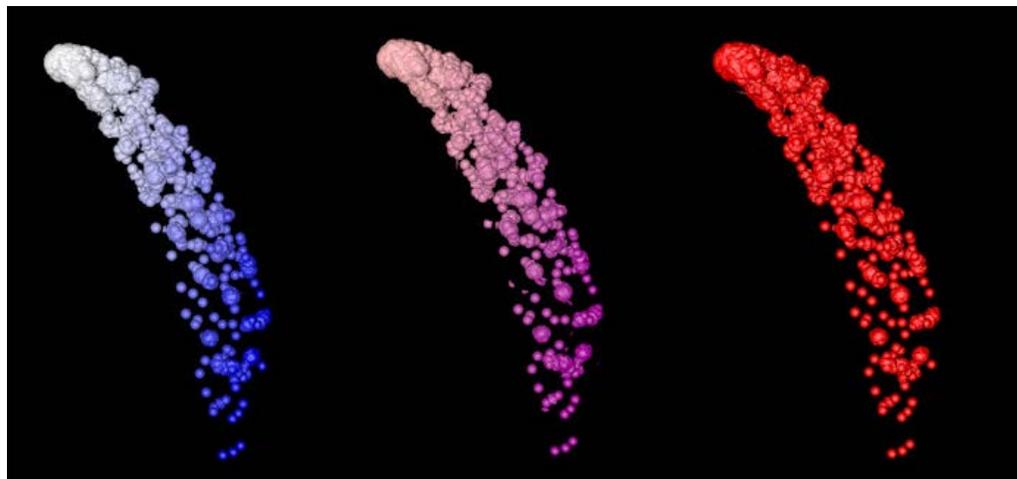
For the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Using the shader

The Skin shader is used to shade the X-Particles Skinner. So you first need an Emitter plus a Skinner, to produce a mesh. Then create a material, add the Skin shader to the Color channel and apply the material to the Skinner object.

The shader takes the particle colour as the base colour for its output. This is then mixed with the Color setting in the shader. A Mix value of 100% uses the particle colour only with no contribution from the shader. A Mix value of 0% uses the shader colour only, with no contribution from the particle colour.

For example, if the shader Color was set to 100% red, and the particles used an age-dependent white-to blue gradient for their colour, you would see the rendered result as follows, at 100% mix, 50% mix and 0% mix respectively:



Settings

Color

The colour to mix with the particle colour.

Blend

A drop-down menu with four blending modes between the different colours.

Mix

The contribution made by the particle and shader colours to the final result. See 'Using the shader' above for a more detailed explanation.

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Blur

The shader can soften the boundaries between colours using this setting, which is the size of the blurred area.

Strength

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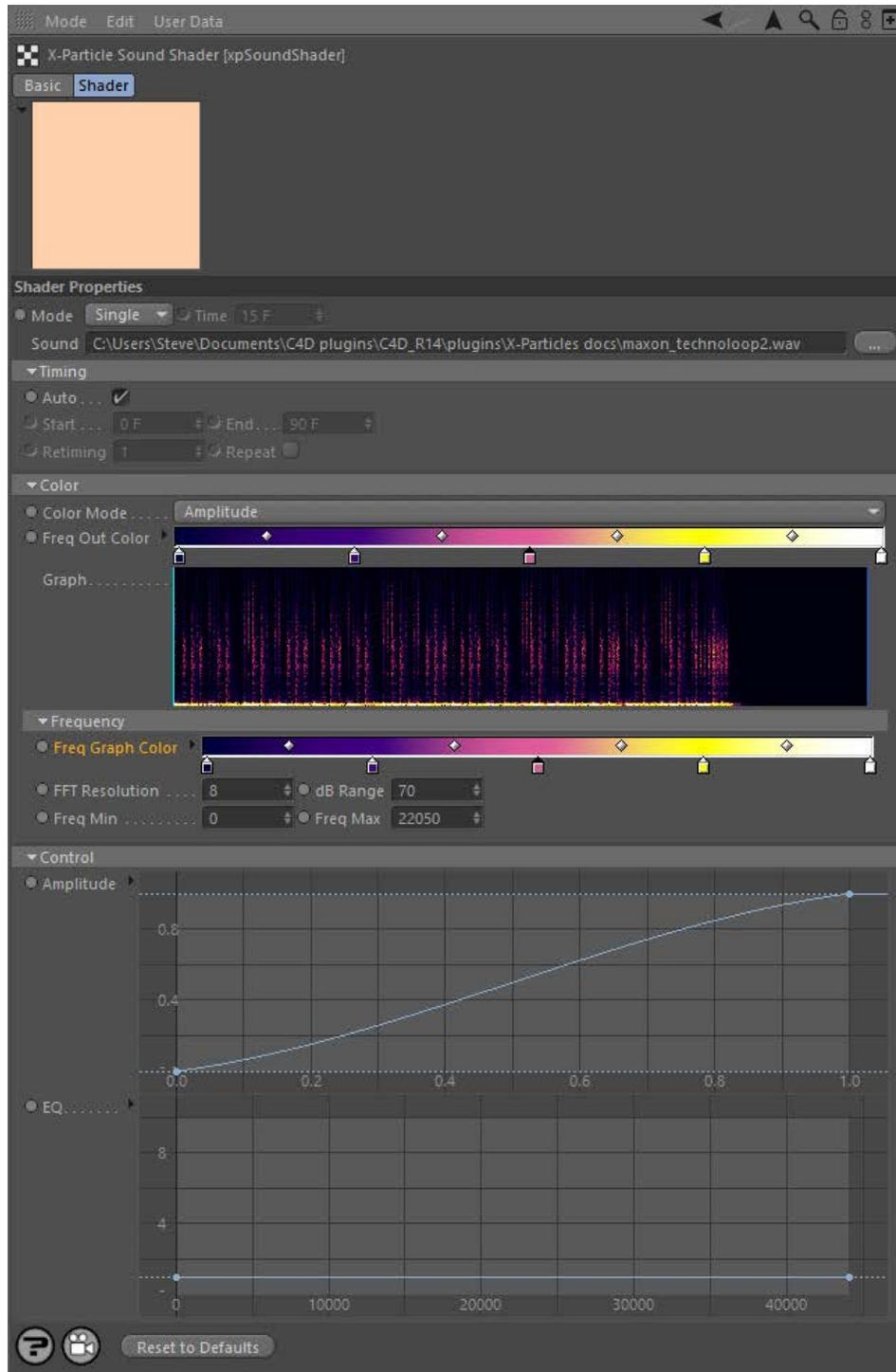
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Sound Shader

The Sound Shader is a shader which can be used in a Cinema 4D material to colour an object by means of a sound file. It does not require an X-Particles emitter or other object to work, but materials with a sound shader can, of course, be applied to the X-Particles Generator, Sprite, Skinner, etc.

Interface

This is the shader's interface:



For the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Using the Sound shader

Using the shader is very simple. Add it to the channel you want to use in a Cinema 4D material, then adjust the settings as required. You will need a sound file in .wav format but no other X-Particle components are required.

As with the Sound modifier, the shader carries out a Fast Fourier Transform (FFT) on the sound file and the settings in the shader are applied after the FFT has taken place. For more details please see the Frequency section below.

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Note: this shader doesn't actually play the sound file! This is due to the way Cinema 4D implements sound playback. To play the sound you must add a sound track to the timeline window; full details are contained in the C4D reference documentation.

Settings

Mode

Single

The object is shaded with a single colour.

Line

This mode takes a single slice of the sound at the current time and shades the object in the U direction according to the the frequencies in the sound file.

Grid

This is the same as 'Line' but shades the object in the V direction over time. The time can be specified in the 'Time' setting.

Time

The time to use when 'Mode' is set to 'Time'.

Sound

The sound file to use. Click the button with three dots to load a sound file, which must be in .wav format.

Timing section

This section controls the mapping of the sound file time onto the particles.

Note: the controls in this section do NOT affect the actual audio playing of the sound file. Remember that this shader does not generate an audible sound, Cinema controls this separately. If you want the sound to loop in the same way as the shader, you will have to set this up manually.

Auto

If this switch is checked, the shader uses the sound in time with the scene timeline. 'Auto' must be unchecked for the following settings to become available.

Start, End

These are time values which control when on the scene timeline the audio is mapped to the particles. For example, if 'Start' is zero and 'End' is three seconds, the audio file will play for three seconds and then stop. (This is influenced by the 'Retiming' value, see below.)

Retiming

This allows the audio's timing to be changed. For example, suppose 'Start' is zero and 'End' is three seconds. With 'Retiming' at the default value of 1, the audio file will play for three seconds and then stop. You can see that the cyan bar in the graph stops at a specific point. If 'Retiming' is increased to 2, the audio file will still only play for three seconds, but it will play twice as fast, as you can see from the position of the cyan bar.

Repeat

Checking this switch will loop the sound file. So if you have set the 'Start' to zero and the 'End' to three seconds, the sound file will run for three seconds then loop back to the beginning.

Color section

Color Mode

The shaded colours can be derived from either the sound amplitude or frequency in the sound file after the FFT has been applied. There are two options, and you will see the 'Graph' display change accordingly:

Amplitude

The amplitude distribution is used.

Frequency

The frequency distribution is used.

Graph

The graph is a representation of the complete sound file. It is a graph of amplitude or frequency intensity (on the vertical or Y axis) over time (on the horizontal or X axis). The frequency ranges from the minimum frequency at the bottom (i.e. bass frequencies) to the maximum frequency at the top. This range (minimum to maximum) can be changed by adjusting the 'Freq Min' and 'Freq Max' settings (see below).

The cyan vertical line on the graph is the current time in the sound file.

Freq Out Color

This is the color gradient used for the output of the shader. The colour used depends on the intensity (amplitude) of each frequency, low amplitudes using the colour on the left of the gradient and high amplitudes the colours to the right. Changing these colours only affects the final output; the colours in the graph will not change (use the 'Freq Graph Color' gradient for this).

Frequency section

This section controls how the frequencies in the sound are analysed. It uses a process called Fast Fourier Transform (FFT) to do this; this is a complex subject but you don't need to know how it works to use this shader! If you are interested much more detail can be found on the net,

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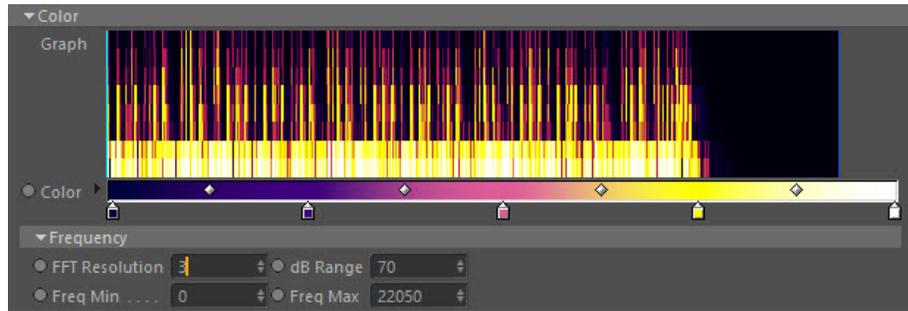
for example see https://en.wikipedia.org/wiki/Fast_Fourier_transform

Freq Graph Color

These are the colours to use in the 'Graph' display only. The gradient does not affect the final output of the shader, which is controlled by the 'Freq Out Color' gradient, so you can change this gradient to anything you like without affecting the output.

FFT Resolution

This controls how many discrete chunks (FFT bins) the frequency range is split into. Lower values give a coarser result. For example, the main screenshot shows the graph with an FFT resolution of 8. If that is reduced to 3, this is the result:



You can see that the lower resolution has resulted in a much smaller number of FFT bins. This will affect the degree of control the shader can exert over the particles.

Be careful when increasing this value. If you increase it too much the time taken for the calculation will increase greatly and it may even appear that Cinema has frozen. If that happens, wait until the calculation finishes and reduce this value.

However, if you have a very narrow frequency range (as determined by the 'Freq Min' and 'Freq Max' settings) you will need to increase the FFT resolution otherwise it will not have sufficient frequency resolution. Note that increasing the frequency resolution reduces the time resolution so you end up with a slower calculation (needs a bigger chunk of the sound) and changes in the audio over time become smeared together.

dB Range

The audio intensity is converted into decibels (dB). Reducing this value will start to remove low-amplitude sound and you will see the colours in the graph move towards the left hand side of the gradient. Lower it too much and the frequency graph may become almost black (with the default colours). If you increase this value, more low amplitude sound is used and the effect is greater.

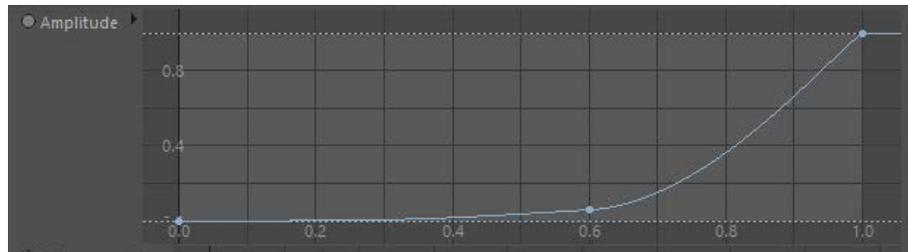
Freq Min, Freq Max

These values control the frequency range used. Increasing 'Freq Min' will cut out lower frequencies, increasing 'Freq Max' will bring in higher ones. Whether you need to change these values will depend on the nature of the sound file. However, note that these values are used after the FFT has been applied, so if the range is narrow you may need to increase the FFT resolution, as explained above.

Control section

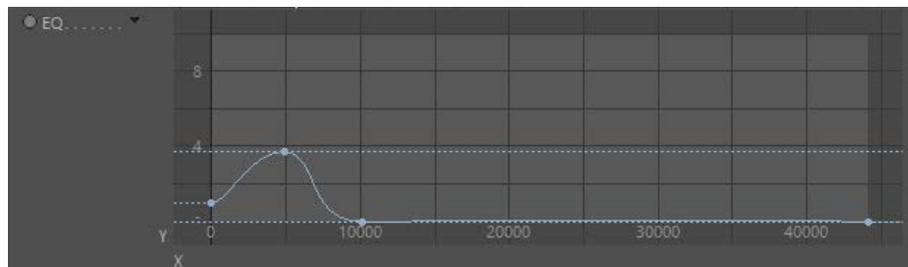
Amplitude

This spline control allows you to map the amplitude values returned from the FFT. You can think of it as acting like an audio filter. For example, this spline would ignore the effect of any low volume sound:



EQ

This is the same as the 'Amplitude' spline but for frequencies rather than amplitude. This spline would boost the effect of bass frequencies and ignore any higher ones:



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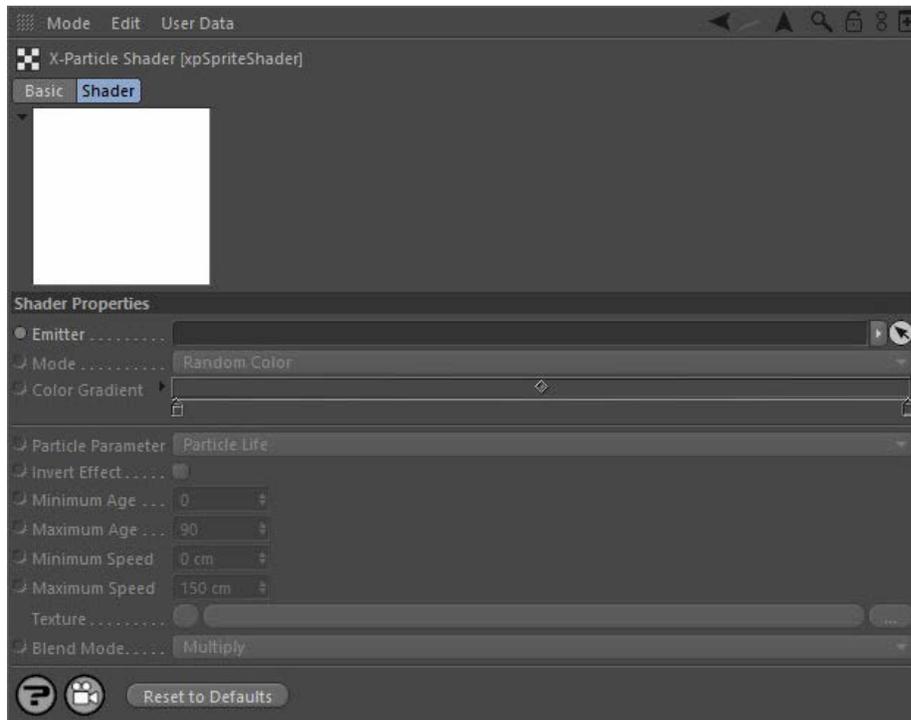
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The Sprite Channel Shader

This is a special shader designed to allow particle-dependent effects to be applied to X-Particles sprites. It will also affect objects produced by the Generator object but particle-dependent effects are not possible with such objects. The shader only affects sprites at render time and its effects are not visible in the editor.



For the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Using the shader

This shader gives you extensive control over the material applied to a sprite. It does this by varying the colour (or transparency, or whichever channel you choose) according to selected attributes of each particle.

For example, you can easily change the sprite colour over the particle's lifetime, or change its transparency over a specified age range, or its alpha channel when a particle exceeds a certain speed.

To use the shader, add it to any material channel which can take shaders. You will find it in the 'Effects' sub-menu in the material editor interface. You can also add it to a Cinema 4D Layer or Filter shader or any other shader you like. To apply the material to sprites, drag it into one of the link fields in the [Textures tab](#) of the [Sprite object](#).

Because the shader depends on data from the particle emitter which is not available until the animation is played, the particles will appear while in the editor: the colours used will only appear when each frame is rendered.

Settings

Note: although we talk about colour in the details below, remember that this shader can also be used in channels such as transparency, bump, displacement, etc.

Emitter

This link field accepts an X-Particles Emitter which you drag in from the object manager. The shader obtains data on particle age, etc. from this emitter, so without it you cannot make any changes to the shader. If placed in the colour channel the shader will render sprites white in the absence of an emitter.

Mode

This drop-down menu has five options:

Use Particle Color

The sprites will have the same colour as the particle. This is particularly useful if the particles were emitted from a texture and took their colour from that texture.

Random Color

The sprites will each have a randomly-selected colour.

Note: if you select this option the sprites may have an odd speckled colour if rendered in the preview render (i.e. the interactive renderer). This is only in the preview render and is not seen if you render the scene to the editor or picture viewer.

Random (From Gradient)

This option will enable the Color gradient and will randomly colour the sprites using a colour taken from the gradient.

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Sprites will be coloured using colours taken from the Color gradient, the colour depending on the particle parameter selected.

Modifier Sets Value

In this mode the color values are set by the [Sprite Shader modifier](#). For more details, see the [explanation below](#).

Color Gradient

The colour is chosen from this gradient when 'Mode' is set to 'Random (From Gradient)' or 'Parameter-Dependent'.

Particle parameter

This allows you to select the parameter used for determining the colour from the Color gradient. There are five options:

Particle Life

This is the most commonly-used option. It selects a gradient colour using the age of the particle compared to its lifespan. Brand-new particles are coloured with the colour from the left of the gradient, while particles at the end of their life are coloured with a colour from the right of the gradient.

Age

This is a simple cutoff switch which changes the particle colour when it reaches the age give in the Minimum age setting (see below). As an example, if you had a blue-to-white gradient, and entered '40' into the 'Minimum Age' field, particles with an age of less than 40 would be coloured blue, while those of age 40 or above would be coloured white. There is no transition, just a one-step change.

Age Range

This is similar to Particle life, but instead of the colour changing over the entire life of the particle, the colour changes between the values in the Minimum age and Maximum age settings. So with the blue-to-white gradient, if 'Minimum Age' is set to 30 and 'Maximum Age' to 60, all particles with age under 30 would be blue, all particles aged over 60 would be white, and those from 30 to 60 would be coloured with a colour from the gradient depending on their age.

Speed

Similar to Age, but using particle speed instead. Particles with a speed less than that in the 'Minimum Speed' field are coloured using the colour at the left-hand edge of the gradient, those with a speed greater than this with the colour from the right-hand edge of the gradient. There is no transition, just a one-step change.

Speed Range

Similar to 'Age Range' but using speed instead. The speed range is obtained from the 'Minimum Speed' and 'Maximum Speed' values.

Invert Effect

This button simply reverses the colour selection from the gradient so that when the colour would normally be taken from the left of the gradient, when this button is checked the colour from the right of the gradient is used instead, etc.

Minimum Age, Maximum Age

Used for the Age and Age Range parameters (see above).

Minimum Speed, Maximum Speed

Used for the Speed and Speed Range parameters (see above).

Texture

This is only available when the Parameter-Dependent mode is selected. You can put any other Cinema 4D channel shader, or a bitmap, in here. The colour returned from this shader or bitmap will blend with the Gradient color according to the Blend mode setting.

A common way of using this setting is to set the Gradient color to a black-to-white gradient and the Blend mode setting to multiply. This will cause the colour to get brighter as the particle ages (if you chose the Particle Life parameter, for example). If you just want to use the colour from the texture without blending with the gradient, just set the gradient to be plain white and Blend to multiply. But then, of course, you lose all the parameter dependent effects so you needn't have bothered with the sprite shader in the first place!

Blend Mode

This setting selects how the Texture blends with the Color gradient. There are three modes, which are the same as in other Cinema 4D shaders:

- Multiply: the most common setting: the two colours are multiplied together.
- Add: the colours are added together. The result will be clamped at white.
- Subtract: the gradient colour is subtracted from the texture colour. The result will be clamped at black.

Using 'Modifier Sets Value'

Using this mode can be a little confusing. What happens is that the [Sprite Shader Modifier](#) changes the colour value to use, but it needs to be set up correctly in order to work

Assume you have a scene with a sprite object, a material applied to it with a Sprite Shader in the Color channel, mode set to 'Modifier Sets Value' and a Sprite Shader Modifier in the scene with the mode is set to 'RGB'. When you play and render the animation, the sprites will be plain white with no colour change over time. Why?

The default colour set by the Sprite Shader is white. The modifier will, by default, increment the colour. However (again by default) the colour is clamped to white in the modifier. Since the sprite colour is already white, nothing happens. In the modifier, now set the Green and Blue rates of change to zero, and the Red to -2%. Then set 'Clamp To' to black. When you render, you will see that the sprite colour changes from white to cyan, as the red is reduced to zero leaving only green and blue.

If you want to set the rates of change to a positive value, to have any effect the colour must start out less than white. So, change the Red rate of change to 2%, change the 'Clamp To' colour to white, and in the Sprite Shader add a Color shader to the 'Texture' slot. Set this colour to black. This will mean that the sprites start black, and the red component increases so that the sprites turn bright red.

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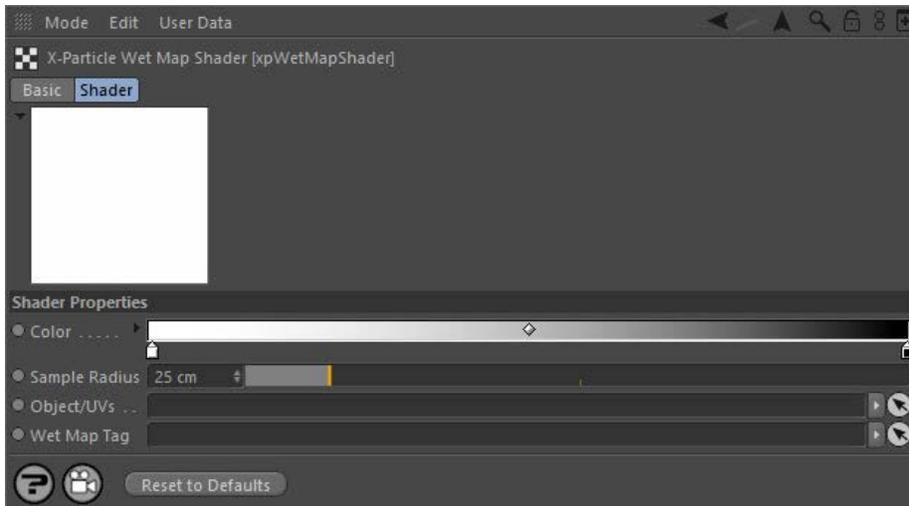
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Wet Map Shader



For the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Using the Shader

Apply a material with this shader to any object on which you wish to shade a wet map. You will also need to generate the wet map itself by adding a [Wet Map Tag](#). The shader will then colour the object according to how 'wet' it is.

Settings

Color

This is the colour of the shader output (0% wet on the left of the gradient, 100% wet on the right). The more particles hit the object the shader is applied to, the 'wetter' it is.

Sample Radius

This is the sampling size from the shading point to the surrounding wet map. A larger radius will increase the smoothing out of the sampling of the wet map.

Object/UVs

Drag a polygon object that has a wet map into this field, or a UV tag from such an object, and the shader will sample the wet map from UV input. This is needed when the shader isn't used for rendering, for example as a shader link in an emitter or other plugins.

Wet Map Tag

An object can have multiple wet map tags, but normally only the first is used by the shader. You can tell the shader which to use by dragging it into this field.

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The X-Particles Material

This shader enables shading of the particles without any geometry. If you want to render your particles and have them cast shadows without using objects then this offers the fastest and highest quality way to do so.

If you need to render thousands or millions of particles then this is the only practical way, using objects with that number of particles would be far too slow and use far too much memory.

In X-Particles 3, the XP Material can also render splines without the need for geometry, and has volumetric rendering for gas, smoke, fire, etc.

Using the shader

To use this shader you should:

- create an X-Particles Material (you'll find this in the Create->Shader menu of the material manager)
- apply the material to an Emitter object or an X-Particles Group object
- add the 'X-Particles' post-effect to the Cinema 4D render settings (normally done automatically when the material is created)
- play the animation and render the scene

Note: if you apply the material to a Group object and not to the emitter, only that group will be rendered with the material. This lets you assign different materials to particles from the same emitter. For example, if the emitter is emitting particles in two groups, you can assign one material to the first group and a different material to the second one.

To render a spline:

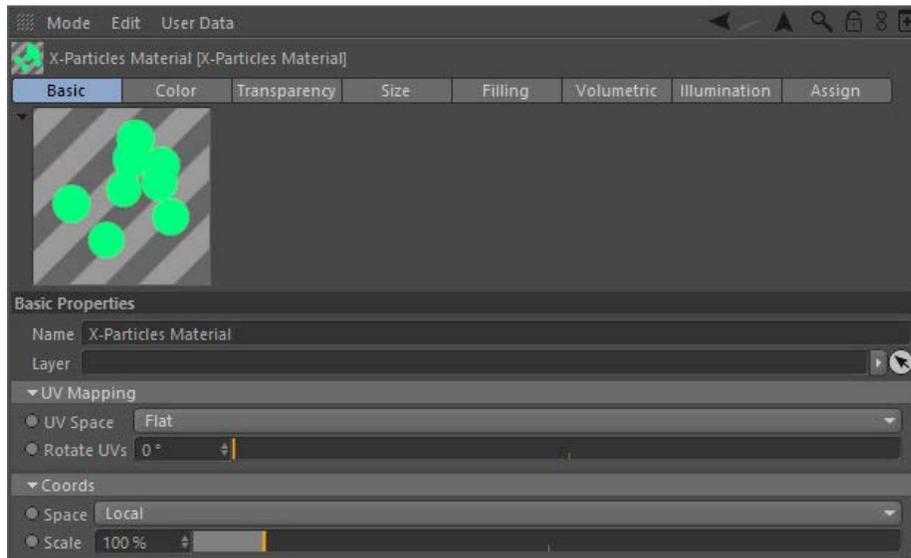
- create an Emitter and a Trail object linked to it
- apply the XP Material to the spline
- alternatively, create any spline including Cinema 4D spline primitives and apply the material to the spline
- render

For details of how to use the FLIP solver and the XP Material for volume rendering, see the main [Volume Rendering](#) page.

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Basic tab



Note: this tab is ONLY visible in the Attribute Manager. It does not appear in the material editor.

Each particle, when rendered, can be given a set of UV coordinates, even though it is not an object. You can change the UV space and rotate the UVs with these settings.

UV Space

This drop-down assigns the UV space. It has three settings:

- Flat: a flat projection which by default will make the particle appear as a flat disk. In this mode, any texture will always appear the same, no matter what the camera angle to the particle.
- Spherical: a spherical projection which will make the particle appear as a sphere. In this mode, the appearance of any assigned texture will vary according to the camera angle to the particle (because if the angle changes, you will be looking at a different part of the sphere).
- Tag: the projection used is the one in the texture tag for the material when it is assigned to an emitter. Note that not all projections will work (e.g. camera mapping will not work).

Rotate UVs

This slider allows you to rotate the UVs. The actual rotation for each particle is a random value between zero and the value in this slider. The effect is that, if a texture is assigned to the particle, instead of each particle looking identical the texture is randomly rotated, making each particle look different.

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Coords

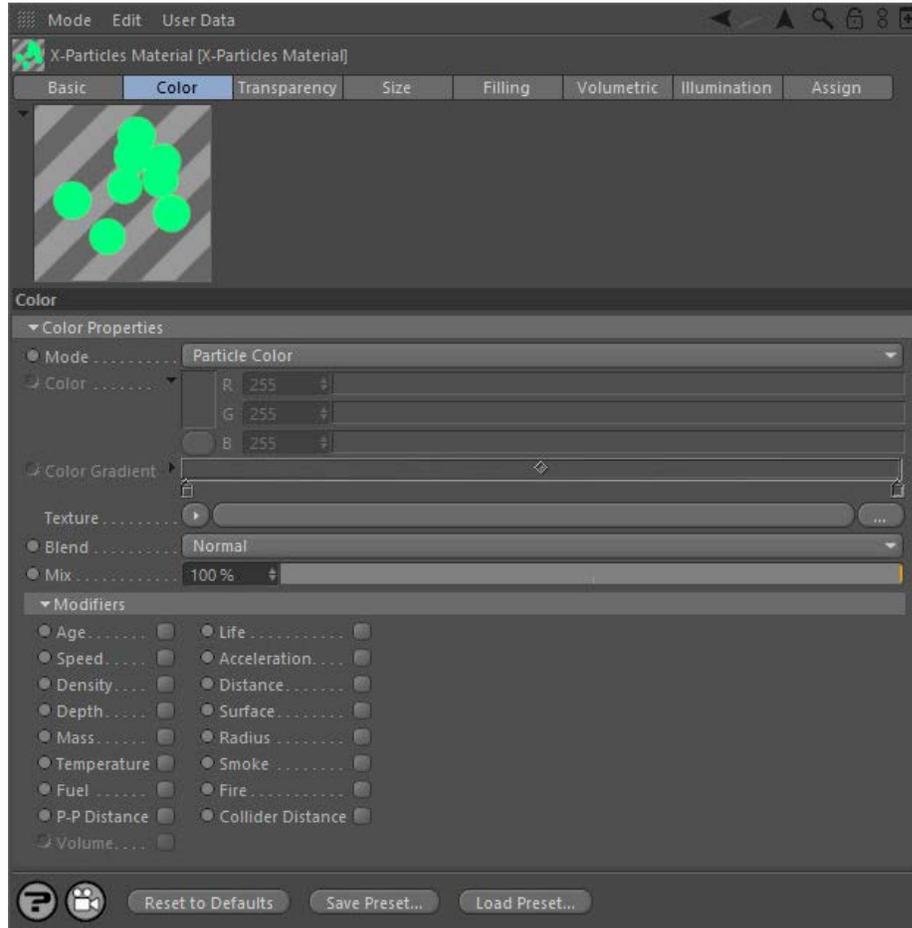
This is the coordinate space used to sample shaders in the material. It has the following options:

- Local
- Particle
- World
- Screen
- Camera

Scale

Used to change the sampling coordinates by scaling them up or down.

Color tab



For the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Mode

This drop-down menu has four settings:

- Single Color: particles are rendered with the colour from the Color setting.
- Random Color: the particles will each have a randomly-selected colour.
- Random (from Gradient): this option will enable the Color gradient and will randomly colour the particles using a colour taken from the gradient.
- Particle Color: the particle color is used. This is useful, for example, if you have particles emitted from an object and which are picking up their colour from the object's texture.

Color

The colour used in the 'Single color' mode.

Color Gradient

The gradient used in the 'Random (from Gradient)' mode. It is unavailable in other modes.

Texture

In any mode, a shader or bitmap can be placed into this link and the particles will then be rendered with that shader (or bitmap). With this setting X-Particles can now be used as a true placard renderer, without the need for any additional geometry. Alpha textures can also be used by adding them to 'Texture' field in the [Transparency tab](#).

Each particle has its own UV coordinates; in the [Basic tab](#) (found in the Attribute Manager) you can define the UV space used and an option to add random rotation to the particle UVs.

Blend

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Four blend modes to blend the colour from the 'Texture' link with the colour from the 'Mode' drop-down.

Mix

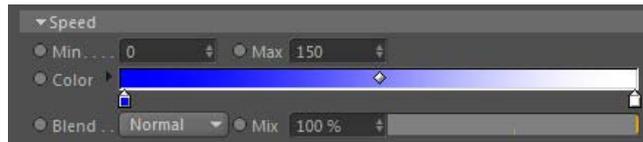
The percentage mixture of the 'Texture' colour and colour from 'Mode'. A mix of 100% is entirely the 'Texture' colour a mix of 0% is entirely from the 'Mode' setting.

Modifiers

In addition there are a series of modifiers which will alter the colour depending on certain particle parameters, including:

Age	The age of the particle - younger particles have the colour on the left of the gradient
Speed	Particle speed
Density	The particle density
Depth	The depth of field
Mass	The particle mass setting
Temperature	The particle temperature
Fuel	The particle fuel value
P-P Distance	The distance between a particle and its nearest neighbour
Volume	The radius, density, or transparency of a volumetric particle
Life	The lifespan of the particle.
Acceleration	The particle's acceleration
Distance	The distance of the particle from the camera
Surface	See below
Radius	The particle radius setting
Smoke	The particle smoke density
Fire	The particle burn value
Collider Distance	The minimum distance from the particle to a collider object

When one of these switches is checked, additional controls are displayed. Most of these are all very similar, a typical set are the Speed controls:



Color

The Color gradient shows the range of colours of the rendered particles. The actual colour depends on the Min and Max settings. In this case, particles with a speed of zero would be coloured blue, those with a speed of 150 or more would be white. Speeds between those values would result in intermediate colours.

Note that the default gradient colours will vary depending on the modifier selected.

Min, Max

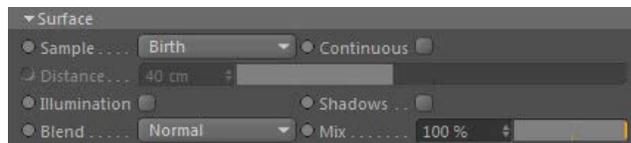
The range of values the shader will use to get the particle colour from the gradient.

Blend, Mix

The Blend setting allows you to blend between colours from the modifier gradient and the Color setting. A Mix of 100% means that only the gradient is used to determine the colour. A Mix of 0% means that only the Color setting is used. 'Blend' gives the mode used to blend the colours.

The Surface Modifier

This is a little different from the other modifiers:



When this modifier is active, and the particles are being emitted from an object, the particle colour is taken from the surface from which it is emitted.

Sample

This drop-down defines when the sampling of the surface should take place:

- Birth: when the particle is created
- Group Change: when the particle's group is changed
- Collision: when a collision occurs
- Distance: when the particle has travelled the distance in the 'Distance' setting

Continuous

If checked, the original sampling position (on the emitting object) is sampled for every frame rendered, so if the texture/surface is changing the particle color will also change.

Distance

The distance used when 'Sample' is set to 'Distance'.

Illumination

If checked, the particle is self-illuminating.

Shadows

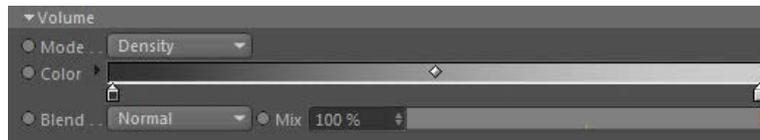
If checked, illuminated particles are self-shadowing.

Blend, Mix

The Blend setting allows you to blend between colours from the modifier and the Color setting. A Mix of 100% means that only the modifier is used to determine the colour. A Mix of 0% means that only the Color setting is used. 'Blend' gives the mode used to blend the colours.

The Volume Modifier

This is different from the other modifiers, and is only available when 'Volumetric' is checked in the 'Volumetric' tab.



Mode

This determines the value of the volumetric particle which affects the colour. The options are:

- Radius
- Density
- Transparency

Color

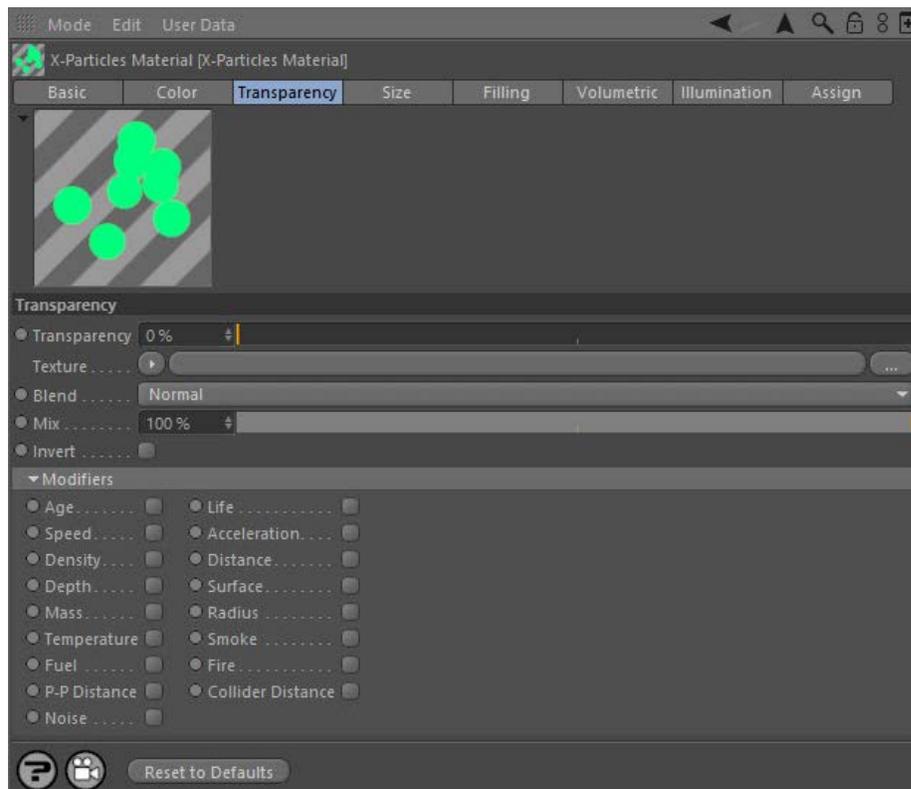
The colour gradient to blend with the particle colour.

Blend, Mix

The Blend setting allows you to blend between colours from the modifier gradient and the Color setting. A Mix of 100% means that only the gradient is used to determine the colour. A Mix of 0% means that only the Color setting is used. 'Blend' gives the mode used to blend the colours.

Transparency tab

Use this tab to set the opacity of the rendered particles.



Transparency

This sets the transparency of the rendered particles. A setting of 0% means no transparency (fully opaque).

Texture

If a shader or bitmap is added to this link, it will be used to determine the transparency. This can act as an alpha map to cut out parts of the rendered particle.

Each particle has its own UV coordinates, in the Basic tab (found in the Attribute Manager) you can define the UV space used and an option to add random rotation to the particle UVs.

Blend

Four blend modes to blend the value from the 'Texture' link with the value from the 'Transparency' field.

Mix

The percentage mixture of the 'Texture' value and the value from 'Transparency'. A mix of 100% is entirely the 'Texture' value and a mix of 0% is entirely from the 'Transparency' setting.

Invert

If checked, inverts the transparency (so black becomes fully opaque rather than fully transparent).

Modifiers

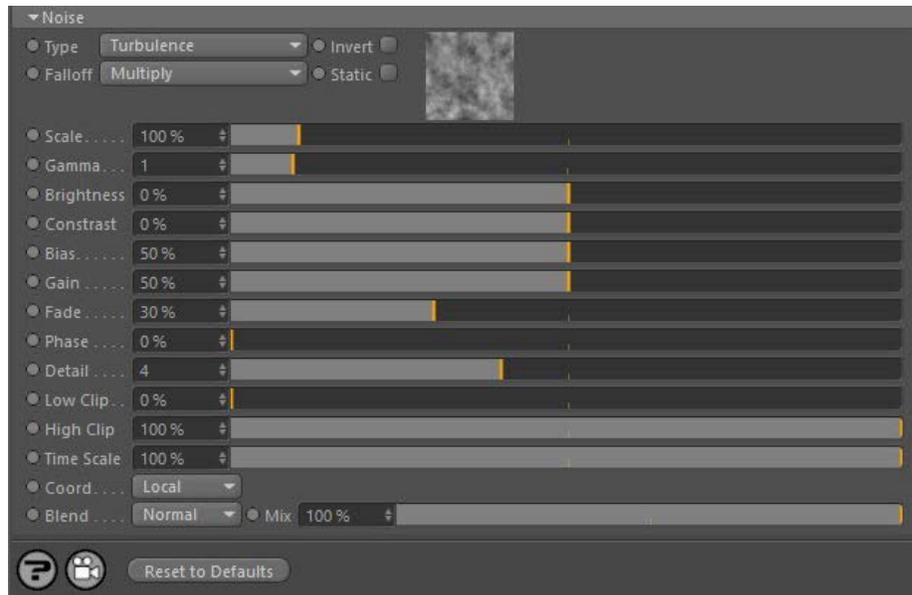
The same modifiers as in the Color tab. The displayed settings differ slightly from the colour settings, here is the Speed modifier set:



The only difference is that the gradients use a greyscale value where black is fully opaque (zero transparency) and white is 100% transparent.

Noise

The Transparency tab has an extra modifier, Noise:



This allows you to add noise to the transparency.

Type

The noise type, as seen in the Cinema 4D Noise shader.

Invert

Inverts the noise sample.

Falloff

The method by which the noise from individual particles is blended:

- Multiply: the greyscale values are multiplied
- None: no blending
- Subtract: the greyscale values are subtracted from one another

Static

If this switch is checked, the noise will not be affected by time, otherwise it will change as time passes (if the noise type supports that).

Scale

Scales the noise effect up and down.

Gamma

Alters the gamma value of the noise.

Brightness, Contrast, Low Clip, and High Clip

These are the same parameters as found in the standard Cinema 4D Noise shader. Please refer to the Cinema 4D Help files for details.

Bias

Controls the noise intensity. Lowering it shifts the level through the noise value to make the noise more prominent. Increasing it will flatten out the noise, making it less noisy.

Gain

As with 'Bias', this can be used to affect the noise intensity.

Fade

This setting softens the noise so it fades out further from the particle.

Phase

Increasing this value will move the noise with time, rather like an offset.

Detail

This is the noise detail, that is, the number of octaves the noise is built from.

Time Scale

This will scale the document time to speed up or slow down animated noise (assuming 'Static' is not checked).

Low Clip, High Clip

Low and high clipping values, as in the Cinema 4D Noise shader.

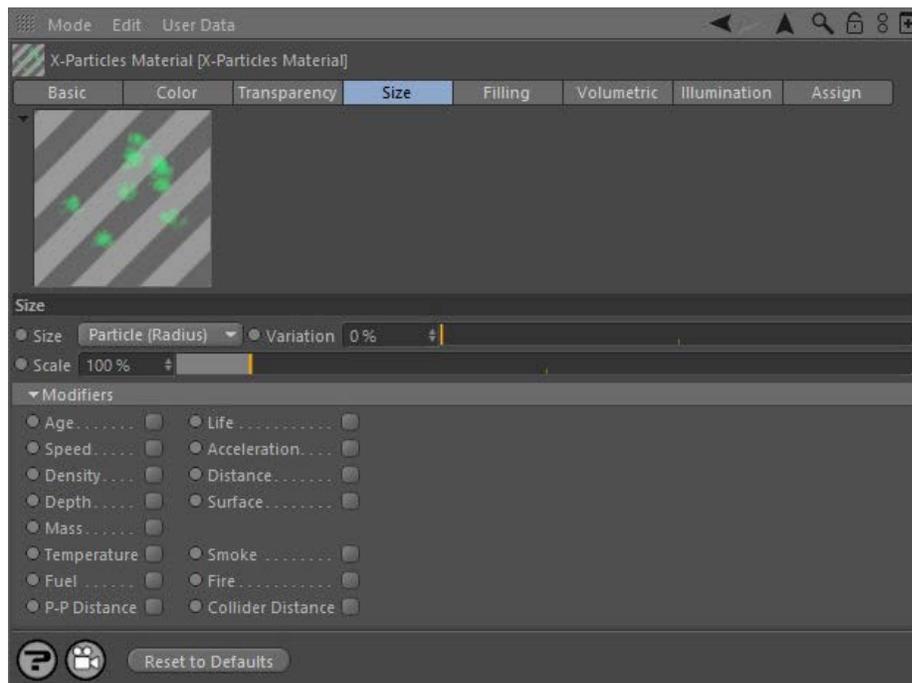
Coord

The coordinate space used to create the noise. If set to 'Default' the coordinates are taken from the 'Basic' tab.

Blend, Mix

The Blend setting allows you to blend between colours from the noise and the particle color. A Mix of 100% means that only the Noise is used to determine the colour. A Mix of 0% means that only the particle color is used. 'Blend' gives the mode used to blend the colours.

Size tab



Size

This drop-down menu determines the size of the rendered particles. It has three settings.

Particle (Radius)

The particle radius determines the rendered size.

World

A custom size is set in the 'Custom' parameter. In this mode, particles which are farther from the camera are rendered smaller than those close to the camera.

Screen

A custom size is set in the 'Custom' parameter. In this mode, all particles are rendered the same size regardless of distance from the camera.

Custom

This setting is only available when 'Size' is set to 'World' or 'Screen'. It is a custom setting for the rendered particle size.

Scale

Regardless of the 'Size' mode, this setting is used to scale the size of the rendered particles up or down.

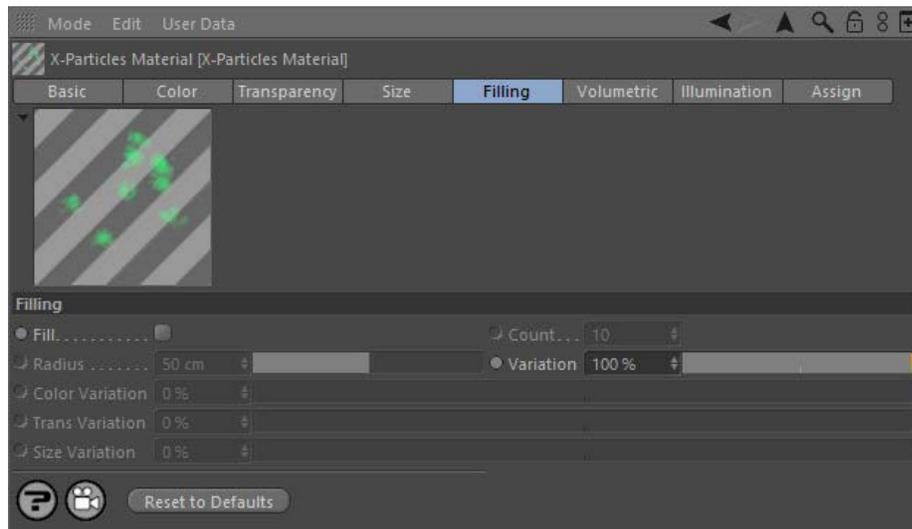
Variation

Regardless of the 'Size' mode, this setting is used to add variation to the size of the rendered particles.

Modifiers

The same modifiers as in the Color tab, with the exception of the Radius modifier, which is not relevant in this tab.

Fill tab



This tab is used to add additional particles ('fill particles') at render time only. It is a simple way to add very large numbers of extra particles when rendering without actually generating and maintaining the additional particles. Note that these are not 'real' particles - no geometry will be generated for them. The size of the fill particles will be the same as the corresponding 'real' particle, subject to the 'Size Variation' setting below.

Fill

Check this switch to add fill particles.

Count

The number of fill particles to add for each 'real' particle.

Radius (and Variation)

This is not the size of the fill particle, but the size of an imaginary sphere around each real particle in which the fill particles will be rendered.

Color Variation

The fill particles will have the same colour as their 'real' particle, but this setting can be used to add colour variation to the fill particles.

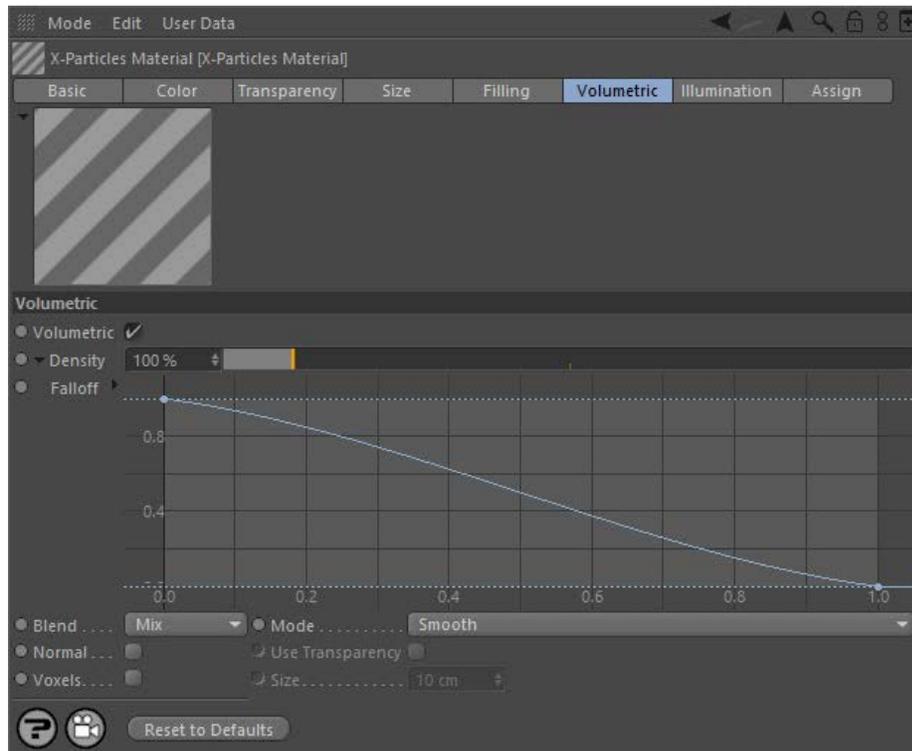
Trans Variation

The fill particles will have the same transparency as their 'real' particle, but this setting can be used to add transparency variation to the fill particles.

Size Variation

The fill particles will have the same size as their 'real' particle, but this setting can be used to add size variation to the fill particles.

Volume tab



This tab controls the volumetric rendering of particles. For details of how to use the FLIP solver and the XP Material for volume rendering, see the main [Volume Rendering](#) page.

To understand these settings, it is important to understand what the material is doing in volumetric mode. Each ray cast by Cinema 4D at render time is sampled at points along the ray (which are determined by the X-Particles render settings) through any volumetric particles hit.

Volumetric

Check this switch to enable volumetric rendering.

Density

The lower this is the more transparent the volume particle is. Each particle combines to increase the opacity of each sample point going through the volume.

Falloff

To see the falloff spline, click the small black arrow next to the word 'Density'. The spline controls the density falloff from the centre of the particle's volume (which is spherical).

Blend

The ray may hit multiple particles in the scene and this drop-down controls how the particle density volumes are blended together.

There are four options:

Mix

This option treats each volume as its own density with the first hit occluding any further along the ray.

Isosurface

Here, the density is clipped at the 'Iso Level' to give a skinner like rendering, rendering the isosurface of the particle volume.

Weighted

The blending is based on distance weighting from the particle.

Absolute

The maximum density of overlapping volumes is used.

Iso Level

This is only available if 'Blend' is set to 'Isosurface' (see above).

Mode

Once the 'Blend' is selected the curve used to blend the density values can be changed here. To use a custom curve select 'Custom' and modify the spline in the 'Curve' setting.

The drop-down has several options:

- Smooth
- Cube
- Blinn (Blobs)
- Wyvill
- Links

- RenderMan
- Hart
- Geiss
- Custom

Curve

The blending curve to use when 'Mode' is set to 'Custom'.

Normal

When checked, the material calculates a normal based on the density value. This is used with the illumination modes Diffuse and Phong and is mainly useful when 'Blend' is set to 'Isosurface'.

Use Transparency

Only available if Normal is checked. When checked, transparency (e.g. noise) will be included in the normal calculation.

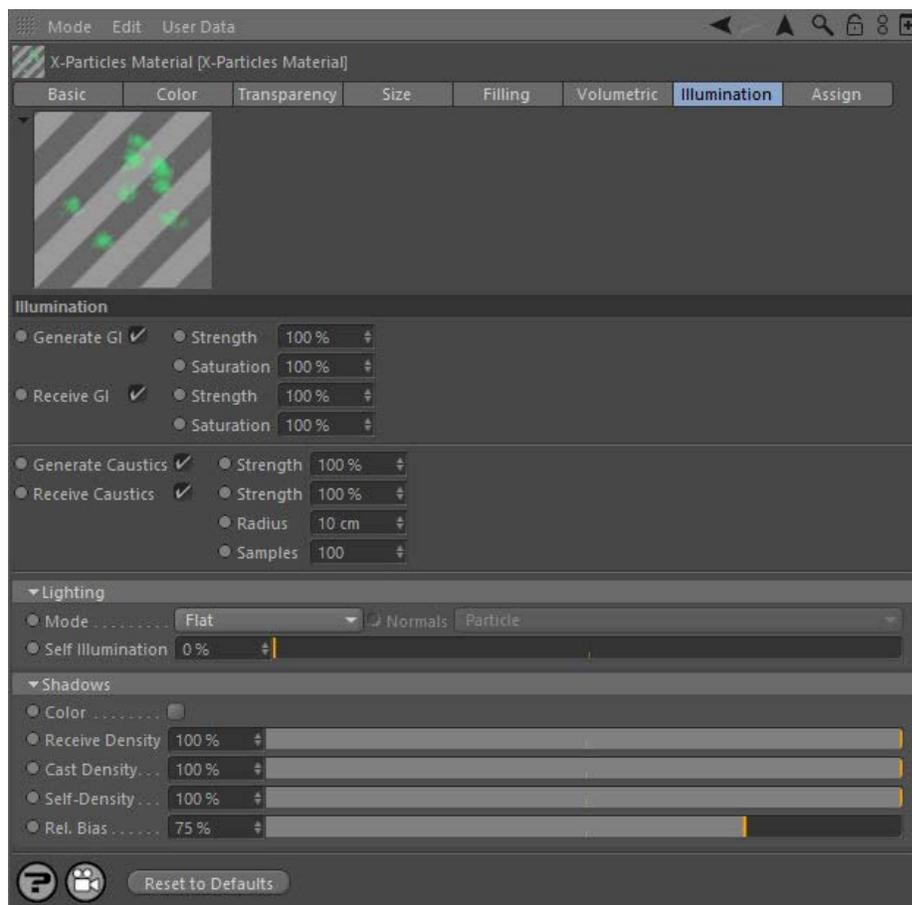
Voxels

When checked, rather than rendering each particle as a volume it combines them into voxels (the size of which is set with the 'Size' parameter) to give a voxel-based volumetric render.

Size

The voxel size if 'Voxels' is checked.

Illumination tab



Mode

The style of rendered particle. The options are:

Flat

Basic, flat shading.

Phong

Standard phong shading with specular settings.

Diffuse

Renders as shaded spheres rather than discs.

Fuzzy

Produces soft, fuzzy-edged particles

Neon

Particles have a surrounding glow.

Heney-Greenstein, Schlick and Rayleigh

These are all scattering illumination models, with each giving a different look. It is suggested the user try each and select the one giving the desired effect.

These modes and their settings repay experimentation as it is difficult to describe the different effects of each. Various parameters will become available depending on the selected style.

Normals

The Diffuse and Phong illumination models require a normal to be provided. This drop-down lets you select the source of the normal. It has the following options:

- Particle
- Velocity
- X Axis
- Y Axis
- Z Axis
- Light

Self Illumination

The amount of self-illumination of the particles can be increased with this control. It has a greater effect in some models (e.g. Phong) than in others.

Diffuse

The amount of colour diffusion. Only available for Diffuse and Phong models. Reducing this value will result in flatter colour shading.

Specular, Width

Only available in the Phong model. These parameters control the brightness ('Specular') and size ('Width') of the specular highlight.

Width, Falloff spline

Only available in the Fuzzy model. These parameters control the fuzziness of the rendered particle.

Width, Falloff

Only available in the Neon model. They control the size and falloff of the effect.

Eccentricity

Only available in the Heney-Greenstein and Schlick models. These are scattering illumination models and this setting controls the strength of the scattering.

Shadows

Color

If checked, this switch enables coloured shadows (from the lights).

Receive Density

As in the Cinema 4D lights, this is the density (strength) of shadows from geometry in the scene cast onto the particles.

Cast Density

Alters the density of the shadow cast by the particles. A value of zero results in no shadows.

Self-Density

This is the density of shadows received by particles from other particles.

Rel. Bias

This setting helps to keep the shadows from self-shadowing (so a particle doesn't shadow itself). The setting is a percentage of the particles radius.

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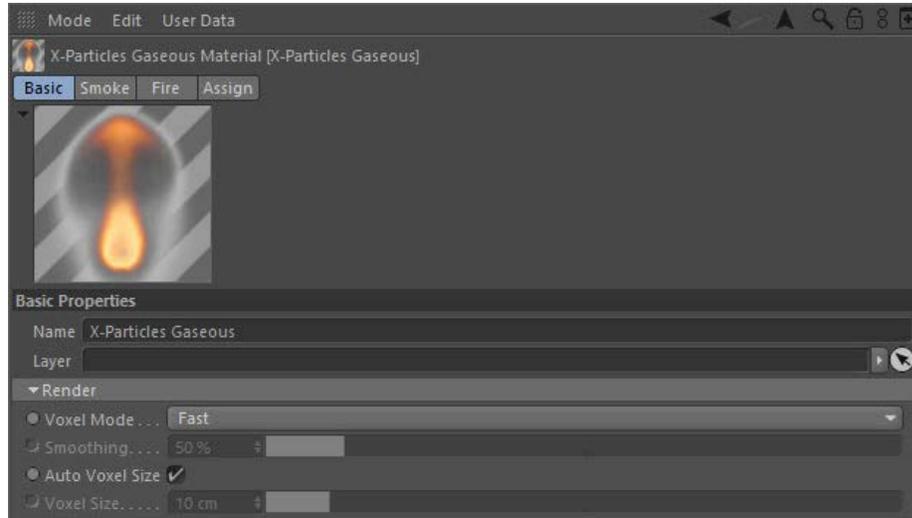
X-Particles Gaseous Material

This shader is used to render fire and smoke when using X-Particles. For details of how to use it, please see the [Volumetric Rendering](#) page.

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Basic tab



Note: this tab is **ONLY** visible in the Attribute Manager. It does not appear in the material editor.

Voxel Mode

This drop-down governs how the voxels in the simulation are rendered. It has three options:

Fast

The voxels are rendered without any smoothing.

Smoothed

A fixed smoothing amount is applied to the voxels.

Custom

With this option you can apply a custom amount of smoothing using the 'Smoothing' parameter.

Smoothing

The amount of smoothing to apply when 'Voxel Mode' is set to 'Custom'.

Auto Voxel Size

If this switch is checked, the voxel size is taken from the Domain object if the material is applied to a Domain. If it is applied to an emitter, the voxel size is the radius setting in the emitter, multiplied by 2.

If applied to an emitter it is recommended that this switch is unchecked and a custom size set in 'Voxel Size'.

Voxel Size

The voxel size used for rendering, if 'Auto Voxel Size' is unchecked.

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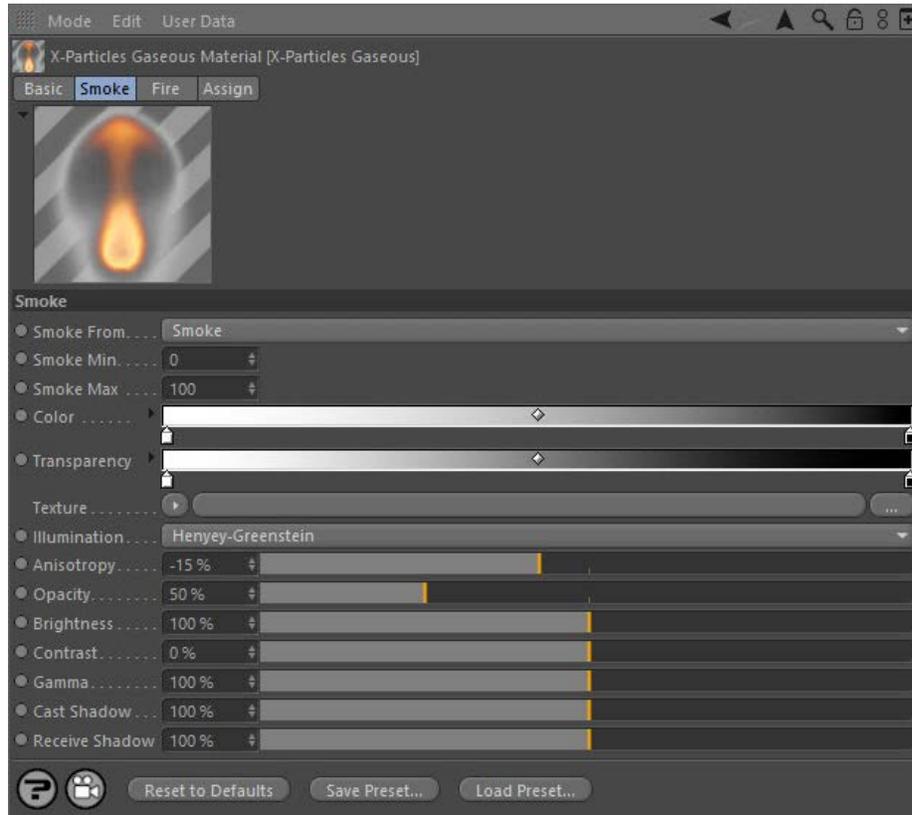
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For the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Smoke From

This drop-down allows you to select where the smoke values are taken from. By default this is 'Smoke' but you can take the smoke values from any of the physical properties. The drop-down has five options:

- None
- Temperature
- Smoke
- Fire
- Fuel

Smoke Min, Smoke Max

The smoke values are mapped to the 'Color' and 'Transparency' gradients so that values at or less than the minimum are given the colour from the gradient's left edge while values at or higher than the maximum are given the colour from the gradient's right edge.

Color

The colour of the smoke, mapped from the smoke value (see 'Smoke Min' and 'Smoke Max' above).

Transparency

The transparency of the smoke, mapped from the smoke value (see 'Smoke Min' and 'Smoke Max' above).

Texture

A texture such as a Noise shader can be applied to the smoke values from UV coordinates generated by the domain simulation. This helps to give more details into lower resolution simulations.

Illumination

This is the illumination model used. 'Isotropic' illuminates the smoke irrelevant of light and view direction. The other models all change the illumination based on light and view direction. Clouds/smoke tend to be darker when the light source is behind them (the light is scattered); when the light is in front and reflecting they are brighter. The different models and the Anisotropy option enable you to change how they appear.

The drop-down has several illumination models:

- Isotropic
- Henyey-Greenstein
- Double Henyey-Greenstein
- Schlick
- Rayleigh

Note: not all of the following settings are always available, depending on the illumination model selected.

Anisotropy

This option changes whether the smoke is darker with the light behind or in front.

Back Scattering

Only available in the 'Double Henyey-Greenstein' illumination model. It also changes the illumination in combination with Anisotropy to

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simulate the scattering of light. These are best tried to see their effect with a light source.

Opacity

This controls how opaque the smoke is, lower for wispy smoke and higher for thick dark smoke.

Brightness, Contrast, Gamma

These are the common controls over the colour. They help with tweaking the colours of the simulation rather than having to make many small changes to the gradients.

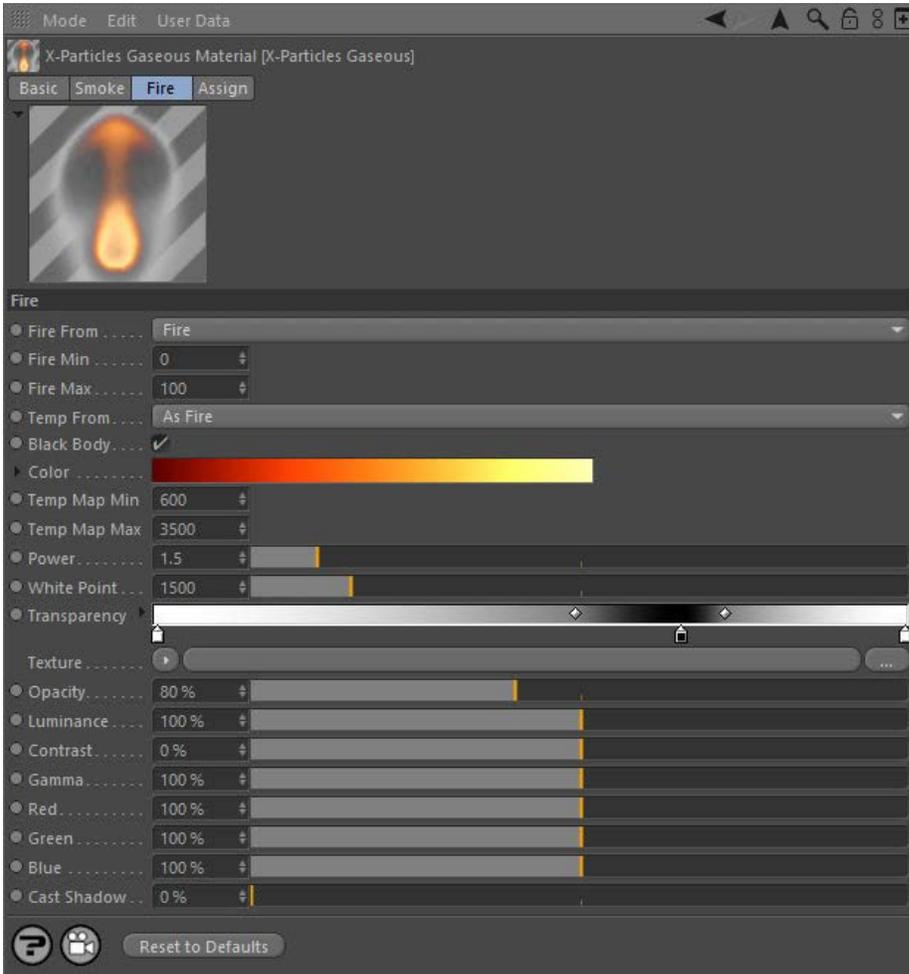
Cast Shadow

This controls the opacity of the shadow cast by the smoke. Higher values represent greater opacity.

Receive Shadow

This controls the opacity of any shadows falling on the smoke. Higher values represent greater opacity.

Fire tab



Fire From

This drop-down allows you to select where the fire values are taken from. By default this is 'Fire' but you can take the fire values from any of the physical properties. The drop-down has five options:

- None
- Temperature
- Smoke
- Fire
- Fuel

Fire Min, Fire Max

The fire values are mapped to the 'Color' and 'Transparency' gradients so that values at or less than the minimum are given the colour from the gradient's left edge while values at or higher than the maximum are given the colour from the gradient's right edge.

Temp From

This drop-down allows you to select where the temperature values are taken from. By default this is 'As Fire' but you can take the temperature values from any of the physical properties. The drop-down has six options:

- None
- Temperature
- Smoke
- Fire

- Fuel
- As Fire

Black Body

If this switch is checked the fire colours use a physically-based black body colour, and cannot be edited. If it is unchecked, the colours in the 'Color' gradient can be altered as desired.

Color

The colour of the fire, mapped from the fire value (see 'Fire Min' and 'Fire Max' above).

Mapping

Click the small black arrow to the left of the word 'Color' to see this drop-down menu.

This drop-down will map the colours to a variety of different colour spaces, depending on the desired output. For example, if displaying the result on a PAL device you would choose PAL in the drop-down.. The list has six options:

- NTSC
- PAL
- SMPTE
- HDTV
- CIE
- CIE REC 790

Temp Map Min, Temp Map Max

The temperature values are mapped to the 'Color' gradient so that values at or less than the minimum are given the colour from the gradient's left edge while values at or higher than the maximum are given the colour from the gradient's right edge.

Power

This setting controls the power used for black body illumination. The physically correct value is 4, but this produces such a large range it is not easily used when rendering. Lower values reduce the power and are therefore more manageable when rendered.

White Point

Fire produces a huge dynamic range of colours. This setting lets you change where the white point is in that range, making the colours easier to manage.

Transparency

The transparency of the fire, mapped from the fire value (see 'Fire Min' and 'Fire Max' above).

Texture

A texture such as a Noise shader can be applied to the fire values from UV coordinates generated by the domain simulation. This helps to give more details into lower resolution simulations.

Opacity

Increasing this value will make the fire more opaque.

Luminance

This setting is used to control the dynamic range needed for fire, either to reduce it or boost it.

Contrast, Gamma

These are the common controls over the colour. They help with tweaking the colours of the simulation rather than having to make many small changes to the gradients.

Red, Green, Blue

You can use these settings to boost these colour components, for example to give a redder fire. This saves having to constantly tweak the gradient.

Cast Shadow

A value above zero enables the fire to cast a shadow. Generally flames don't cast a shadow unless under very bright external light sources or if the light source is absorbed by the flame.

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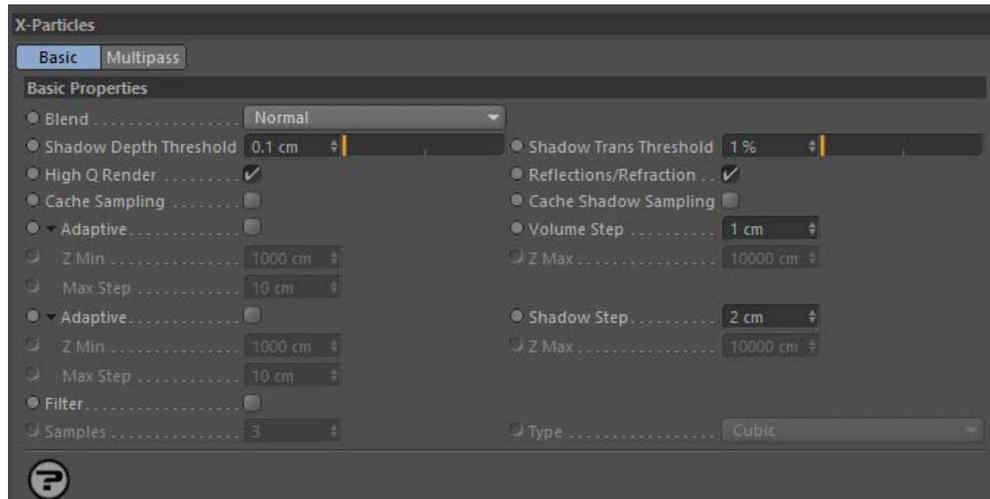
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X-Particles Render Settings

These settings are added to the main Cinema 4D render settings dialog when you add an X-Particles material to the scene. You can also add them manually by clicking on the 'Effect...' button in the render settings dialog and selecting 'X-Particles' from the list.

Basic tab Interface



Settings

Blend

The method used in blending the rendered particle colour with the scene, either Normal or Add.

Shadow Depth Threshold, Shadow Trans Threshold

When rendering the shadow maps used for the particles, these define the change in depth (distance from the light source) and transparency (shadow) after which another sample is stored in the shadow map. Lowering these value increases the shadow accuracy at the cost of time and memory use.

High Q Render

If checked, this accelerates the rendering speed of particles and increases the quality. However, it will only work on direct camera rays and not on reflection/refraction rays or when rendering DOF (from Physical). If you need to use DOF within Physical render then disable this option.

Reflections/Refraction

If disabled this will stop X-Particles from calculating data required for reflections/refractions of the particles, this will stop them being rendered in reflections/refraction. If you do not need reflection/refraction of particles then disabling this will reduce the render prepare time and memory used, this mostly affects very high particle count scenes (millions of particles).

Cache Sampling, Cache Shadow Sampling

When using Best AA Cinema 4D will sample the same pixel many times with different rays (subpixels), if your particles colour/shading is fairly constant over each pixel (or less than a pixel in size) then enable this will tell X-Particles to cache the particle colour per pixel and reuse this rather than sampling the particle colour each subpixel. This can speed up Best AA renders with particles.

Adaptive

If checked, the 'Volume Step' value is increased in size over the 'Z Min' to 'Z Max' distances from the camera, to a maximum of 'Max Step'. This reduces the volume sampling further away from the camera.

Volume Step

This is the size of the steps through a volume done for volumetric and voxel rendering. Increasing this can speed up the render but if it is too large (bigger than the smallest volume/voxel) then it will cause artefacts in the render.

Z Min, Z Max and Max Step

See 'Adaptive' above.

Adaptive

If enabled the 'Shadow Step' is increased in size over the 'Z Min' to 'Z Max' distances from the light source when sampling shadows, to a maximum of 'Max Step'. This reduces the shadow sampling further away from the light.

Shadow Step

As with 'Volume Step' but for the shadow maps. Larger values speed up shadow map building. It is usually possible to have this larger than the 'Volume Step' without noticeable artifacts due to the blurring of sampling the shadow maps.

Z Min, Z Max and Max Step

See 'Adaptive' above.

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Applies a blur filter to each particle pixel rendering, blending it with surrounding particles.

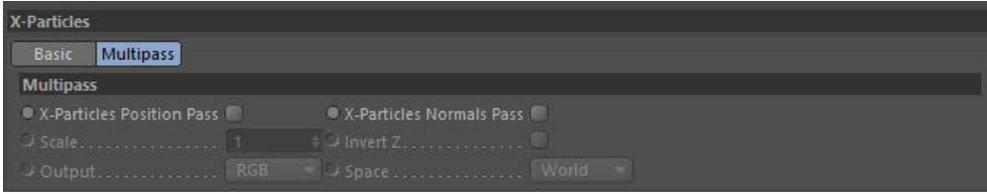
Samples

The width in pixels used for the blur filter.

Type

The filter type, either Linear or Cubic.

Multipass tab interface



Settings

X-Particles Position Pass, X-Particles Normals Pass

Enable to create Normal/Position passes.

Scale

Defines the scale used when encoding the information into the pass.

Invert Z

Flips the Z stored within the pass, some applications require the Z facing forwards (Cinema has Z facing away).

Output

The output order depends on the compositing application used, see your compositing software information for which you need.

Space

The coordinates that should be encoded into the pass.

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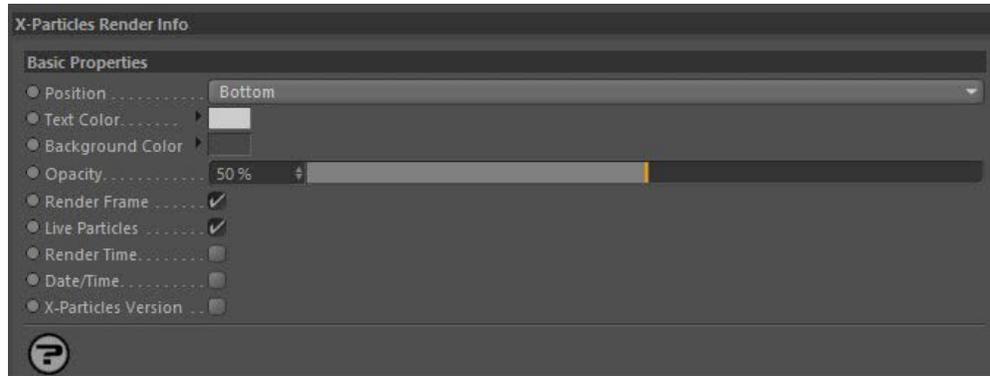
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Render Information

X-Particles can display information about each frame when rendered in the form of a watermark on the rendered image. To do this, add the 'X-Particles Render Info' post-effect to the Cinema 4D render settings. The following interface is displayed:



Settings

Position

A drop-down menu setting where the information will appear, either at the Top or Bottom of the image.

Text Color, Background Color

The colours used for the text and the background to it.

Opacity

The opacity of the watermark.

Information to be displayed

Each tick box, if checked, will display a certain piece of information. These are:

Render Frame

The current frame number.

Live Particles

The number of live particles in the frame.

Render Time

The time to render the frame.

Date/Time

The current date and time.

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The version of X-Particles used.

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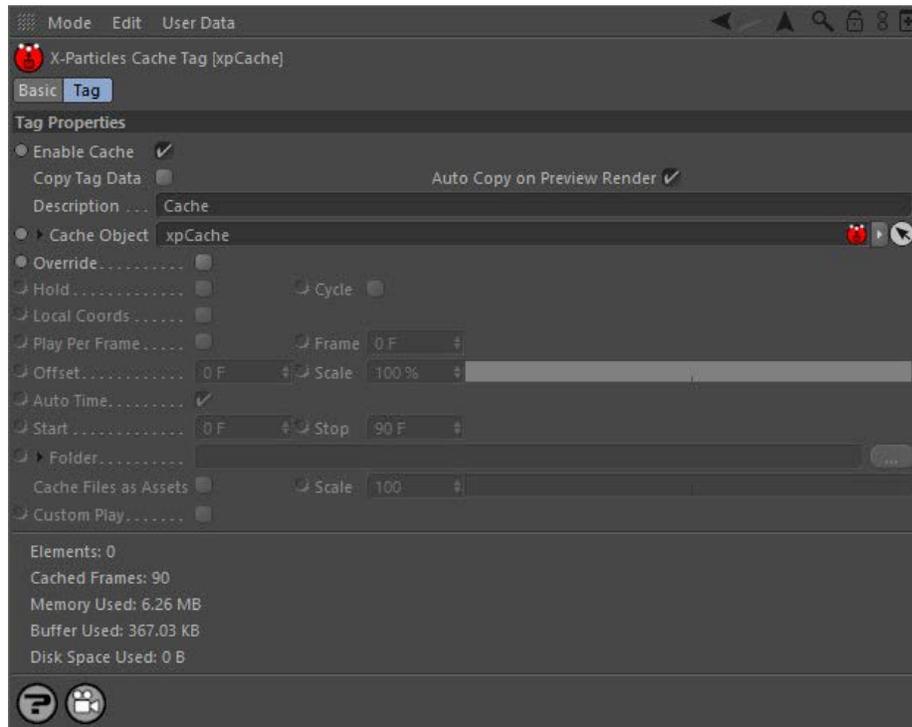
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Cache Tag

The Cache tag holds the cached data for an X-Particles object. Deleting the tag will delete the cache data for that object and the cache will have to be rebuilt if you need it again.

Interface

This is the tag's interface:



For the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Parameters

Enable Cache

If an object is cached, its cached data will be used during playback if this switch is checked. To prevent use of the cached data without deleting it, uncheck this switch.

If you have multiple cache tags on an object, the object will use the first cache tag which is enabled. This lets you switch between different caches very easily by checking or unchecking this switch in the appropriate tags.

Copy Tag Data

This is an important switch in two situations:

- if you are saving the cache to external files and have turned on 'Cache Files as Assets' in the [Cache object](#) for use with Team Render
- or you are rendering a cached scene using the hardware or software renderers

In the first case, if this switch is not enabled the data held by the tag data will not be copied by Team Render and the render will fail with an error message. In the second case, when rendering a scene to the picture viewer the entire document is first cloned (by Cinema itself, not XP) and a message is sent to XP to copy its own data to the new document. However, that message is not sent when using the hardware or software renderers, so the data is not copied and there is nothing to render.

Why is this switch not enabled by default? If it was, generators (such as the Skinner or Sprite or Trail objects) would be constantly copying all their cache tag data every frame, which would slow them down considerably. Unfortunately this is how Cinema 4D itself works and is not a fault in X-Particles.

Therefore you should normally leave this switch unchecked unless you encounter one of the two situations listed above.

Auto Copy on Preview Render

 The 'Copy Tag Data' switch described above is recommended to be left unchecked but is required to be checked if you do a preview render using the hardware or software renderer. To save you having to turn the 'Copy Tag Data' switch on and off, this switch will cause the data to be copied if a preview render is carried out. It is recommended that you leave this switch checked so that you can always do a preview render, but if you really want to, you can turn it off.

Description

If you have multiple cache tags on an object, how do you know what each one does? For example, you might have two caches, one using a turbulence modifier and one not. To distinguish between the caches so you can switch between them, you can enter a description of the cache in this field.

Cache Object

The Cache object linked to this tag. The Cache object which created the cache will be automatically placed in here when the cache is built.

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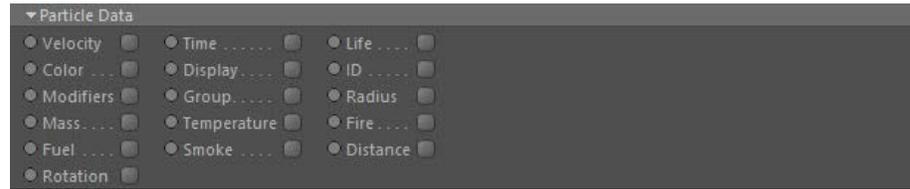
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Override

Checking this switch allows access to the remaining settings. These are the same as the corresponding settings in the Cache object, but if 'Override' is checked, the tag settings will override those in the Cache object.

Custom Play

This switch becomes available if 'Override' is checked. Then check this switch to display the cached data playback settings:



These settings are identical to those found in the Cache object.

All other settings

These are the same as the settings with the same name in the Cache object. Please see the [Cache object](#) for more details.

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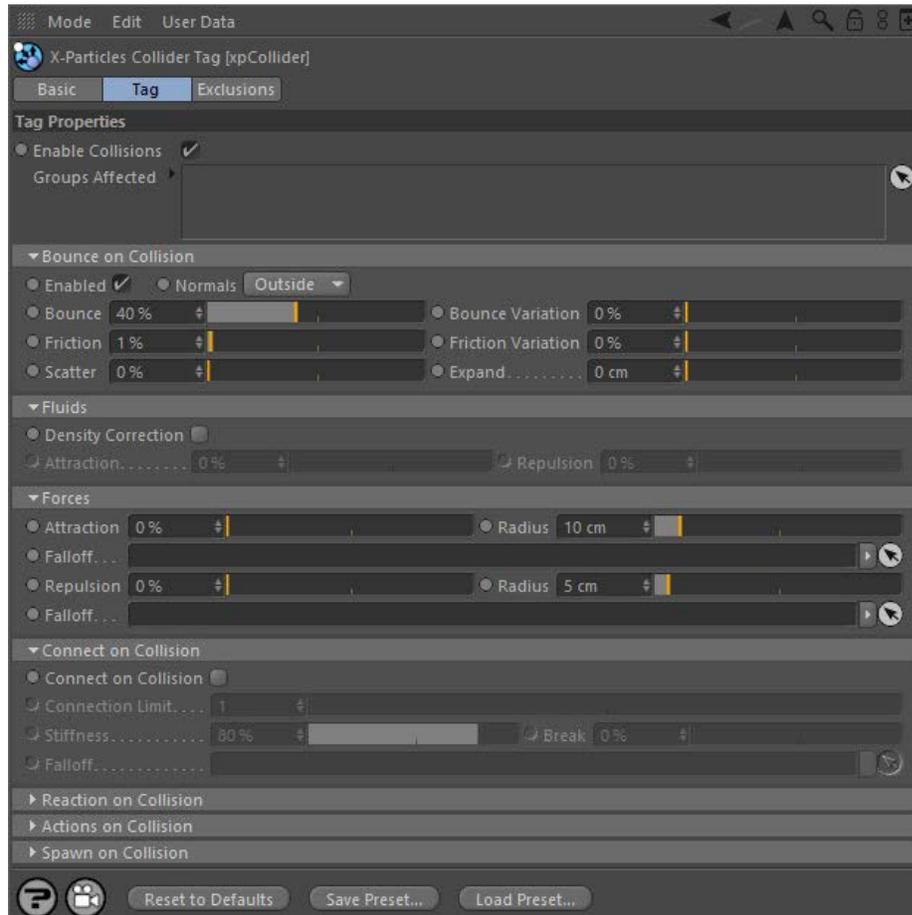
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Collider Tag

This tag forms part of the collision engine used in X-Particles. In order to test for collision between a particle and a scene object, the scene object must have an instance of this tag attached to it.

For more information about collisions, please see the [Collision Engine](#) page.

This is the tag's interface:



For the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Main tab

Enable collisions

If this switch is unchecked, the object to which the tag is attached will not be checked for collisions with any particles.

Groups Affected

Drag the particle Group object(s) you want to be affected by the tag into the 'Groups Affected' list. If the list contains at least one group, groups not in the list will not be affected. But if no groups are in the list, all groups are affected.

Bounce on Collision

Enabled

For particles to bounce from the collider object, check the 'Enabled' switch in this section. If this switch is unchecked, no bounce will occur but note that the collision is still registered. For example, if you have an action which is triggered by a collision, it will be triggered even if this switch is unchecked.

Normals

This drop-down has three options:

Outside

Normals on objects tend to point outside of the object, so the interior of the object should be the opposite direction of the normal. This is Outside. Any particle found "inside" the object (by using the normals) is pushed out.

Inside

However, sometimes you want to keep particles inside the objects (e.g. particles in a cube); this is Inside.

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If you just want to take your chances and ignore the inside/outside and just go for the particle hitting the polygons, then this is Any (and tends to leak easily!).

Bounce and Bounce Variation

The bounce controls the speed with which the particle will rebound from the object. A bounce of 100% means that the speed after hitting the object is the same as before hitting it.

Friction, Friction Variation

These settings add friction between the particle and colliding surface. Suppose you have a scenario in which particle fall onto a surface (perhaps under the influence of a Gravity modifier). They bounce, fall back and bounce again, until they simply roll along over the surface. They will do that until they fall off the object or until the scene ends.

Friction will cause the rolling particles to come to a halt. The higher the setting, the more quickly they stop. You can add some random variation to the amount of friction with the 'Friction Variation' setting.

Scatter

When bouncing from flat surface, the particles will rebound at a reflected angle which is correct for the angle at which the particle strikes the surface. For example, if the particle hits the surface at an angle of 90 degrees to it, the particle will bounce back in a direction which is the exact reverse of its original course.

This is geometrically correct but not necessarily realistic. 'Scatter' does exactly that - causes a degree or spread or scatter when the particle stream rebounds from a surface.

Expand

The distance between the particle and the collider object at which the collision occurs is determined by the particle radius. This is not always appropriate for some surfaces - the particle may get too close to the surface before colliding. The 'Expand' setting is used to increase the collision radius and can therefore be applied on a per-object basis.

Fluids

This section is used when an [SPH Fluids object](#) is used for fluid simulation.

Density Correction

This adds an additional calculation to the fluid simulation to correct the fluid density along the colliders boundary. Where the smoothing radius is cut off by a collision boundary the density calculated of the surround fluid is too low. This causes the fluid to try and pull together to increase the density, making the fluid particles along collider boundary too close (density higher than set). With this option enabled a correction is applied to estimate what the true density is, but at the cost of slowing the fluid simulation down.

Attraction

The collider surface attracted fluid particles near the surface.

Repulsion

The collider surface repels the fluid particles near it, this can be used to help push near boundary fluid particles away if they are stacking up along the collider boundary.

Forces

Attraction and Radius

This represents an attraction force between the particle and the collider. You can set the force in the 'Attraction' parameter. The particle must be as close or closer to the collider object than the value given in the 'Radius' setting before the force will have any effect.

Repulsion and Radius

This represents a repulsion force between the particle and the collider. You can set the force in the 'Repulsion' parameter. The particle must be as close or closer to the collider object than the value given in the 'Radius' setting before the force will have any effect.

Falloff

By default particles are attracted to (or repulsed from) the whole mesh, subject to the 'Radius' settings. If you want the force to apply to only part of the mesh, drag a vertex map into the Falloff link field. Maximum force will apply where the vertex weight is 100%, and will not apply at all if the weight is zero.

Connect on Collision

Connections are part of the Constraints system. For more details of what they are, please see the [Constraints object](#).

Connect on Collision

If this switch is checked, connections may be made between the particle and the collider object. Bear in mind that you may not see any if the nature of the collisions, friction, bounce, etc. mean that the connection can never be made, or breaks immediately it is made.

Connection Limit

The maximum number of connections a particle may make to a collider object.

Stiffness

This controls how "strong" the connection effect is.

Break

A measure of how much the connection can stretch before it breaks. 0% means that the connection will never break. 50% means that it will break when it has stretched 50% of its original length.

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Dragging a vertex map into this field will alter the connection stiffness. Maximum stiffness will apply where the vertex weight is 100%, and will not apply at all if the weight is zero.

Reaction on Collision



Reaction

This drop-down has two settings:

None

The objects the particle collides with is unaffected by the collision.

Translate

The object the particle collides with will be moved by the collision in a direction away from the particle after collision.

Initial Velocity

The colliding object can be given an initial velocity on the X, Y, or Z axes with this control.

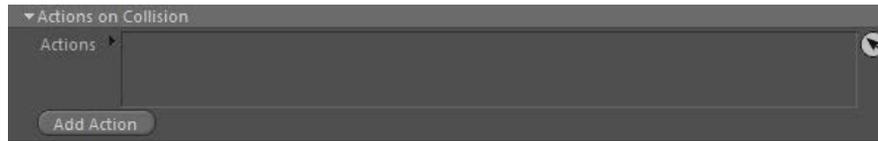
Mass

This is the mass of the object, the lower the mass the more effect 'Translate' mode has on particle collision.

Set Rest State, To Rest State

If you add a Collider tag to an object and set 'Reaction' to 'Translate' you may find that, if you move the object and then play the scene, the object jumps back to the position it was in before it was moved. To fix the initial position of the object, click 'Set Rest State'. To move an object to its initial (rest) state, click 'To Rest State'.

Actions on Collision

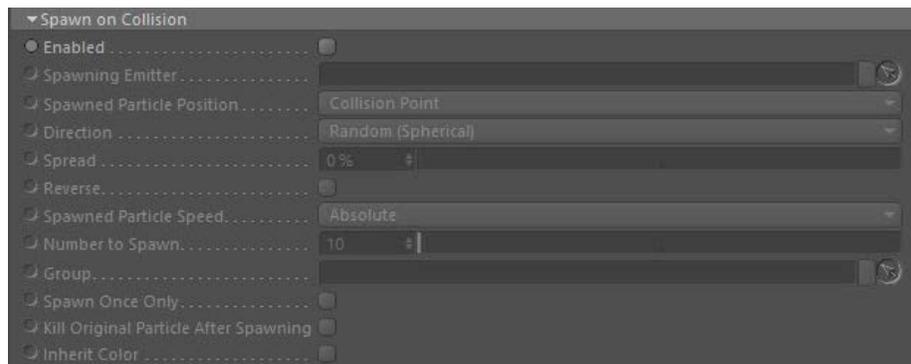


You can drag one or more Actions into this list and those Actions will be carried out on each particle when it collides with the object. You can use any Action you like. Note that the Action you use does NOT have to be associated with a Question. The Action is triggered directly by the collision - in effect, the collision event acts as a question which triggers an Action.

Add Action

Clicking this button will add an action to the scene and drop it into the Actions list.

Spawn on Collision



The collision engine can spawn new particles on collision. You don't need a spawn modifier or action to do this; the collision engine triggers the spawning directly.

Enabled

This switch must be checked before spawning takes place.

Spawning Emitter

Drag an emitter into this field; this emitter will be used to generate the new particles. As explained in the [Spawn modifier page](#), it is NOT a good idea to use the same emitter which is producing the particles which collide and trigger the spawning. Use a different emitter instead. When you drag an emitter into this field, the 'Emission Mode' setting in that emitter will automatically be set to 'Controlled Only'. You can change that setting manually if you really need to.

Spawned Particle Position

This drop-down determines where the particle will be emitted. It has two choices:

Collision Point

The spawned particles will be emitted from the point of collision. In this mode, the direction of the spawned particles is determined by the Direction setting (see below).

Determined by Emitter

In this mode the spawning emitter decides where the particles are emitted. So you can have the spawning emitter emit particles from an object which may be at a completely different position from where the collision occurred. The spawning emitter also determines the direction of the spawned particles.

Direction

This is how the direction of the spawned particles is determined. It is only available if 'Spawned particle position' is set to 'Collision point'. The [collision engine page](#) gives more details, especially on the difference between 'Source particle' and 'Face normal' directions. There are three options:

Random (Spherical)

The direction of the spawned particles is set to a random value, which in practice means that the spawns adopt a spherical distribution.

Source Particle

In this mode the direction of the new particle is the same as the source particle (but can be modified by the Spread and Reverse settings - see below).

Face Normal

In this mode the direction of the new particles is along the normal of the face the source particle collided with. The direction can be modified by the Spread and Reverse settings - see below.

Spread, Reverse

These parameters are only available if the 'Spawned Particle Position' is set to 'Collision Point' and the 'Direction' parameter is set to 'Source Particle' or 'Face Normal'.

If Direction is set to Source Particle, the spawned particles have the same direction as the source particle which spawned them. If Direction is set to Face Normal, they all travel along the normal of the collision face. This isn't very useful, so you can modify the direction with these parameters. Spread is a deviation to the particle heading, in percentage terms, from the direction of the source particle. Given a low value of, say, 10%, this causes the spawns to follow a narrow cone along the path of the source particle; set to 100%, you will get a hemisphere of particles.

The Reverse setting, if checked, will reverse the direction of the spawned particles so that instead of following along the path of the source particle they head directly away from it (useful for rocket trails, for example).

Spawned Particle Speed

This drop-down menu has two settings:

Absolute

With this option, the spawned particles will have the speed given in the spawning emitter.

Relative

If you select this option, the speed in the spawning emitter is added to the current speed of the source particle. For example, if the spawning emitter has a speed of 50 and the source particle has a speed of 150, the new particles will have a speed of 200 (150 + 50). This is a really a convenience function so you don't have to calculate the speed the spawned particles should have.

Number to Spawn

This is the number of particles to be spawned from the source particle.

Group

This allows you to specify the group to which the spawned particles will belong. If there is nothing in this field, the group is determined by the spawning emitter. To specify the group, drag the desired Group object into this field.

This setting is useful if you want to ensure that the spawned particles are, or are not, affected by a specific modifier, for example.

Spawn Once Only

If this switch is on, the tag will only spawn once from a specific particle. The reason for this is to prevent multiple spawning from a particle which is repeatedly colliding with the collider object, for example, under the influence of a gravity modifier.

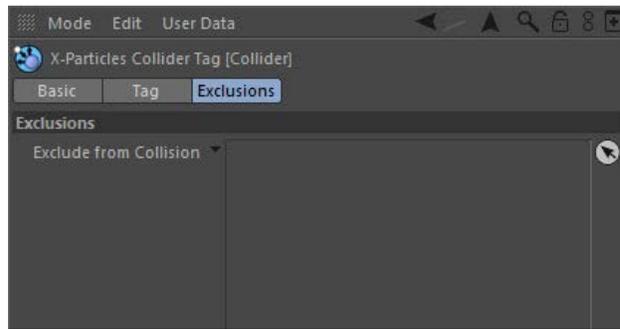
Kill Original Particle After Spawning

This switch, if checked, will remove the source particle from the scene after it has spawned. This can be used to ensure that each source particle spawns only once.

Inherit Color

 The spawned particles will inherit the colour of the source particle.

Exclusions tab



Exclude from Collision

By default, the collider tag will look for collisions with particles emitted from all the emitters in the scene. It might happen that you don't want to detect collisions with particles from a particular emitter, but you do want that emitter's particles to collide with other objects (so you can't simply disable collisions in the tag or the emitter). In that case you can drag the emitter into this list and then collisions will not be detected for this object and any emitters in this list.

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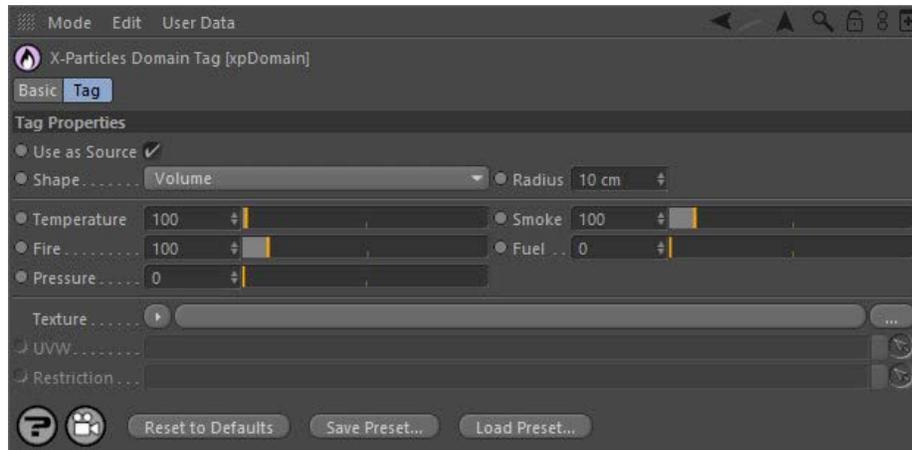
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Domain Tag

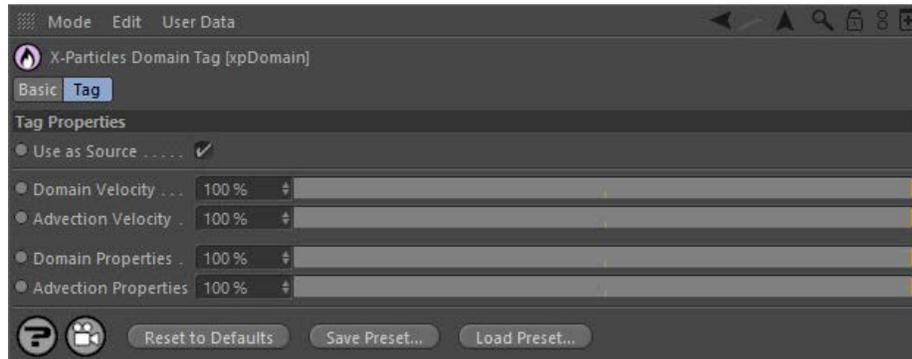
This tag is used in conjunction with a FLIP (xpDomain) object. It allows you to use an object as a source of fire rather than an emitter. To use it, add the tag to the object you wish to use as a source. Note that the object must be located inside an xpDomain object for the tag to have any effect. The tag then sets the voxel properties from the object.

Interface

This is the tag's interface when attached to an object other than an Emitter:



When attached to an Emitter, the interface changes to look like this:



For the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Use as Source

Check this switch to use the object as a source for a domain. If it is not checked the object will not be used as a source by the domain.

Shape

This selects whether the volume or surface of the geometry object should be used for setting the domain voxel properties.

The drop-down has three options:

Surface

The surface of the object is used.

Surface (Outwards)

The surface of the object is used and the values are set in the direction of the surface normal.

Volume

The object's volume is used.

Radius

This is the distance from the object (either surface or volume) over which to set the voxel properties. If 'Shape' is set to 'Volume' the properties are set within the full volume and faded over the Radius distance from the geometry.

Temperature, Smoke, Fire, Fuel and Pressure

These are the values to set for the respective properties of the voxels in the domain.

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Here you can add a shader (e.g. a Noise shader) to modify the value of the properties set into the voxels.

UVW

You can drag a UVW tag or Texture tag into this field. This enables the texture/shader in the 'Texture' field to be used over a surface to set the values over the geometry. Note that this field is not available if 'Shape' is set to 'Volume'.

Restriction

Drag a selection tag or vertex map tag into this field to restrict where over the surface the values are set. If a vertex map is used the values are weighted much like using the texture.

Emitter values

These values are used when the tag is attached to an Emitter. In this case, the controls govern how the particles from the emitter are linked to the domain.

Domain Velocity

The weight of the particles' velocity which affects the velocity field of the domain (voxels).

Advection Velocity

The weight of changing the particles' velocity from the domains advected velocity, so at 0% the particles will not be changed, at 100% they will be under complete control of the domain.

Domain Properties

The weight of the particles physical properties (smoke, fire, etc.) that is used to blend into the domain voxels (as with the velocity above).

Advection Properties

The mix of domain voxels back into the particles properties, so at 0% the particles' physical properties (e.g. smoke) will be unchanged.

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Freeze Tag

This tag can be used to halt X-Particles completely at a particular frame, then restart it again. Do not confuse it with the [Freeze modifier](#), which is very different!

This tag will halt everything done by X-Particles - particle motion, trail generation, object and sprite generation, etc. Note that particle ages will NOT increase while the system is frozen!



For the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

The interface is very simple and has the following settings.

Freeze X-particles

Checking this button will halt X-Particles at the specified frame. If you are generating Thinking Particles, these will also be frozen (and also will not age).

At Frame

The frame at which the system will be halted.

Unfreeze X-Particles

Restarts the system from the point at which it was frozen.

At Frame

The frame at which the system will be restarted.

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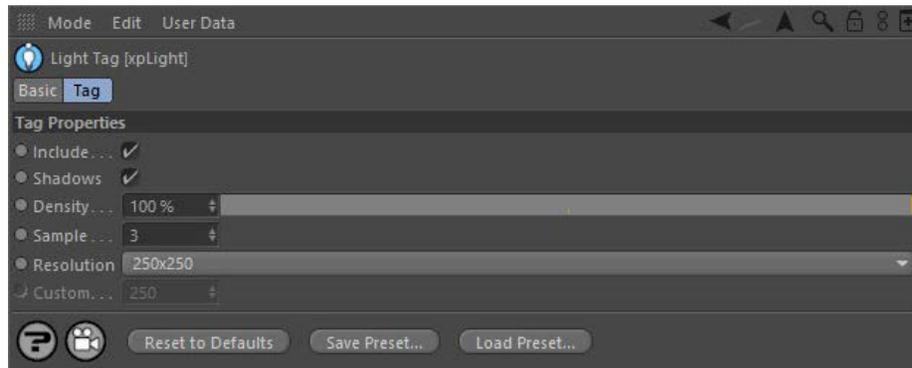
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Light Tag

This tag allows you to control individual lights when using an X-Particles material to render the particles. It must be applied to the light you wish to control.

Interface

This is the tag's interface:



For the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Include

If this switch is checked, the light will be used to illuminate the particles. If unchecked, the light will continue to illuminate other scene objects, but not the particles.

Shadows

If the light casts shadows, you can turn them off for the particles only by unchecking this switch.

Density

Shadow density, as in the Cinema 4D Light object Shadows tab.

Sample, Resolution, Custom

'Resolution' is the same as in the Cinema 4D Light object Shadows tab. You can choose 'Custom' from the drop-down and then set the custom shadow map size in the 'Custom' field.

A low resolution will produce soft, fuzzy shadows. If you then increase the resolution, you will get harder-edged shadows. To make them soft again while maintaining the resolution, increase the 'Sample' setting. Note, however, that this will significantly increase render time. If 'Sample' is set too high, your shadows may be so soft they disappear altogether.

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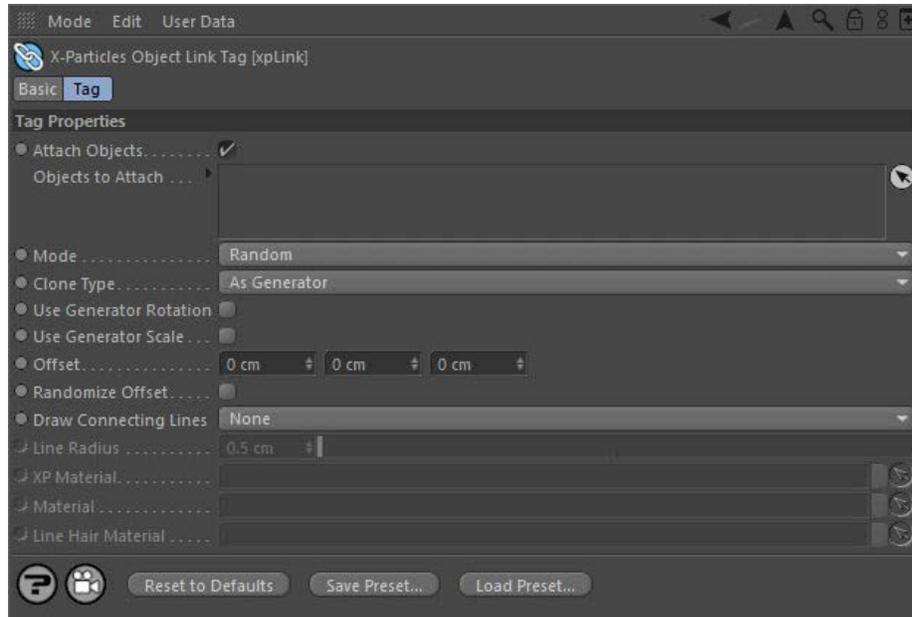
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Object Link Tag

The purpose of the Object Link tag, as its name implies, is to allow you to attach another object to the object being generated by a Generator.



For the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Important: for this tag to be used, the Generator setting 'Use multiple child objects' **MUST** be set to 'First Child Only'. The tag will have no effect with any other setting. Note that adding an Object Link tag to a Generator object will automatically set the correct setting in the Generator.

Settings

Attach Objects

If this switch is unchecked, the objects to be attached will not be generated.

Objects to attach

Drag the object(s) you want to attach into this list. Which object is generated depends on the 'Mode' setting.

Note 1: the object must be a spline or a polygon object. Generator objects such as the various C4D generator objects, some primitives, cloners, etc. cannot be used. Convert these to polygon objects first.

Note 2: the originals of the objects to be attached will be visible in the scene. You may need to move them well out of camera view to prevent them being rendered. Alternatively, add the object to be attached as a child object of the Generator. Since the Generator when using this tag must be set to generate the first child only, the original of the object to be attached will not be visible.

Mode

This drop-down menu has two settings:

- Random: an object to attach will be selected randomly from the list.
- Sequential: the first object in the list will be generated first, then the second, and so on until all objects have been generated. The sequence will then start again with the first object.

Clone Type

This drop-down lets you choose how the clones of the linked object are generated. 'Straight Clone' generates full copies, as if you duplicated the object in the object manager. 'Instances' generates Cinema 4D instances, while 'Render Instances' generates, well, render instances. Details of instances and render instances can be found in the Cinema 4D documentation.

The default setting is 'As Generator' which will then use the same setting as in the Generator object to which the tag is attached.

Note that there is a small issue if you select render instances. In this case the source object which will be cloned will remain visible in the scene and will be rendered. This is due to internal workings of Cinema 4D. A simple workaround is to position the source object off screen in such a position that it will never appear in the rendered image.

Use Generator Rotation

If checked, this will cause the attached object to be rotated according to the 'Rotation' setting in the Generator.

Use Generator Scale

If checked, this will cause the attached object to be scaled according to the 'Scale' setting in the Generator.

Offset

By default the offset is set to zero, which will generate the attached object at the same position as the object from the Generator. To offset the position, change the values in this field. You can add an offset along any of the three axes.

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Randomise Offset

If this switch is checked, the offset value are randomised. The maximum offset will be the same as in the 'Offset' field; the minimum offset will be the 'Offset' field value multiplied by -1 (i.e. if the X value in the 'Offset' field is 50, then when 'Randomise offset' is checked the actual value can range from -50 to 50).

Draw Connecting Lines

The tag can draw connecting lines between the object from the Generator and the attached object. There are five options in this drop-down menu:

None

No connecting lines will be produced

Use XP Material

The lines will be rendered using an XP Material. Drop such a material into the 'XP Material' link field.

Use Sweep Object

A Sweep object will be generated automatically. You can set the radius of the line in the 'Line radius' setting.

Use Hair Material

This will render the lines with the Hair renderer (if your version of Cinema supports that). To use it, you must also drag a hair material into the 'Line hair material' field.

Use Sketch & Toon

If your version of Cinema supports Sketch & Toon, you can render the lines using this option. Note that setting up S&T must be done manually: in the render settings, add the Sketch & Toon effect, and ensure that 'Splines' are checked in the 'Lines' tab.

Line Radius

Only used when 'Draw Connecting Lines' is set to 'Use Sweep Object'. The radius of the resulting line can be set here.

XP Material

Only used when 'Draw Connecting Lines' is set to 'Use XP Material'. Drag the material to be used by the line into this field.

Material

Only used when 'Draw Connecting Lines' is set to 'Use Sweep Object'. Drag the material to be used by the line into this field.

Line Hair Material

Only used when 'Draw Connecting Lines' is set to 'Use Hair Material'. Drag the Hair material to be used by the line into this field.

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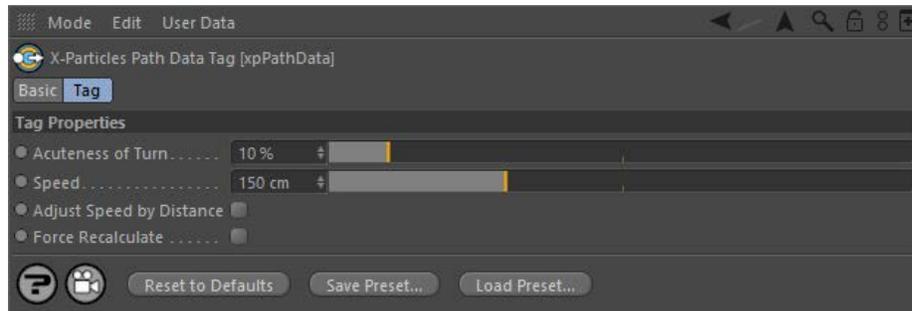
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Path Data Tag

This tag is used in conjunction with the Follow Path modifier. For details of how the tag is used, please see the [Follow Path modifier page](#). It allows you to set different parameters for one or more of the path objects if you need different settings for a particular object. The tag is not required for routine use of the Follow Path modifier, only if you need a different setting for an object.

Interface

The tag's interface looks like this:



For the buttons at the bottom of the interface, please see the [Common interface elements](#) page.

Parameters

Acuteness of Turn

This value controls how sharply the particle will turn to head for the object the tag is applied to. If it is too low, the particle may not reach the object in time, in which case it will circle back to try again. This setting is used if in the Follow Path modifier the 'Get AOT From' parameter is set to 'Tag'.

Speed

The speed with which the particle will move to the object the tag is applied to. This setting is used if in the Follow Path modifier the 'Speed Mode' parameter is set to 'Get Speed From Tag' or 'Increment Speed From Tag'.

Adjust Speed By Distance

When the particle stream turns to point to the next path object, they will all move at the same speed but particles on the outside of the curve will take longer to get there than those on the inside. Checking this switch will reduce that discrepancy by adjusting the speed to take account of the distance to be travelled. This setting is used if in the Follow Path modifier the 'Speed Mode' parameter is set to 'Get Speed From Tag' or 'Increment Speed From Tag'.

Force Recalculate

When a particle stream moves from one path object to another, the Follow Path modifier tries to send each particle to the same relative position in the next object, to avoid excessive distortion of the particle stream. In many cases this works very well, but if the next path object is very different in shape or size from the previous one, it may not be so successful. If that happens, add this tag to the next object and check 'Force Recalculate'. This will force the modifier to find a new position in the next path object, but at the cost of some twisting to the particle stream.

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This tag is created by the [Skinner object](#) to store colour information. It is not visible unless you make the Skinner editable.

This tag allows colours to be baked and kept with the polygons so that the [Skin Shader](#) will work.

The tag has no interface and no parameters for the user to adjust.

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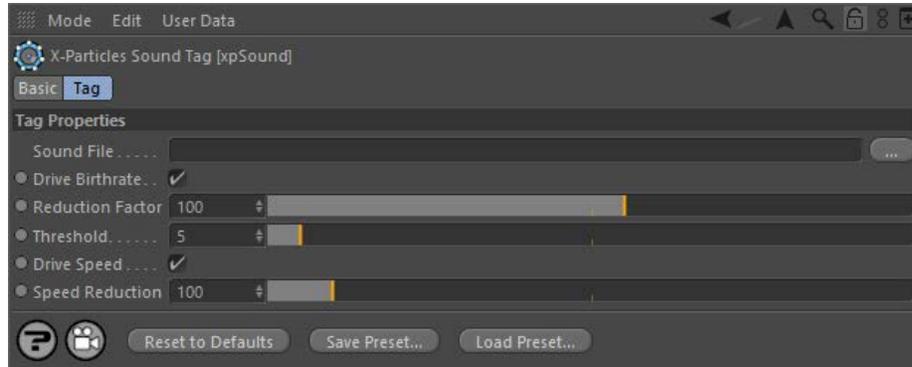
Sound tag

This tag will drive the emitter via a sound file.

Deprecated This tag is now deprecated and the [Sound modifier](#) should be used instead. The tag is retained for backwards compatibility but will be removed in a future version of X-Particles.

This tag must be applied to the emitter. Applying it to anything other than an emitter will have no effect.

Interface



For the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

Parameters

Sound File

This is the sound file which will drive the emitter. It must be a .WAV file; no other formats are supported.

Drive Birthrate

If checked, this switch will cause the emitter's birthrate to vary according to the sampled sound.

Reduction Factor

Sound files vary widely. The result of sampling is typically a large value, so it is necessary to reduce that value before applying it to the emitter's birthrate. For many files a reduction factor of 100 is sufficient, but if you find that too many particles are being emitted each frame, you can reduce the number by increasing this value. Conversely, if too few particles are emitted, you can reduce this factor.

Threshold

Many sound files have a background noise which will cause a few particles to be emitted even during 'quiet' frames. This can be distracting. To stop this happening, no particles will be emitted in any frame unless the number to be emitted exceeds the threshold value. You can increase this if you still get unwanted particles being emitted. If you find that too few are being emitted, even after adjusting the Reduction Factor, you can reduce the threshold value.

Drive Speed

If checked, this switch will cause the initial particle speed to vary according to the sampled sound.

Speed Reduction

This is exactly the same principle as the birthrate Reduction Factor, and is there for the same reason. If you find that the particles are still too fast, try increasing this factor, or reduce it if they are too slow.

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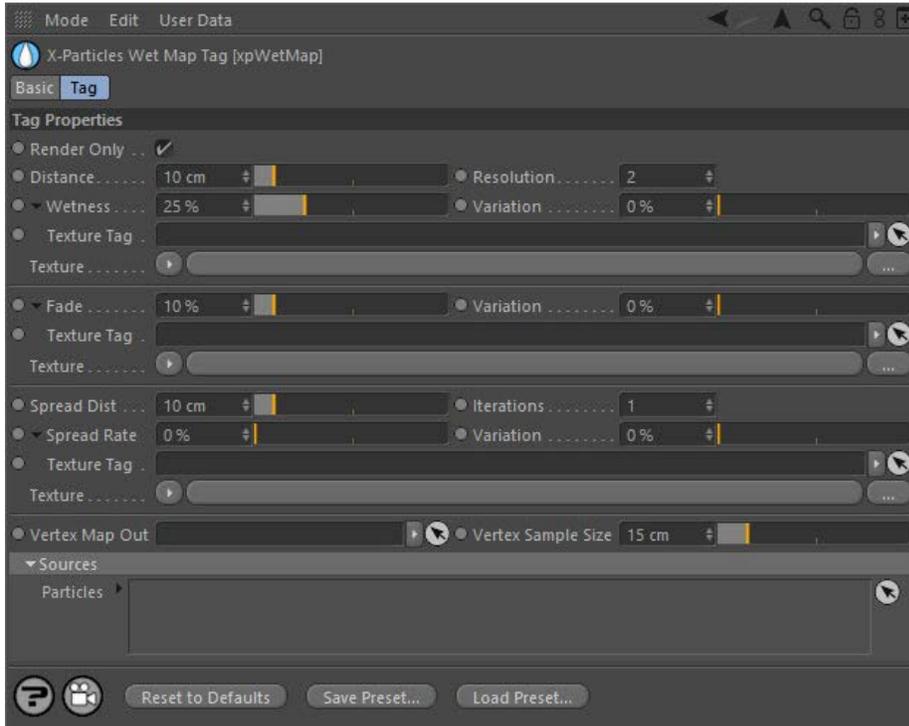
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Wet Map Tag

Interface

This is the tag's interface:



For the buttons at the bottom of the interface, please see the ['Common interface elements'](#) page.

How to produce a wet map

To generate a wet map requires three things:

- an emitter: wet maps can be created from any particle interaction (not just fluid particles)
- an object to generate the wet map on
- a wet map tag applied to the object

To generate the map, apply the tag to the object and drag the emitter or an X-Particles group into the 'Particles' list box in the tab.

There are two other things you can do. You can generate a vertex map on the object, which you could then use (for example) as the emission source for another emitter. To do this, the object must be made editable and a vertex map generated for it. Drag the vertex map tag into the 'Vertex Map Out' field and uncheck the 'Render Only' switch. If you select the object and switch to Points mode, you can see the vertex map being generated as you play the scene.

You can also shade the wet map if desired, by using a [Wet Map Shader](#). This will colour the surface depending on how 'wet' the surface is. The more particles hit the object the 'wetter' it is.

Parameters

Render Only

If this switch is checked, wet maps are created only during rendering. Uncheck the switch if you need to create wet maps for output to a vertex map within the viewport (e.g. for use as a selection for another emitter).

Distance

This is the falloff distance added to the particle radius to spread the wetness from a particle onto the wet map.

Resolution

The number of wet map subdivisions within a polygon. Each polygon is subdivided to give wet map vertices within each face, and this setting controls how many vertices each polygon receives. Increasing this value will slow wet map generation down, so it is best to have a larger number of polygons and a low resolution, rather than a low polygon count and high resolution.

Wetness

This setting controls how 'wet' a particle makes the wet map (in other words, the strength of its influence).

Variation/Texture Tag/Texture

These settings change how wet the map becomes from the particles, based on either a random variation (Variation field), a shader (placed into the Texture field - a Noise shader works well), or a texture tag from a material applied to the object.

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Each time the wet map is calculated (when the scene time changes) the current map is faded before any new wetness is applied, which controls how quickly the wet map fades (i.e. dries).

Variation/Texture Tag/Texture

These settings change the fading with either a random variation (Variation field), a shader (placed into the Texture field), or a texture tag from a material applied to the object.

Spread Dist

This controls how far each wet map vertex is spread to the surrounding wet map area.

Iterations

The number of iterations used during the spreading. Higher values spreads (smooths) more, but is slower to calculate.

Spread Rate

This controls how much the wet map spreads (higher values smooth the wet map to the surrounding area).

Note: spreading is very slow and is therefore best kept for when the scene is rendered or when it is cached.

Variation/Texture Tag/Texture

These settings change the spread rate with either a random variation (Variation field), a shader (placed into the Texture field), or a texture tag from a material applied to the object.

Vertex Map Out

This field accepts a vertex map tag which should be dragged from the object on which the wet map is to be generated. The wet map will then be output to that vertex map. If you need the map in the viewport (e.g. to use it as the emission source for another emitter) you must uncheck 'Render Only'.

Vertex Sample Size

This is the sampling size from the wet map point to the surrounding wetmap. Larger values will smooth out the sampling of the wet map.

Sources

Particles

Drag any emitter or particle group(s) for which a wet map is required into this box.

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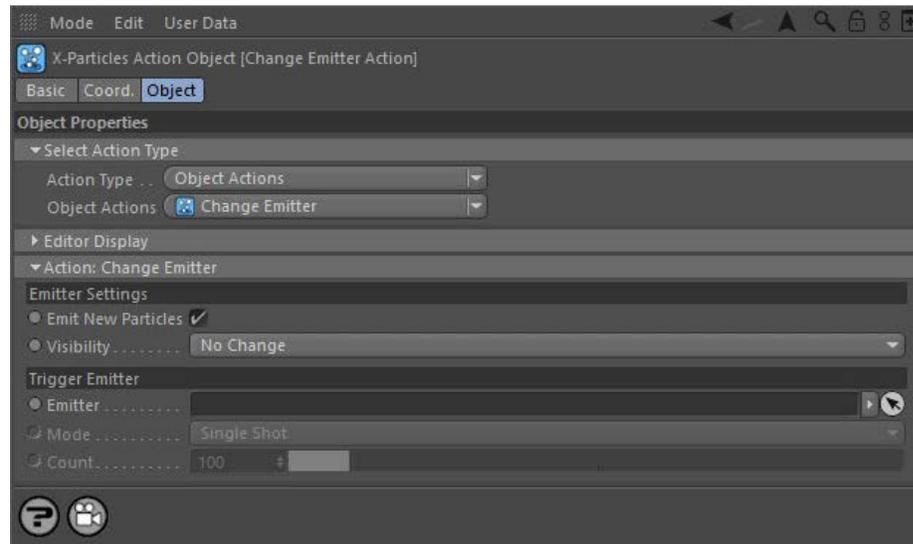
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Action: Change Emitter

This Action changes settings in the emitter.

Interface

The Action's interface looks like this:



Parameters

Emitter Settings

Emit New Particles

While this switch is checked, the emitter will continue to emit new particles (subject to other settings in the emitter, such as the birthrate). If unchecked, existing particles will persist but no new ones will be emitted.

Visibility

This allows you to change the particle's visibility in the editor (this does NOT affect render visibility). There are three options:

No change

The particle's visibility status will not be altered.

Visible

The particle will be made visible.

Invisible

The particle will be made invisible.

Trigger Emitter

These settings are used in conjunction with the 'Trigger' mode in the Emitter.

Note: the Emitter to be triggered MUST be in 'Trigger' mode for this action to have any effect.

Emitter

Drag the Emitter to be triggered into this field.

Mode

This drop-down menu has three settings.

Single Shot

This will cause the linked Emitter to emit a single burst of particles, then stop emitting. The number of particles emitted is given in the 'Count' parameter.

Hold Trigger

When the Action is called, this will cause the linked Emitter to start emitting particles. It will have no effect if the Emitter was already emitting particles. The emitter will continue to emit particles until it is turned off by a 'Release Trigger' action. The number of particles emitted in each frame is given in the 'Count' parameter.

Release Trigger

When the Action is called, this will cause the linked Emitter to stop emitting particles. It will have no effect if the Emitter was not emitting

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anything.

Count

The number of particles to be emitted when in 'Single Shot' mode.

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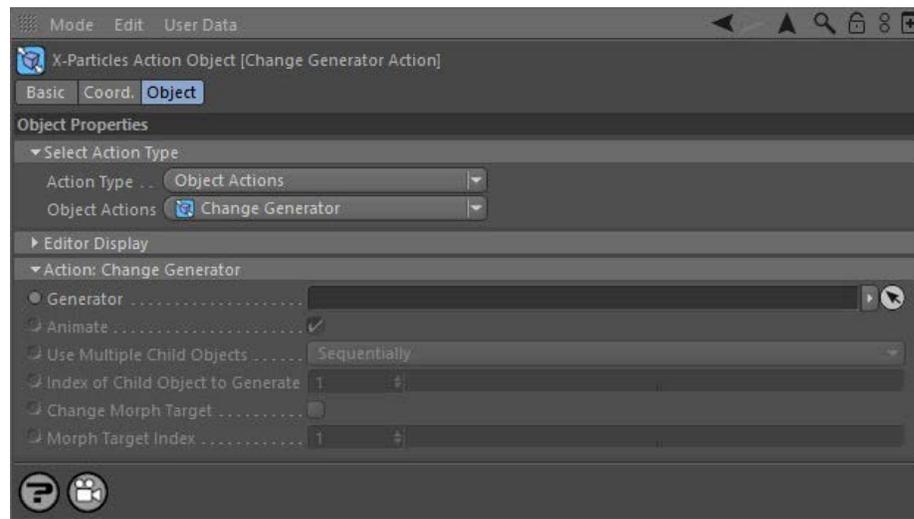
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Action: Change Generator

This action will change the settings in a Generator object. It does NOT affect existing particles, it simply changes the Generator settings themselves.

Interface

The Action's interface looks like this:



Parameters

Generator

Drag the Generator to be changed by the action into this link field.

Other Parameters

These are the same as the corresponding parameters with the same name in the Generator object. Please refer to the [Generator manual page](#) for details.

Note: this action does NOT affect existing particles. It only affects what the Generator will do when generating objects for particles created after this action is triggered.

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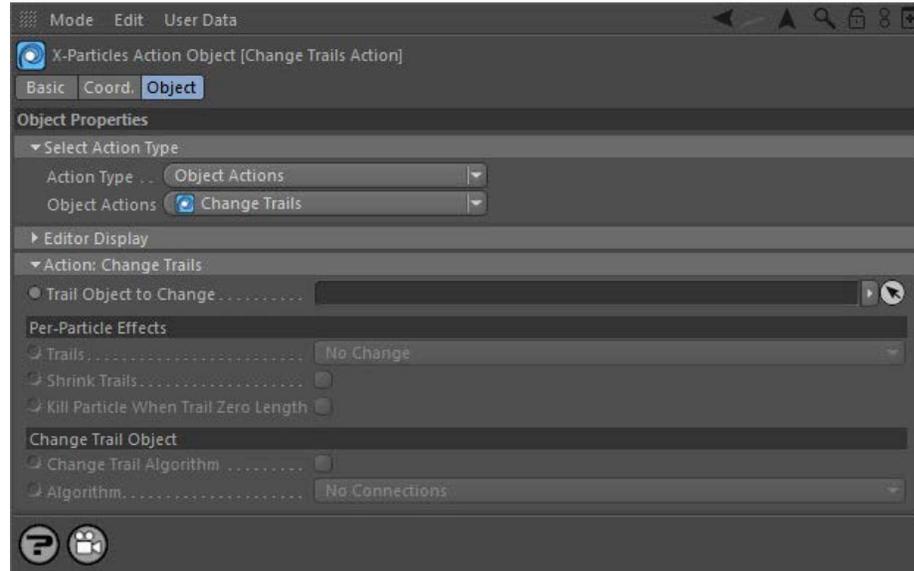
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Action: Change Trails

This action will let you change the trails generated from a particle.

Interface

The Action's interface looks like this:



Parameters

Trail Object to Change

This field accepts a Trail Object which you drag into the field from the Object Manager. Without a linked Trail object, you cannot access any of the other parameters and the Action will have no effect.

Per-Particle Effects

These are effects which are carried out on individual particles.

Trails

This drop-down three settings:

No Change

This does nothing to the trail, allowing you to make other settings without affecting existing trails.

Generate Trail

If trail generation in this particle has been turned off by an Action, or the Trail object setting 'Trails From Particle Birth' is unchecked, this setting will turn them on.

Don't Generate Trail

If trails are currently on for this particle, this will turn them off. All particles will lose their trail as soon as they pass the Question which triggers this Action.

Shrink Trails

If this switch is checked then the action will shrink the particle trail until it reaches zero. The trail shrinks at 1 point in the trail per frame, this cannot be altered.

Kill Particle When Trail Zero Length

Used in conjunction with the 'Shrink Trails' switch. If checked, this will cause the particle to die when its trail has a length of zero.

Change Trail Object

These settings let you change the Trail object itself.

Change Trail Algorithm

When checked, you can change the connection algorithm used in the Trail object.

Algorithm

The new algorithm to use. These settings are identical to those found in the Trail object; please refer to the [Trail object manual page](#) for details.

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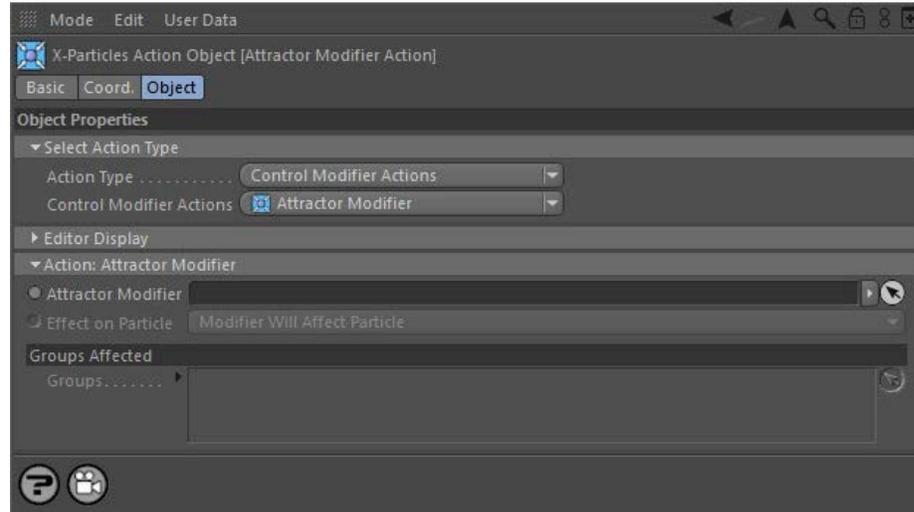
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Action: Attractor Modifier

This action gives control over an Attractor modifier.

Interface

The Action's interface looks like this:



Parameters

Attractor Modifier

This field accepts an Attractor modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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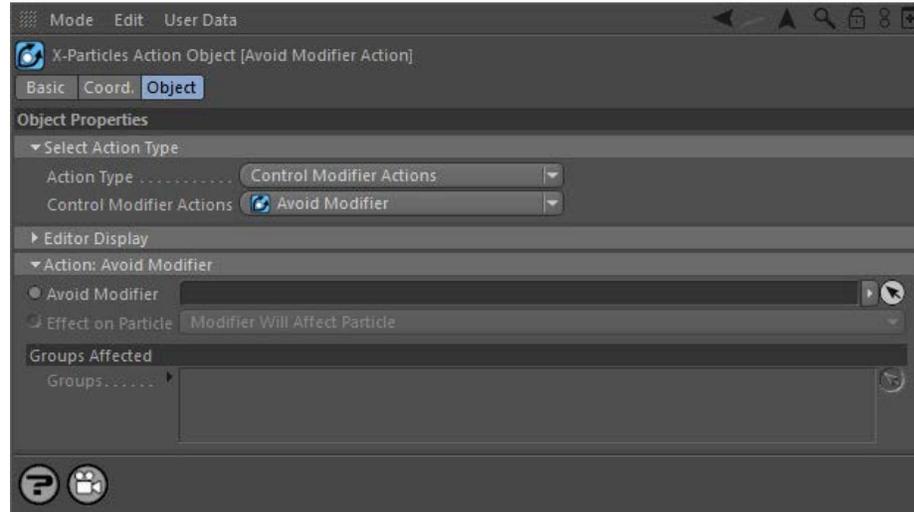
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Action: Avoid Modifier

This action gives control over an Avoid modifier.

Interface

The Action's interface looks like this:



Parameters

Avoid Modifier

This field accepts an Avoid modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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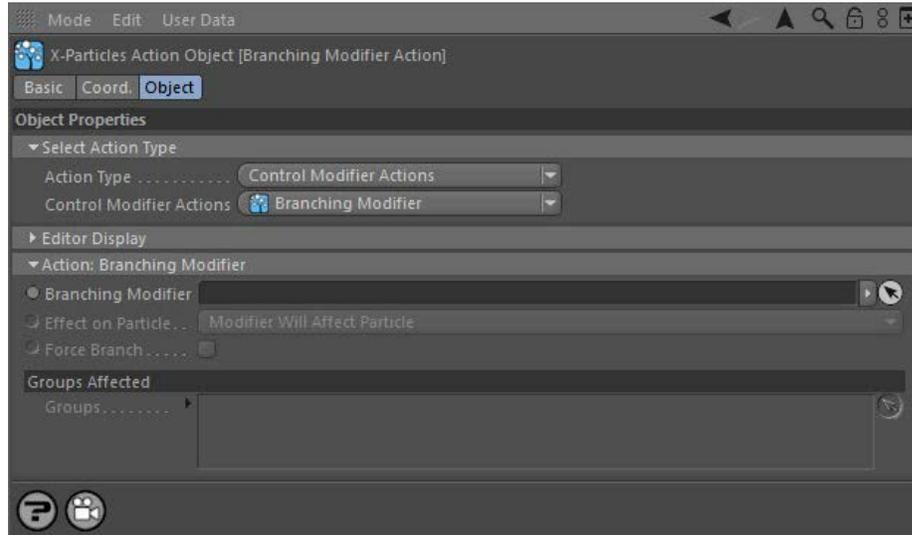
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Action: Branching Modifier

This action gives control over a Branching modifier.

Interface

The Action's interface looks like this:



Parameters

Branching Modifier

This field accepts a Branching modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Force Branch

If checked, then when the action is triggered, it will force the modifier to branch immediately from the particle, rather than waiting until the time until the next branch has elapsed.

Important: for this to work, you must ensure that the Branching Modifier is already activated BEFORE a 'Force Branch' action is triggered. In other words, you must have turned the modifier on (as it must be in action-controlled mode) before triggering a 'Force Branch' action. You cannot use the same action to turn on the modifier and force a branch simultaneously.

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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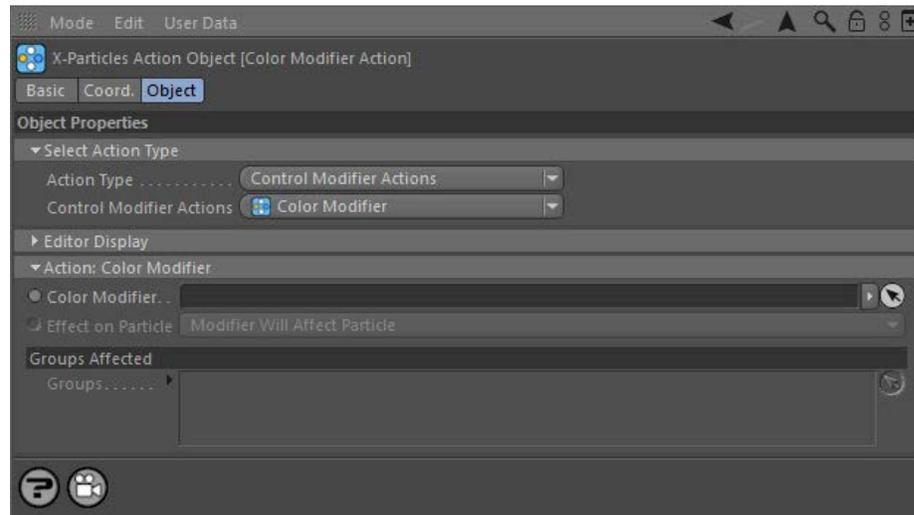
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Action: Color Modifier

This action gives control over a Color modifier.

Interface

The Action's interface looks like this:



Parameters

Color Modifier

This field accepts a Color modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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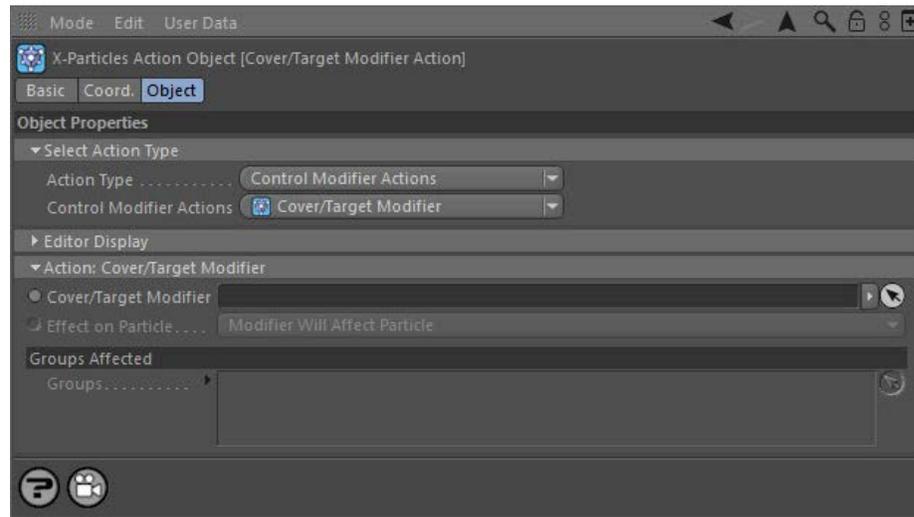
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- [Color](#)
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- [Explode](#)
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- [Follow Path](#)
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- [Gaseous](#)
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Action: Cover/Target Modifier

This action gives you control over a Cover/Target modifier in the scene.

Interface

The Action's interface looks like this:



Parameters

Cover/Target Modifier

This field accepts a Cover/Target modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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- [Network](#)
- [Rotator](#)
- [Sound](#)
- [Speed](#)
- [Spin](#)
- [Turbulence](#)
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- [Weight Modifier](#)
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X-Particles Dynamics:

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Particle Modifiers:

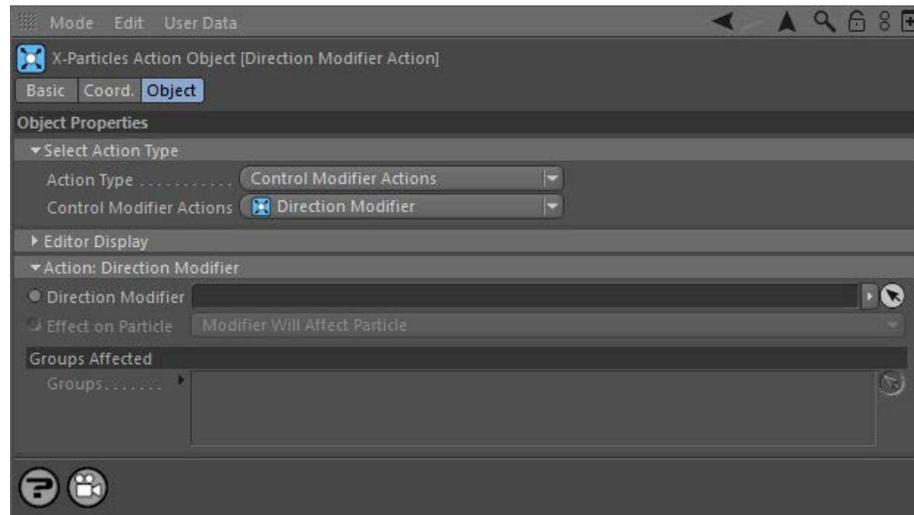
- --- Controller Modifiers ---
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- [Color](#)
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- [Inherit](#)
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- [Follow Surface](#)
- [Gaseous](#)
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Action: Direction Modifier

This action gives you control over a Direction modifier in the scene.

Interface

The Action's interface looks like this:



Parameters

Direction Modifier

This field accepts a Direction modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

- [Limit](#)
- [Network](#)
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Particle Modifiers:

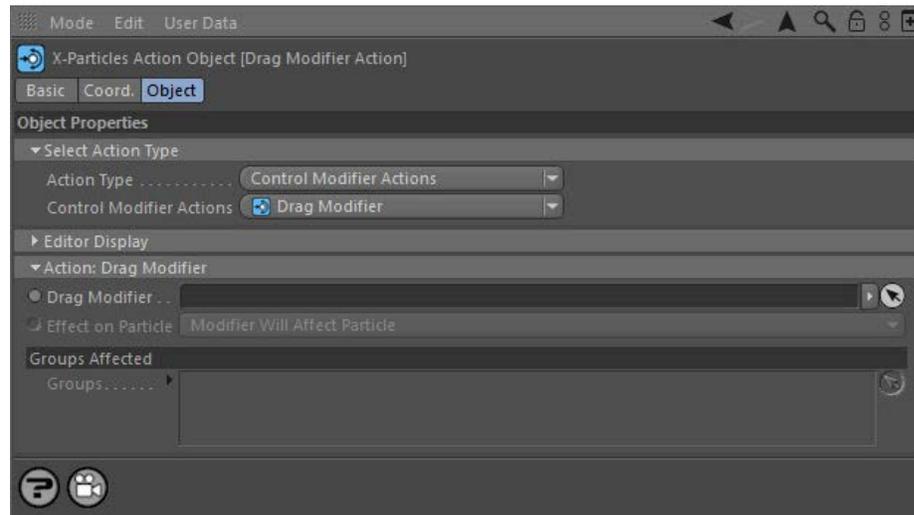
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- [Color](#)
- [Freeze](#)
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- [Explode](#)
- [Flocking](#)
- [Follow Path](#)
- [Follow Spline](#)
- [Follow Surface](#)
- [Gaseous](#)
- [Gravity](#)

Action: Drag Modifier

This action gives control over a Drag modifier.

Interface

The Action's interface looks like this:



Parameters

Drag Modifier

This field accepts a Drag modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

- [Limit](#)
- [Network](#)
- [Rotator](#)
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- [Speed](#)
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- --- Generate Modifiers ---
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X-Particles Dynamics:

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Particle Modifiers:

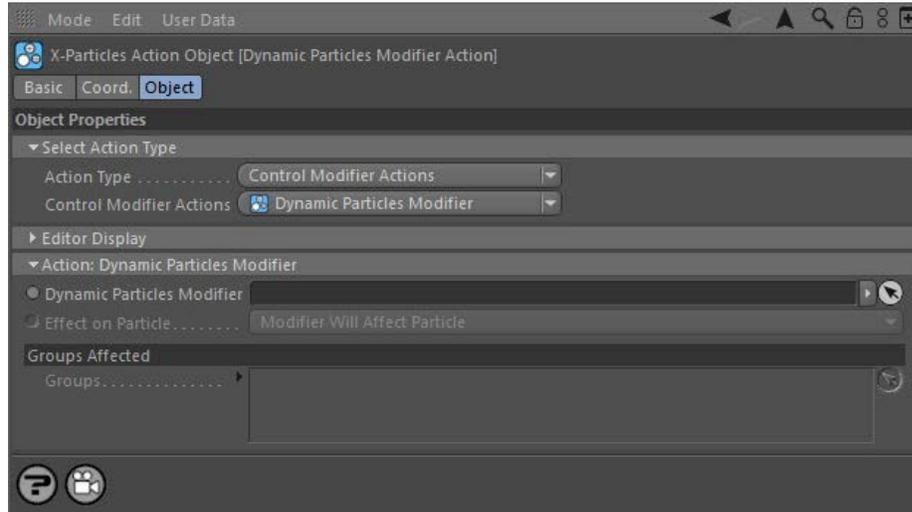
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- [Inherit](#)
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- [Follow Path](#)
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Action: Dynamic Particles Modifier

This action gives control over a Dynamic Particles modifier.

Interface

The Action's interface looks like this:



Parameters

Dynamic Particles Modifier

This field accepts a Dynamic Particles modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

- [Limit](#)
- [Network](#)
- [Rotator](#)
- [Sound](#)
- [Speed](#)
- [Spin](#)
- [Turbulence](#)
- [Vortex](#)
- [Vorticity](#)
- [Wind](#)
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- [Dynamic Particles](#)
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- [Sound Shader](#)
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- [Domain Tag](#)
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- --- Object Actions ---
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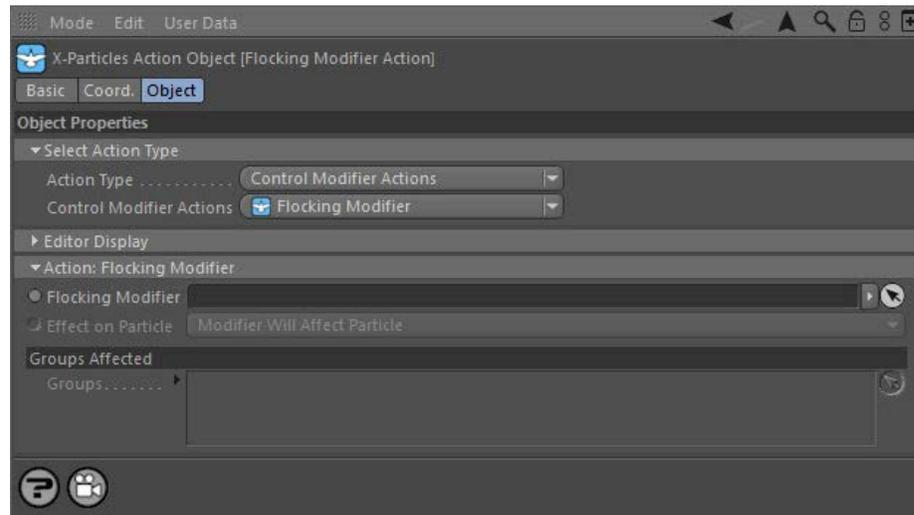
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Action: Flocking Modifier

This action gives you control over a Flocking modifier in the scene.

Interface

The Action's interface looks like this:



Parameters

Flocking Modifier

This field accepts a Flocking modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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X-Particles Dynamics:

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Particle Modifiers:

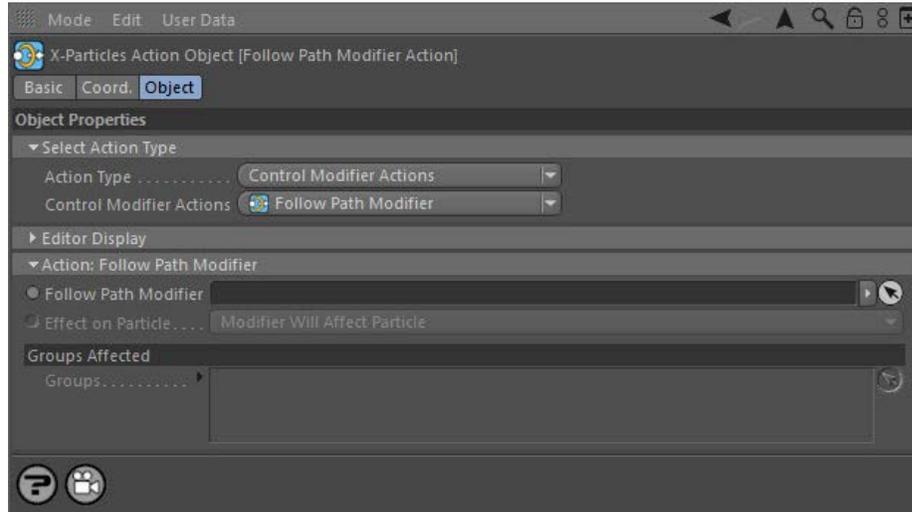
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Action: Follow Path Modifier

This action gives you control over a Follow Path modifier in the scene.

Interface

The Action's interface looks like this:



Parameters

Follow Path Modifier

This field accepts a Follow Path modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

- [Limit](#)
- [Network](#)
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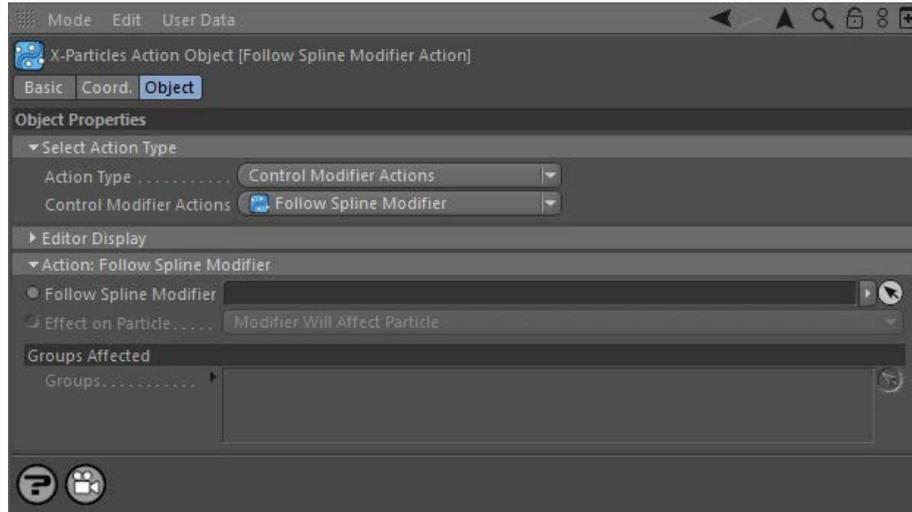
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Action: Follow Spline Modifier

This action gives control over a Follow Spline modifier.

Interface

The Action's interface looks like this:



Parameters

Follow Spline Modifier

This field accepts a Follow Spline modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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Particle Modifiers:

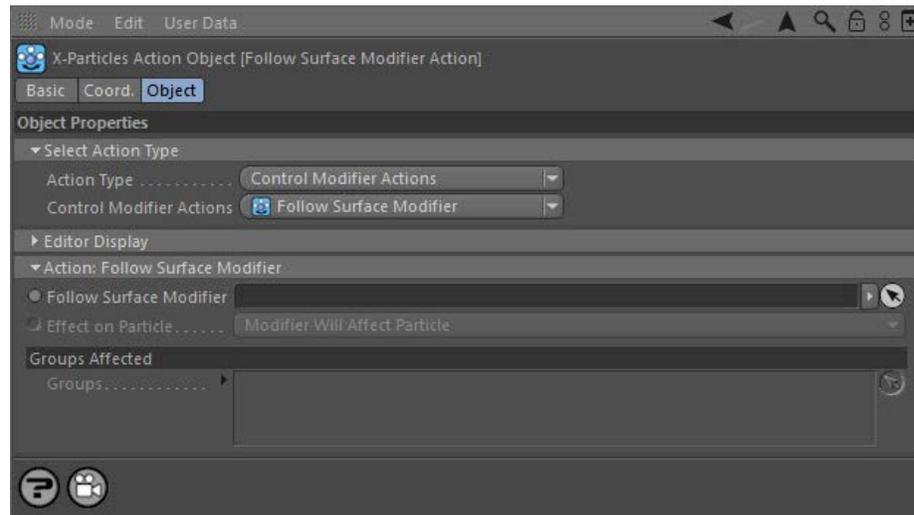
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Action: Follow Surface Modifier

This action will let you manage the effect of a Follow Surface modifier.

Interface

The Action's interface looks like this:



Parameters

Follow Surface Modifier

This field accepts a Move Over Surface modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

- [Limit](#)
- [Network](#)
- [Rotator](#)
- [Sound](#)
- [Speed](#)
- [Spin](#)
- [Turbulence](#)
- [Vortex](#)
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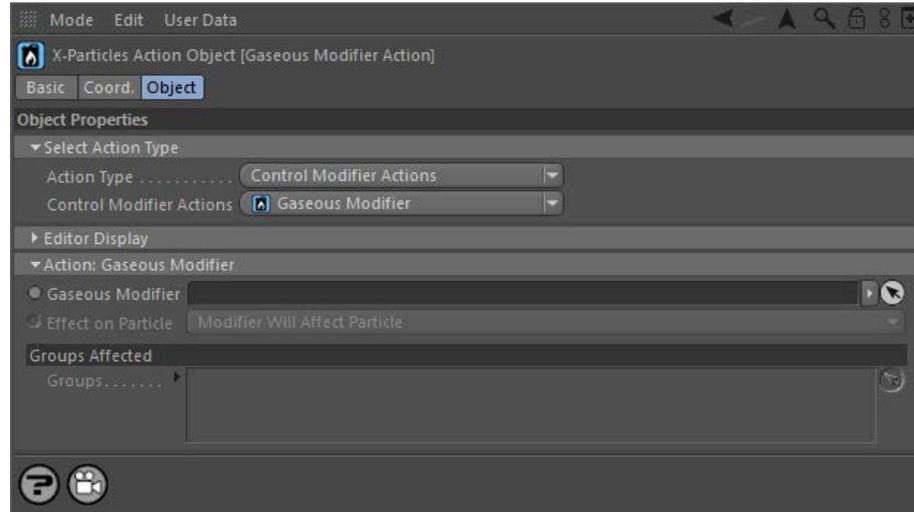
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Action: Gaseous Modifier

This action gives control over a Gaseous modifier.

Interface

The Action's interface looks like this:



Parameters

Gaseous Modifier

This field accepts a Gaseous modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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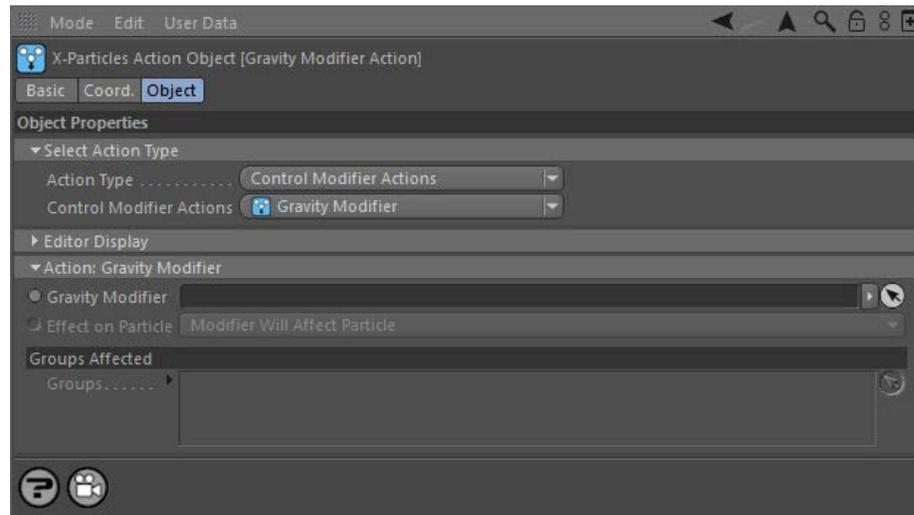
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Action: Gravity Modifier

This action gives control over a Gravity modifier.

Interface

The Action's interface looks like this:



Parameters

Gravity Modifier

This field accepts a Gravity modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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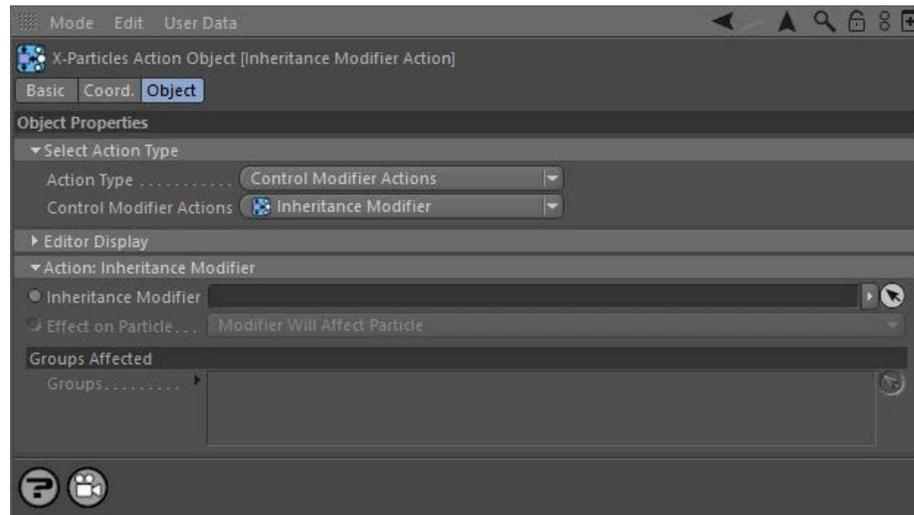
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Action: Inheritance Modifier

This action gives control over an Inheritance modifier.

Interface

The Action's interface looks like this:



Parameters

Inheritance Modifier

This field accepts an Inheritance modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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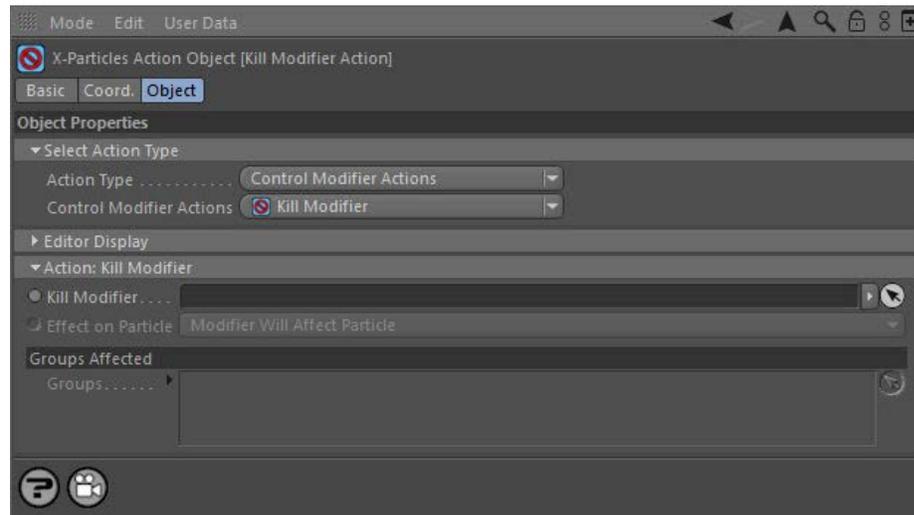
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Action: Kill Modifier

This action gives control over a Kill modifier.

Interface

The Action's interface looks like this:



Parameters

Kill Modifier

This field accepts a Kill modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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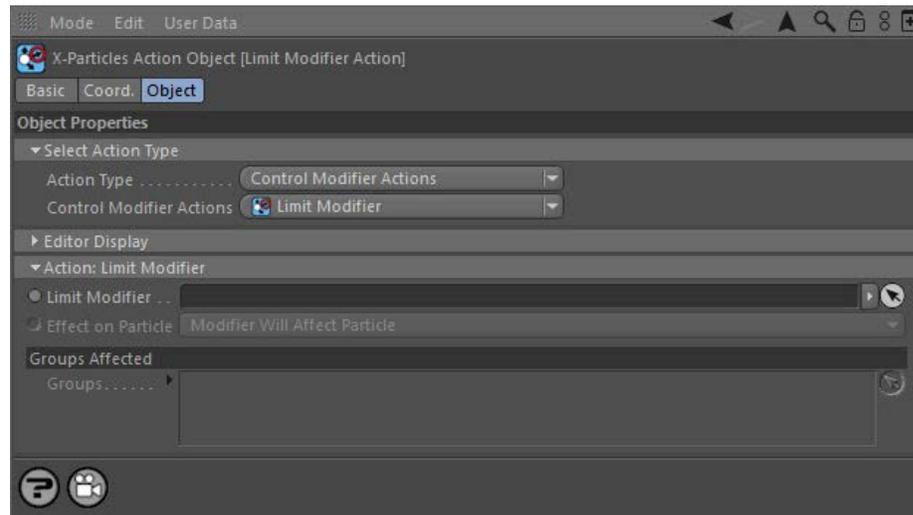
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Action: Limit Modifier

This action gives control over a Limit modifier.

Interface

The Action's interface looks like this:



Parameters

Limit Modifier

This field accepts a Limit modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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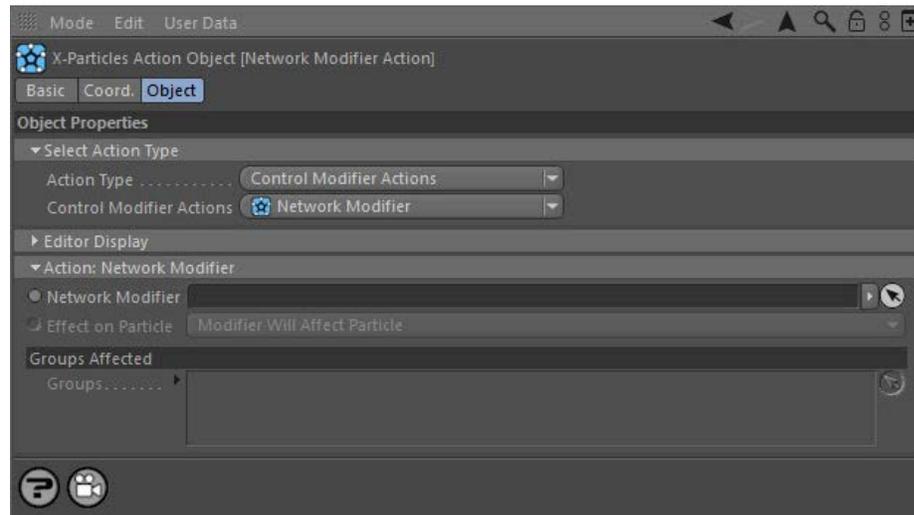
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Action: Network Modifier

This action gives control over a Network modifier.

Interface

The Action's interface looks like this:



Parameters

Network Modifier

This field accepts a Network modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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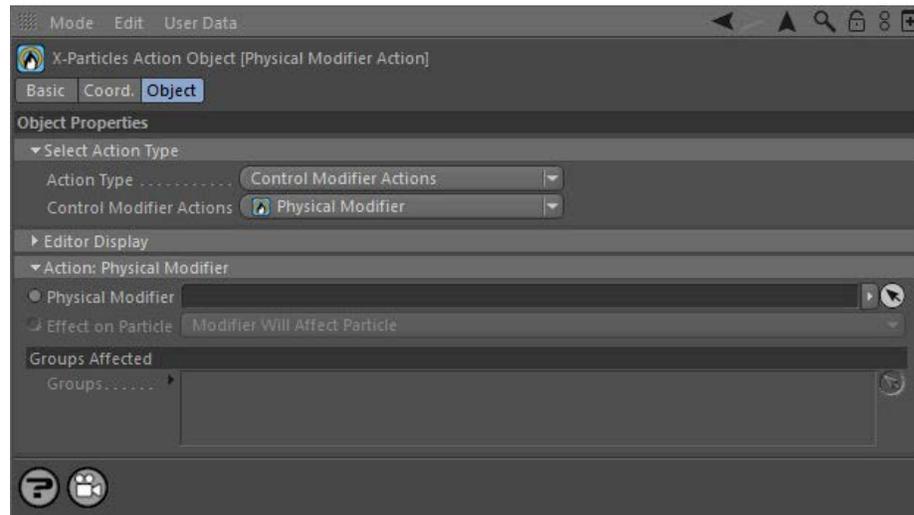
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Action: Physical Modifier

This action gives control over a Physical modifier.

Interface

The Action's interface looks like this:



Parameters

Physical Modifier

This field accepts a Physical modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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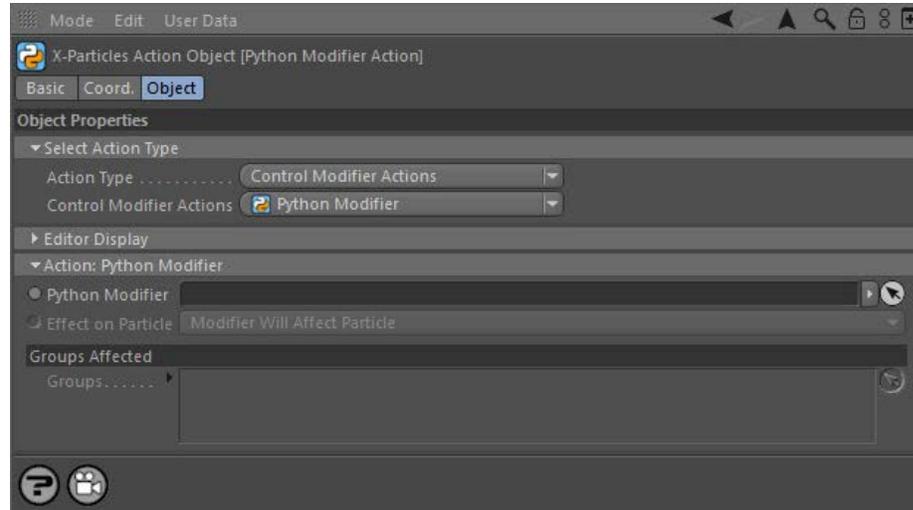
Action: Python Modifier

This Action lets you control a Python modifier.

Important: this Action has NO EFFECT if the Python script in the modifier is using the `modify()` function. It only works if using the `modifyParticle()` function.

Interface

The action's interface looks like this:



Parameters

Python Modifier

This field accepts a Python modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Remember: this Action has NO EFFECT if the Python script in the modifier is using the `modify()` function. It only works if using the `modifyParticle()` function.

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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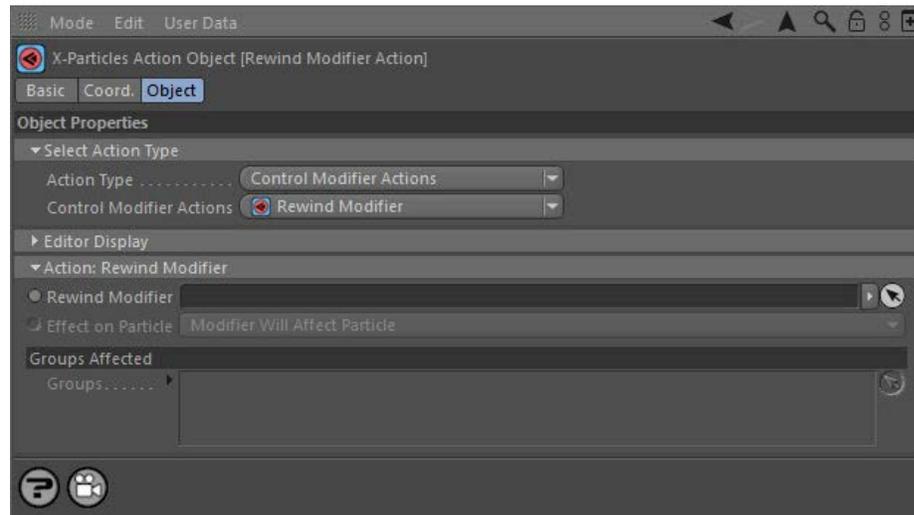
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Action: Rewind Modifier

This action gives control over a Rewind modifier.

Interface

The Action's interface looks like this:



Parameters

Rewind Modifier

This field accepts a Rewind modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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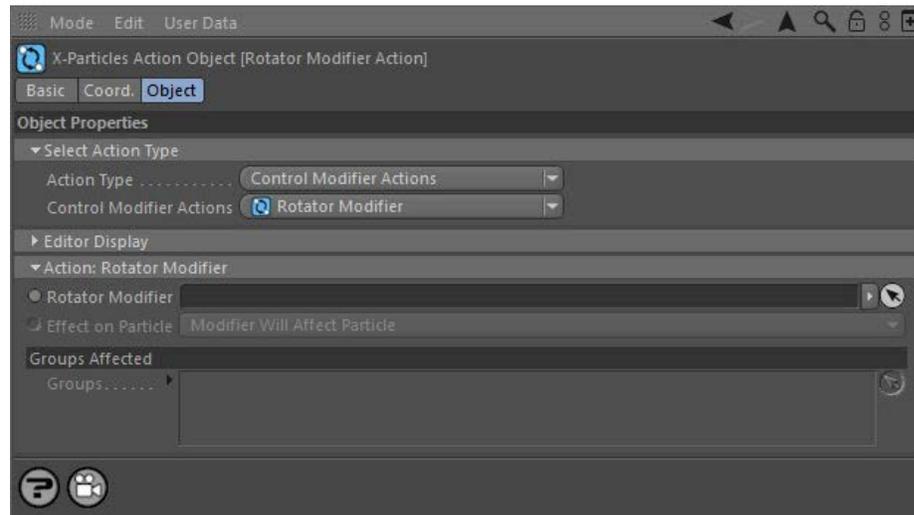
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Action: Rotator Modifier

This action gives control over a Rotator modifier.

Interface

The Action's interface looks like this:



Parameters

Rotator Modifier

This field accepts a Rotator modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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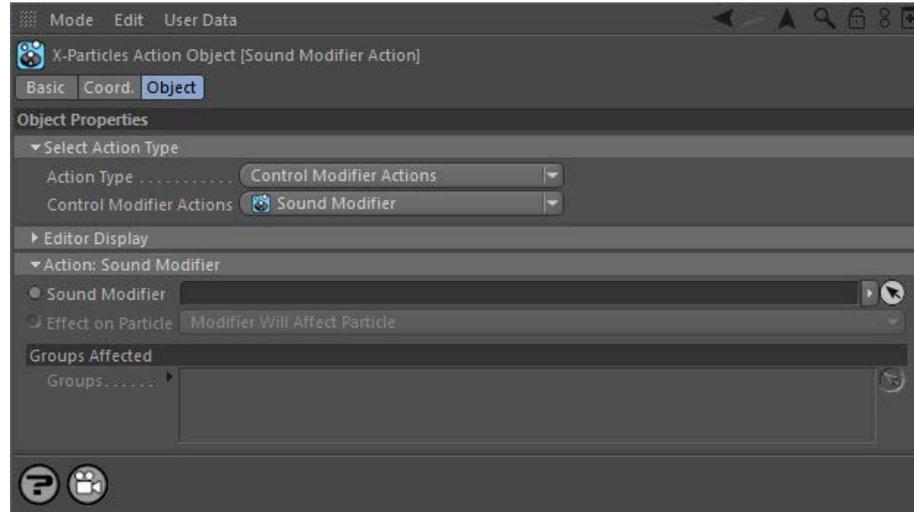
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Action: Sound Modifier

This action gives control over a Sound modifier.

Interface

The Action's interface looks like this:



Parameters

Sound Modifier

This field accepts a Sound modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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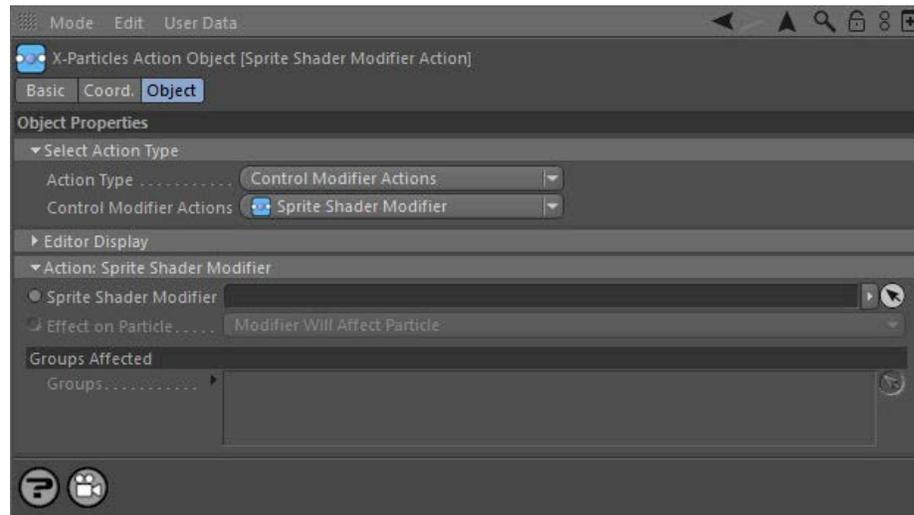
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- [Color](#)
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Action: Sprite Shader Modifier

As its name implies, this action will let you control the effect of a Sprite Shader modifier.

Interface

The Action's interface looks like this:



Parameters

Sprite Shader Modifier

This field accepts a Sprite Shader modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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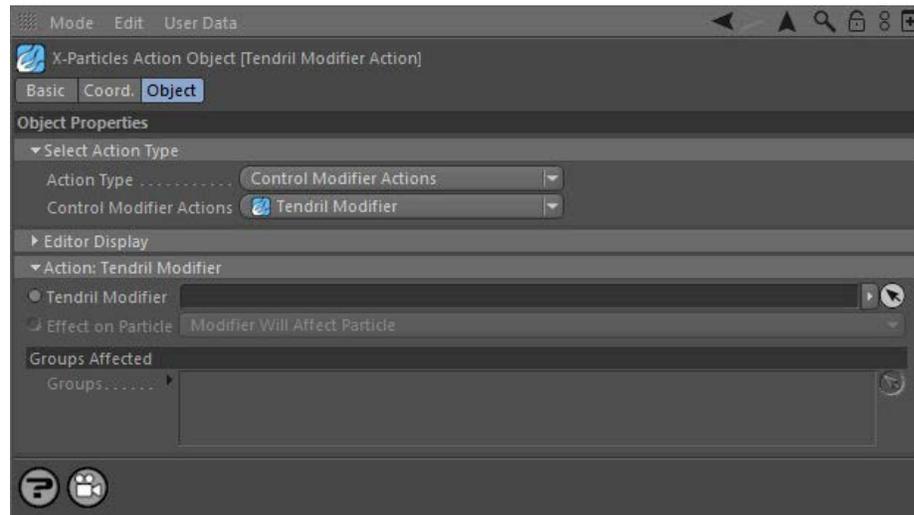
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Action: Tendril Modifier

This action gives control over a Tendril modifier.

Interface

The Action's interface looks like this:



Parameters

Tendril Modifier

This field accepts a Tendril modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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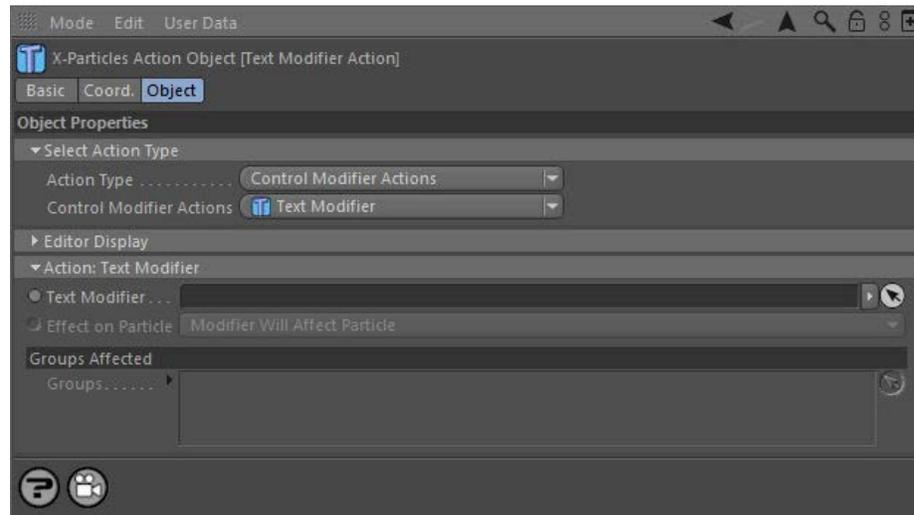
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- [Follow Surface](#)
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Action: Text Modifier

This action will let you manage the effect of a Text modifier on a particle.

Interface

The Action's interface looks like this:



Parameters

Text Modifier

This field accepts a Text modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

- [Limit](#)
- [Network](#)
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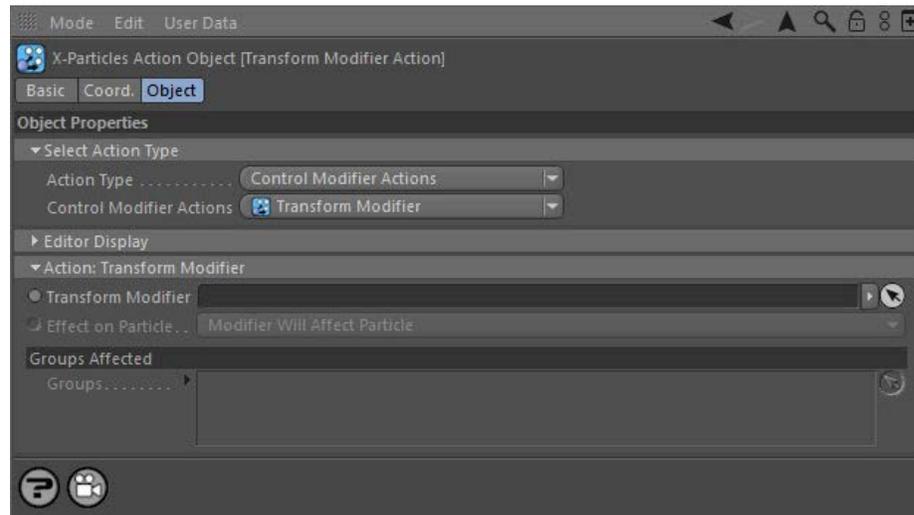
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Action: Transform Modifier

This action gives control over a Transform modifier.

Interface

The Action's interface looks like this:



Parameters

Transform Modifier

This field accepts a Transform modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

- [Limit](#)
- [Network](#)
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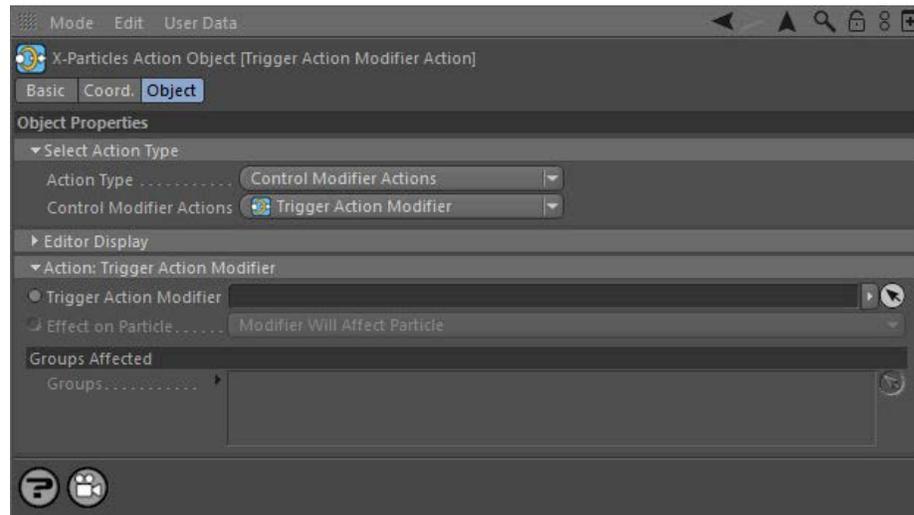
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Action: Trigger Action Modifier

This action will let you manage the effect of a Trigger Action Modifier.

Interface

The Action's interface looks like this:



Parameters

Trigger Action Modifier

This field accepts a Trigger Action modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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- [Sound](#)
- [Speed](#)
- [Spin](#)
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Particle Modifiers:

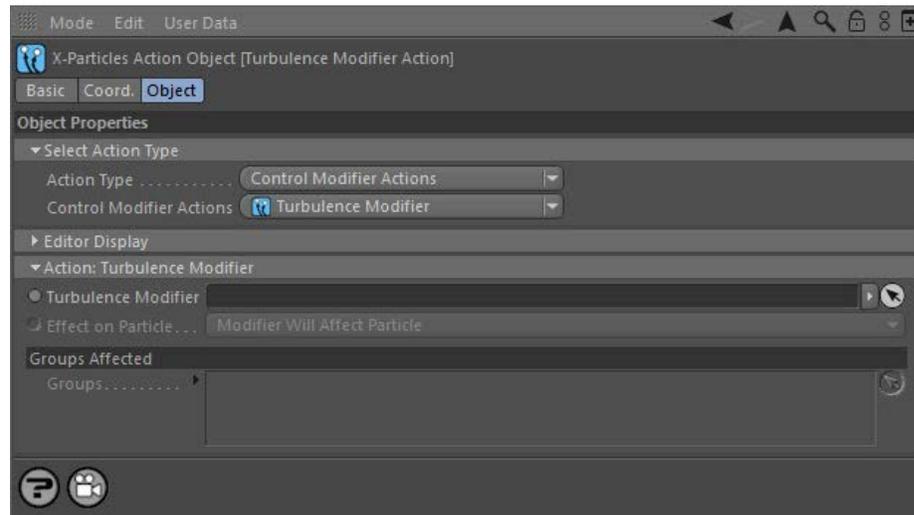
- --- Controller Modifiers ---
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Action: Turbulence Modifier

This action gives control over a Turbulence modifier.

Interface

The Action's interface looks like this:



Parameters

Turbulence Modifier

This field accepts a Turbulence modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

- [Limit](#)
- [Network](#)
- [Rotator](#)
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- [Speed](#)
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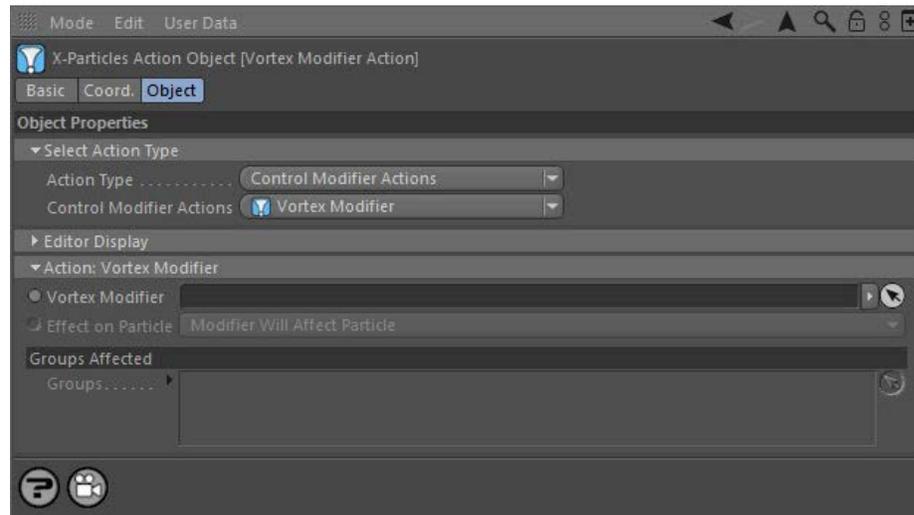
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- [Follow Surface](#)
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Action: Vortex Modifier

This action gives control over a Vortex modifier.

Interface

The Action's interface looks like this:



Parameters

Vortex Modifier

This field accepts a Vortex modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

- [Limit](#)
- [Network](#)
- [Rotator](#)
- [Sound](#)
- [Speed](#)
- [Spin](#)
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Particle Modifiers:

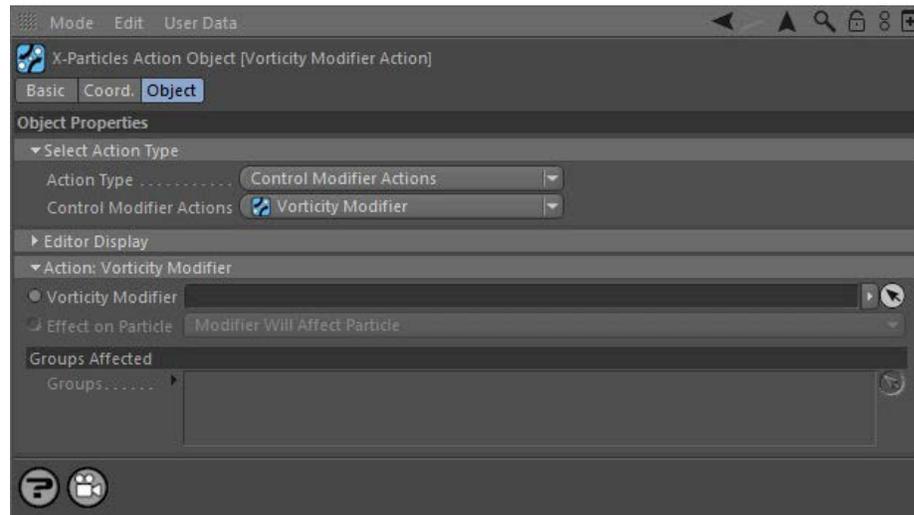
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Action: Vorticity Modifier

This action gives control over a Vorticity modifier.

Interface

The Action's interface looks like this:



Parameters

Vorticity Modifier

This field accepts a Vorticity modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

- [Limit](#)
- [Network](#)
- [Rotator](#)
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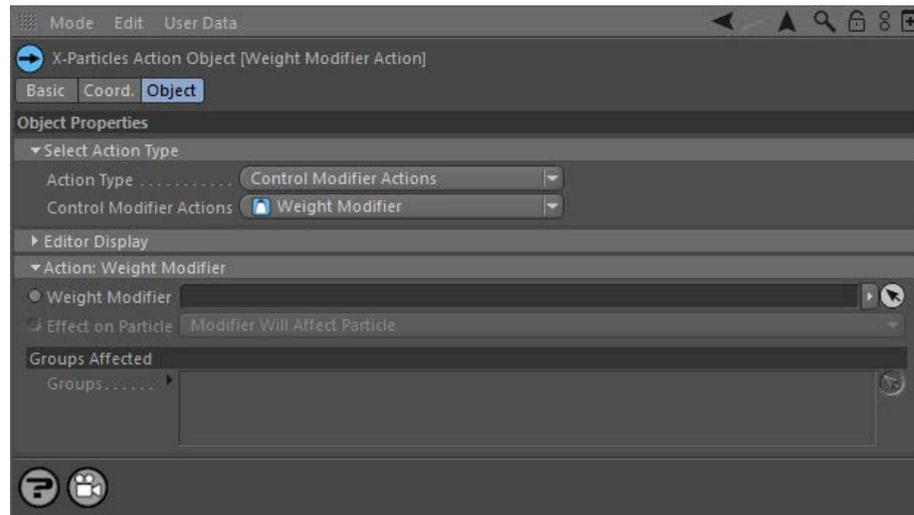
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Action: Weight Modifier

This action gives control over a Weight modifier.

Interface

The Action's interface looks like this:



Parameters

Weight Modifier

This field accepts a Weight modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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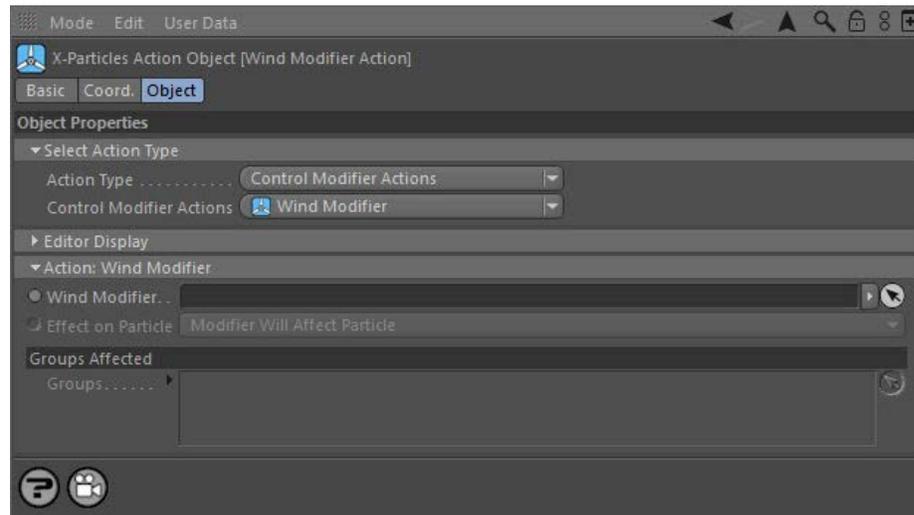
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Action: Wind Modifier

This action gives control over a Wind modifier.

Interface

The Action's interface looks like this:



Parameters

Wind Modifier

This field accepts a Wind modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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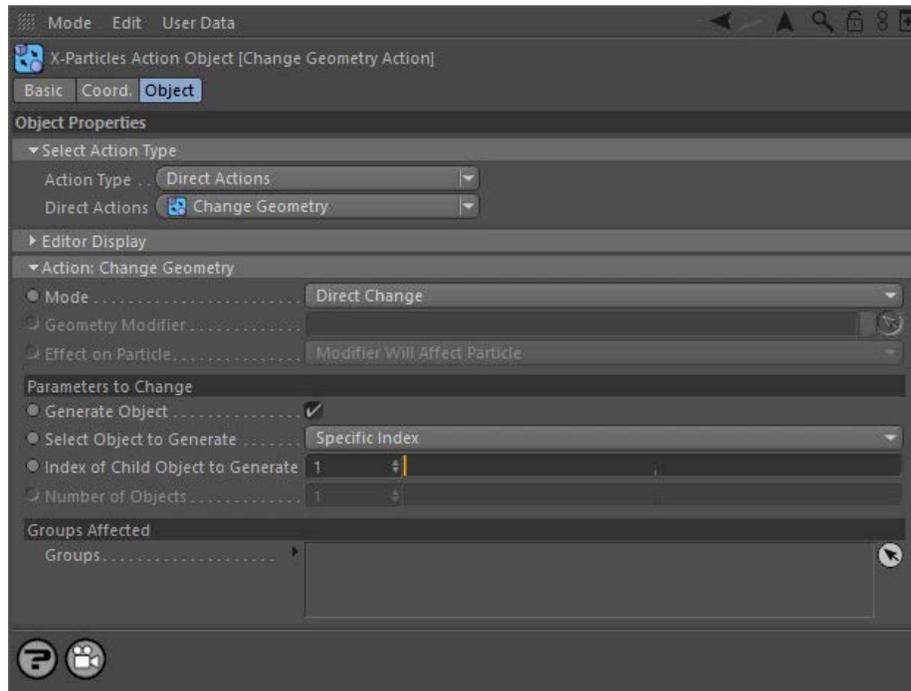
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Action: Change Geometry

This action will let you change the object(s) associated with the particle and produced by a Generator object. It can either affect particles directly, or act by changing a Geometry modifier in the scene.

Interface

The Action's interface looks like this:



Parameters

Mode

This sets the operation mode of the Action. There are two options:

Direct Change

The Action will directly alter the object associated with the particle(s) affected by the Action. It does NOT require a Geometry modifier. This lets you change generated geometry at a precise point without having to work indirectly through a modifier, which can be a little convoluted for such a simple alteration.

Control Modifier

In this case the Action will let you control the operation of a Geometry modifier in the scene.

Control Modifier Mode

Geometry Modifier

This field is only available if you choose 'Control Modifier' in the Mode setting.

This field accepts a Geometry modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Direct Change Mode

These are the parameters which can be changed in 'Direct Change' mode.

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Generate Object

If unchecked, this will cause the generator to stop generating objects for the affected particle.

Select Object to Generate

This drop-down allows you to specify how the Action will change the object to be generated. It has five options:

Specific Index

With this option you must then enter the index of the child object of the generator which will be generated. This is entered in the 'Index of child object to generate' field - see below.

Random

The Action will select randomly between the child objects of the generator. You must specify how many child objects you want to randomise between. This number is entered in the 'Number of Objects' field - see below. How this works is as follows. Suppose the generator has three child objects. If you enter '3' into the 'Number of Objects' field, the Action will choose randomly between all three. If you enter '2', it will only choose between the first two child objects and the third is ignored. Entering '4' would result in an object not being generated at all about 1 in 4 times, because the generator only has three child objects.

Sequential

The Action will change the object to the next child object of the generator. If the Action is triggered again, it will change to the next child object, and so on. Note that if it changes more times than there are child objects, it may run out of objects and nothing will be generated.

Sequential With Wrap

This is the same as the Sequential option but this time, when the Action finds no more child objects it will go back to the first one and the cycle will be repeated. You must enter the number of objects in the 'Number of Objects' field. For example, if the generator has four child objects and you enter '3' in the 'Number of Objects' field, the Action will cycle between objects 1, 2, and 3, and object 4 will be ignored.

Index of Child Object to Generate

This refers to the index of the child object of the generator linked to any Emitter which is affected by this Action (see the [Generator object](#) for more details). It is up to you to ensure that this index is valid. If you enter '3' into this field, and the Generator only has two child objects, nothing will be generated and the object will seem to just disappear. This parameter is only available if you choose 'Specific Index' in the 'Select Object to Generate' drop-down.

Number of Objects

This is the number of objects, used in conjunction with the 'Random' and 'Sequential With Wrap' options in the 'Select Object to Generate' drop-down.

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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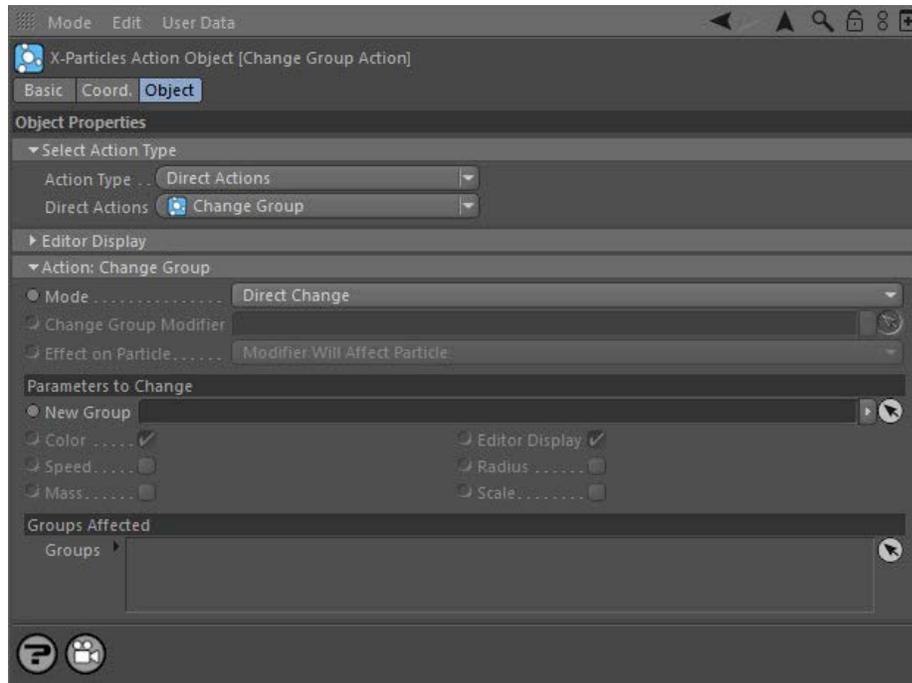
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Action: Change Group

This action either lets you change the group number of a particle directly, or gives control over a Change Group modifier. Since groups can now control other particle parameters such as colour, you can also select which of these parameters should also be changed when changing a group.

Interface

The Action's interface looks like this:



Parameters

Mode

This sets the operation mode of the Action. There are two options:

Direct Change

The Action will change the particle group directly. It does NOT require a Change Group modifier.

Control Modifier

In this case the Action will let you control the operation of a Change Group modifier in the scene.

Control Modifier Mode

Change Group Modifier

This field is only available if you choose 'Control Modifier' in the Mode setting.

This field accepts a Change Group modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Direct Change Mode

These are the parameters which can be changed in 'Direct Change' mode.

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- [Network](#)
- [Rotator](#)
- [Sound](#)
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- --- Direct Actions ---
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New Group

Drag the new group the particle will have into this field. If this field is empty, the action will have no effect.

In X-Particles 3, the particle group can now hold extra settings such as particle speed and colour. Changing a group simply tells the particle engine which group a particle belongs to. But it does not change any other particle settings unless one or more of the data fields in this action are checked. So for example, if you check Speed and Color, when the group changes the particle's speed and colour will be changed to the default settings given in the group's interface. If none of the options are checked, only the internal group number is changed (which may affect which modifiers work on the particle, for example).

Color, Editor Display, Speed, Radius, Mass, and Scale

These settings can all be checked or unchecked independently. For any checked setting, when the particle group is changed the particle will change those settings to the default setting of the new group.

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

- [Change Speed](#)
- [Change Spin](#)
- [Change Sprites](#)
- [Control Morphing](#)
- [Control Spawning](#)
- [Explode Particles](#)
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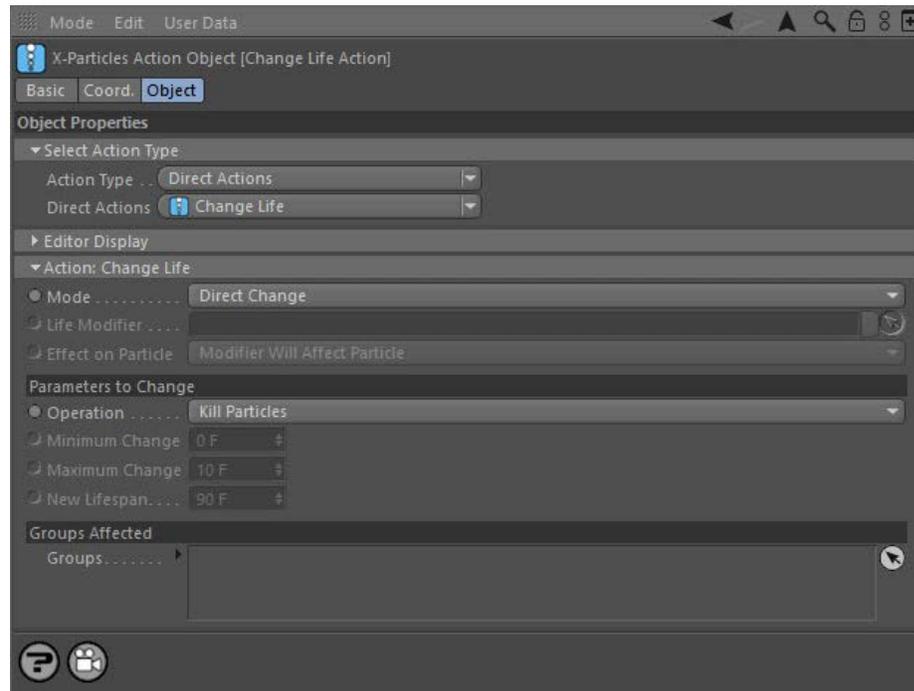
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Action: Change Life

As its name implies, this action will let you manage a particle's lifespan. It can either affect particles directly, or act by changing a Particle Life modifier in the scene.

Interface

The Action's interface looks like this:



Parameters

Mode

This sets the operation mode of the Action. There are two options:

Direct Change

The Action will directly alter the particle lifespan. It does NOT require a Particle Life modifier. This lets you change a particle's life at a precise point without having to work indirectly through a modifier, which can be a little convoluted for such a simple alteration.

Control Modifier

In this case the Action will let you control the operation of a Particle life modifier in the scene.

Control Modifier Mode

Life Modifier

This field is only available if you choose 'Control Modifier' in the Mode setting.

This field accepts a Life modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Direct Change Mode

These are the parameters which can be changed in 'Direct Change' mode.

- [Limit](#)
- [Network](#)
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- [Change Group](#)
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Operation

This setting has four modes:

Kill Particles

In this mode the action will kill particles, that is, remove them completely from the scene.

Increase Particle Lifespan and Decrease Particle Lifespan

Here the particle lifespan will be changed but the particle will not be killed. There are two values which you can change: these are the minimum and maximum possible changes to the lifespan. For example, if the minimum value is 5 frames and the maximum is 10 frames the lifespan will change by at least 5 frames and at most by 10 frames.

Set New Lifespan

This allows you to set the lifespan to a specific value, found in the 'New Lifespan' setting.

Minimum Change / Maximum Change

These are the values used when 'Operation' is set to 'Increase (or Decrease) Particle Lifespan'.

New Lifespan

Only available when 'Operation' is set to 'Set New Lifespan'. This is the new lifespan of the particle. Note that if the new lifespan is less than the particle age, the particle will immediately die.

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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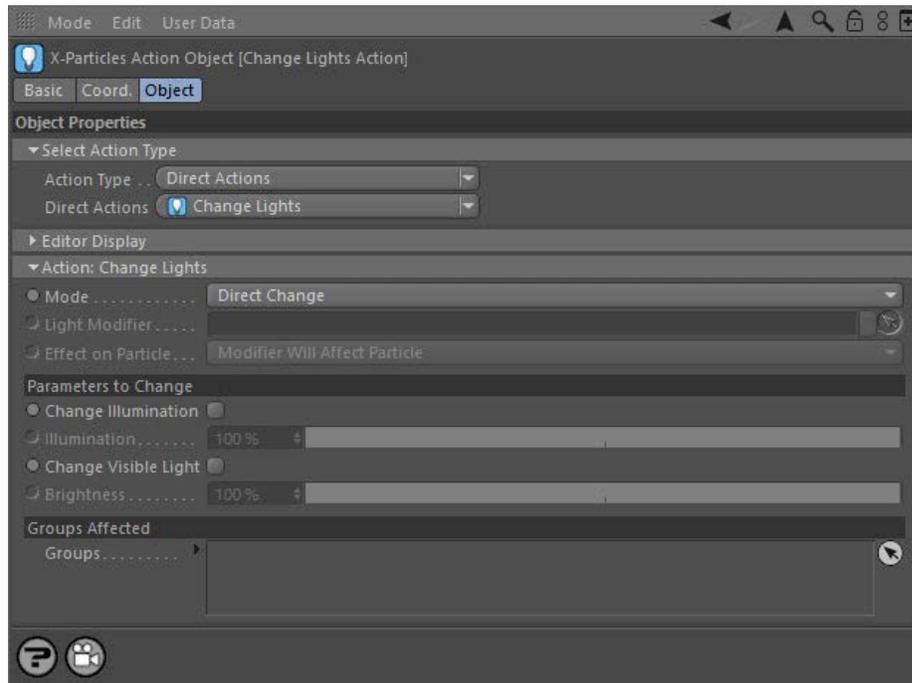
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Action: Change Lights

This action will let you vary the parameters of lights generated by a Sprite object. It can either affect particles directly, or act by changing a Light modifier in the scene.

Interface

The Action's interface looks like this:



Parameters

Mode

This sets the operation mode of the Action. There are two options:

Direct Change

The Action will directly alter the parameters of the light. It does NOT require a Light modifier. This lets you change the lights at a precise point without having to work indirectly through a modifier, which can be a little convoluted for such a simple alteration.

Control Modifier

In this case the Action will let you control the operation of a Light modifier in the scene.

Control Modifier Mode

Light Modifier

This field is only available if you choose 'Control Modifier' in the Mode setting.

This field accepts a Light modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Direct Change Mode

These are the parameters which can be changed in 'Direct Change' mode.

- [Limit](#)
- [Network](#)
- [Rotator](#)
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Change Illumination and Change Visible Light

To change either of the parameters in these two sections, you must first check the relevant button. If a button is left unchecked, those parameters will not be changed by the Action.

Illumination

The amount of illumination produced by the light. Note that the light will only illuminate if 'No Illumination' is unchecked in the Sprite object.

Brightness

The brightness of a visible light.

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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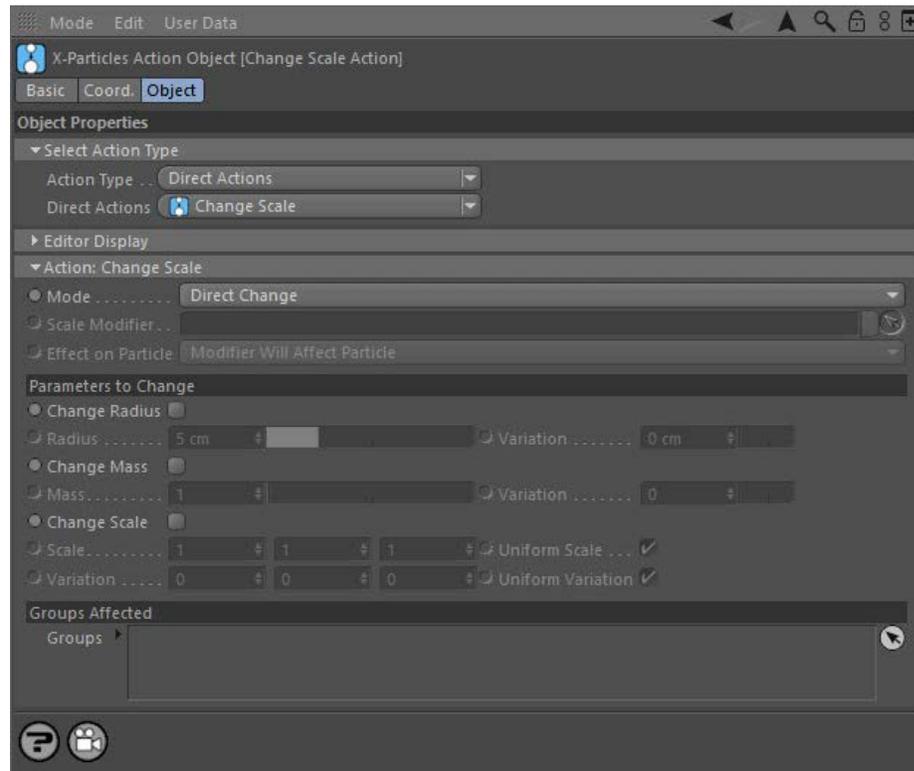
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Action: Change Scale

This action will let you manage the scale of a particle. It can either affect particles directly, or act by changing a Scale modifier in the scene.

Interface

The Action's interface looks like this:



Parameters

Mode

This sets the operation mode of the Action. There are two options:

Direct Change

The Action will directly alter the scale of the particle(s) affected by the Action. It does NOT require a Scale modifier. This lets you change the particle scale at a precise point without having to work indirectly through a modifier, which can be a little convoluted for such a simple alteration.

Control Modifier

In this case the Action will let you control the operation of a Scale modifier in the scene.

Control Modifier Mode

Scale Modifier

This field is only available if you choose 'Control Modifier' in the Mode setting.

This field accepts a Scale modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

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Direct Change Mode

These are the parameters which can be changed in 'Direct Change' mode.

Change Radius, Radius, Variation

If this switch is checked, the particle radius can be changed using the 'Radius' and 'Variation' settings.

Change Mass, Mass, Variation

If this switch is checked, the particle mass can be changed using the 'Mass' and 'Variation' settings.

Change Scale, Scale, Variation

If this switch is checked, the particle scale can be changed using the 'Scale' and 'Variation' settings,

Uniform Scale and Uniform Variation

A scale value has three settings, one for each dimension. Often, you want the scale to be the same on all three axes. It can be inconvenient to have to change each axis separately, so if if these switches are checked, you only need to change the scale on one axis and the others will conform with it.

If you need to set the scale independently on the three axes, uncheck one or both switches.

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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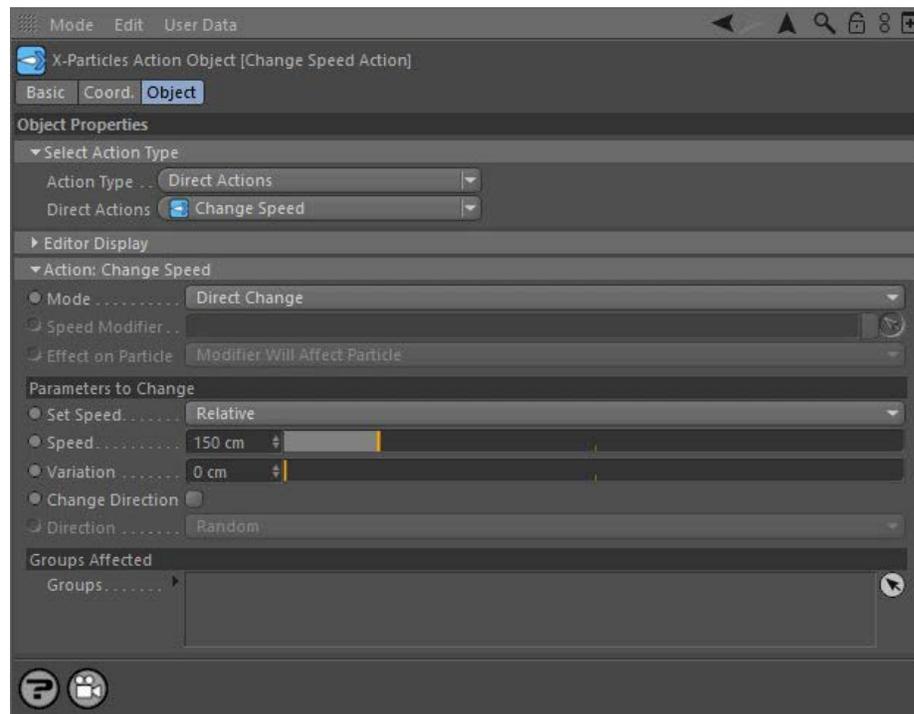
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Action: Change Speed

As its name implies, this action will let you manage a particle's speed. It can either affect particles directly, or by changing a Speed modifier in the scene.

Interface

The Action's interface looks like this:



Parameters

Mode

This sets the operation mode of the Action. There are two options:

Direct Change

The Action will directly alter the particle speed. It does NOT require a Speed modifier. This lets you change a particle's speed at a precise point without having to work indirectly through a modifier, which can be a little convoluted for such a simple alteration. However, one potential disadvantage is that using this method will cause an abrupt speed change, rather than the smooth change you can achieve with a modifier as the particle passes through the field of the effect.

Control Modifier

In this case the Action will let you control the operation of a Speed modifier in the scene.

Control Modifier Mode

Speed Modifier

This field is only available if you choose 'Control Modifier' in the Mode setting.

This field accepts a Speed modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Direct Change Mode

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These are the parameters which can be changed in 'Direct Change' mode.

Set Speed

This drop-down has two modes:

- Relative: the speed given in the Speed field is added to the particle's current speed
- Absolute: the speed given in the Speed field becomes the particle's speed

Speed

The particle's new speed.

Variation

A random variation of the speed given in the Speed field.

Change Direction

Check this switch to change the particle's direction, using the setting in the Direction field.

Direction

This drop-down can be used to change the direction of the particle. The available settings are:

- Random: each particle adopts a random direction
- X+ axis: the particle travels along the world's positive X-axis
- Y+ axis: the particle travels along the world's positive Y-axis
- Z+ axis: the particle travels along the world's positive Z-axis
- X- axis: the particle travels along the world's negative X-axis
- Y- axis: the particle travels along the world's negative Y-axis
- Z- axis: the particle travels along the world's negative Z-axis

You can use the Direction drop-down to change the particle's direction but that isn't it's primary purpose. The reason it is included is as follows.

The velocity of a particle consists of two things: the direction in which it moves and the speed with which it moves. Because of the way velocity is implemented in 3D calculations, setting the speed of a particle to zero will also remove its direction. A particle with zero speed will then have a 3D direction of 0,0,0 which means it is completely stationary; in addition, it cannot be given a speed unless it is also given a direction.

This is a problem because some of the modifiers in X-Particles can set the particle speed to zero. Or, you may want to set the initial speed of the particle when emitted to zero, then start it moving later. With a speed of zero, the particle is halted and no modifier will be able to move it. To get such a particle moving again, this Action is required. Once moving, it will be influenced by the particle modifiers as usual.

The Direction setting is therefore intended for use with particles which currently have zero speed. For changing the direction of already moving particles, it is recommended that you use the **Direction modifier** instead, as this will give you better control over the particle's direction.

Note: this Action can NOT be used to restart a particle which has been frozen with the Freeze tag or Freeze modifier! These objects do not set the particle speed to zero (although they can) but simply stop the processing of any particle movement. Do not try to use this Action to restart frozen particles, as it will have no effect.

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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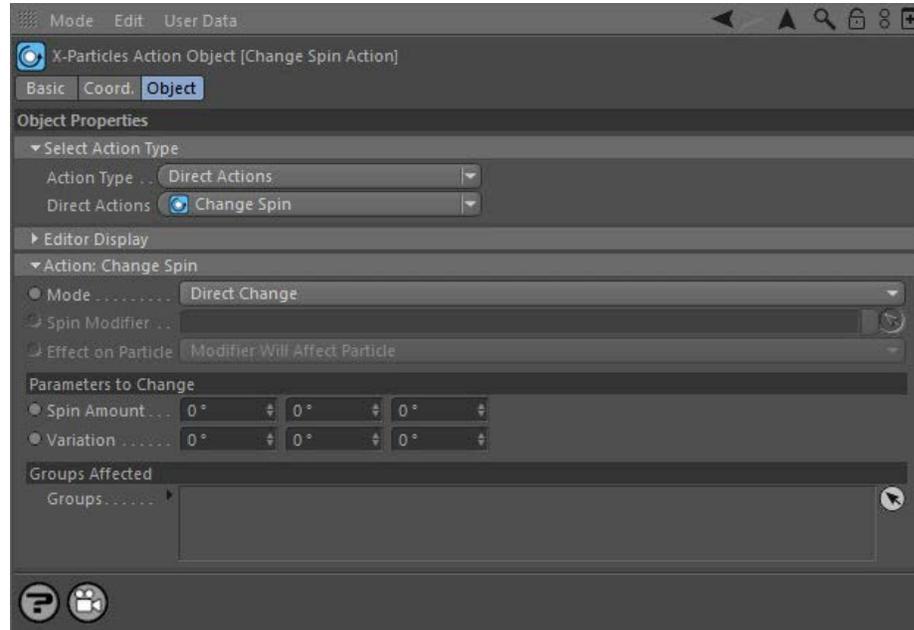
Action: Change Spin

This action will let you change a particle's spin. It can either affect particles directly, or act by changing a Spin modifier in the scene.

Note: particle rotations must be enabled in the emitter for this action to have any effect!

Interface

The Action's interface looks like this:



Parameters

Mode

This sets the operation mode of the Action. There are two options:

Direct Change

The Action will change the spin of the particle(s) affected by the Action. It does NOT require a Spin modifier. This lets you change the spin at a precise point without having to work indirectly through a modifier, which can be a little convoluted for such a simple alteration.

Important: unlike a modifier, which will affect particles emitted from all Emitters in the scene, direct mode will only affect particles emitted by the Emitter linked to the Question which has triggered this Action.

Control Modifier

In this case the Action will let you control the operation of a Spin modifier in the scene.

Control Modifier Mode

Spin Modifier

This field is only available if you choose 'Control Modifier' in the Mode setting.

This field accepts a Spin modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

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These are the parameters which can be changed in 'Direct Change' mode.

Spin Amount

Sets the amount of spin on all three axes.

Variation

Allows some variation in the amount to be introduced for each particle.

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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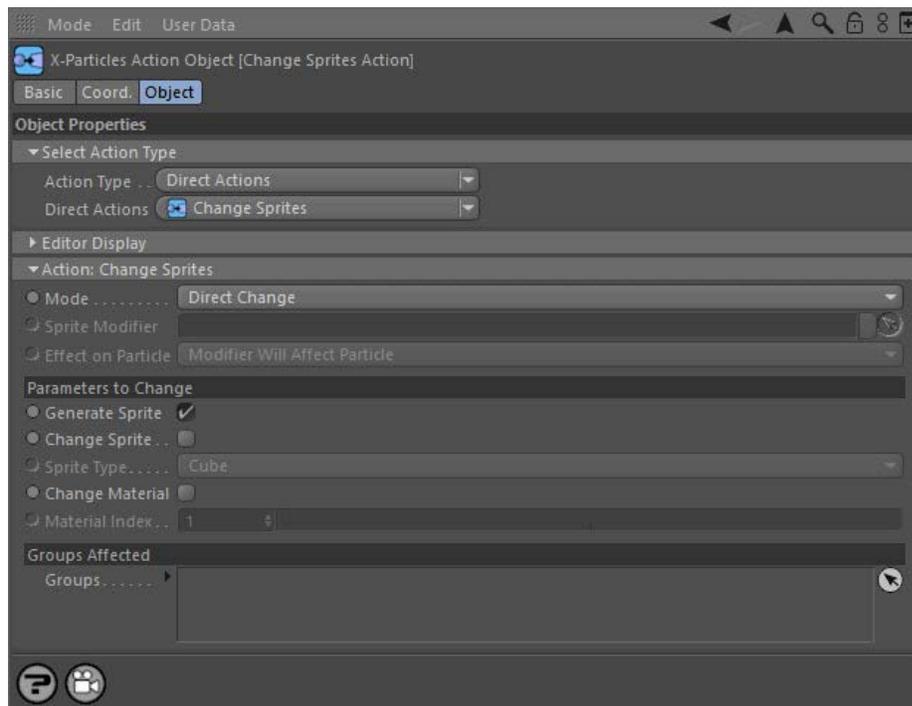
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Action: Change Sprites

This action will let you change the object generated by a Sprite object, or the material applied to the sprite. It can either affect particles directly, or act by changing a Sprite modifier in the scene.

Interface

The Action's interface looks like this:



Parameters

Mode

This sets the operation mode of the Action. There are two options:

Direct Change

The Action will directly alter the sprite associated with the particle(s) affected by the Action. It does NOT require a Sprite modifier. This lets you change the sprite or its material at a precise point without having to work indirectly through a modifier, which can be a little convoluted for such a simple alteration.

Control Modifier

In this case the Action will let you control the operation of a Sprite modifier in the scene.

Control Modifier Mode

Sprite Modifier

This field is only available if you choose 'Control Modifier' in the Mode setting.

This field accepts a Sprite modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

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These are the parameters which can be changed in 'Direct Change' mode.

Generate Sprite

If unchecked, this will cause the generator to stop generating sprites for the affected particle.

Change Sprite and Sprite Type

If the 'Change Sprite' button is checked, you can use the 'Sprite Type' drop-down to select which object is generated by the Sprite object. So for example, you could use this to change spheres to lights.

Note: if you change the sprite type, make sure you have changed any parameters in the Sprite object to the ones you want for the new type before you use this action to change the sprite.

Change Material and Material Index

If the 'Change Material' button is checked, you can use the 'Material Index' field to select which material is applied to objects generated by the Sprite object. The index refers to the Textures list in the [Textures tab](#) of the Sprite object. It is up to you to make sure that the index refers to a valid material. For example, if you specify an index of 2, and there is only one material in the 'Textures' list of the Sprite object, no material will be applied to the sprite.

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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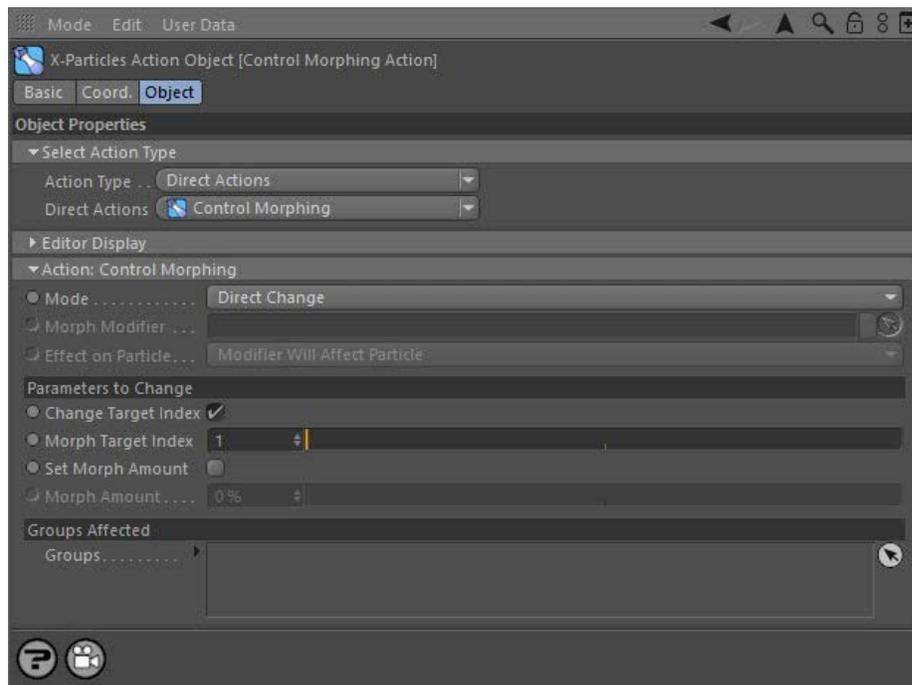
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Action: Control Morphing

This action gives control over the morphing of generated objects. It can do so either by acting directly on the particle, or by controlling a Morph modifier.

Interface

The Action's interface looks like this:



Parameters

Mode

This sets the operation mode of the Action. There are two options:

Direct Change

The Action will directly alter the particle morphing. It does NOT require a Morph modifier. This lets you control morphing at a precise point without having to work indirectly through a modifier.

Control Modifier

In this case the Action will let you control the operation of a Morph modifier in the scene.

Control Modifier Mode

Morph Modifier

This field is only available if you choose 'Control Modifier' in the Mode setting.

This field accepts a Morph modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Direct Change Mode

These are the parameters which can be changed in 'Direct Change' mode.

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Change Target Index, Morph Target Index

These settings work identically to the settings 'Change Morph Target' and 'Morph Target Index' in the morph modifier. Please refer to the [Morph modifier](#) for details.

Set Morph Amount

If this switch is checked, the amount that the object is morphed will be changed to the value in the 'Morph Amount' setting.

Morph Amount

The amount to morph an object associated with the affected particle.

Groups Affected

Drag the particle Group object(s) you want to be affected by the modifier into the 'Groups Affected' list. If the list contains at least one group, groups not in the list will not be affected. But if no groups are in the list, all groups are affected.

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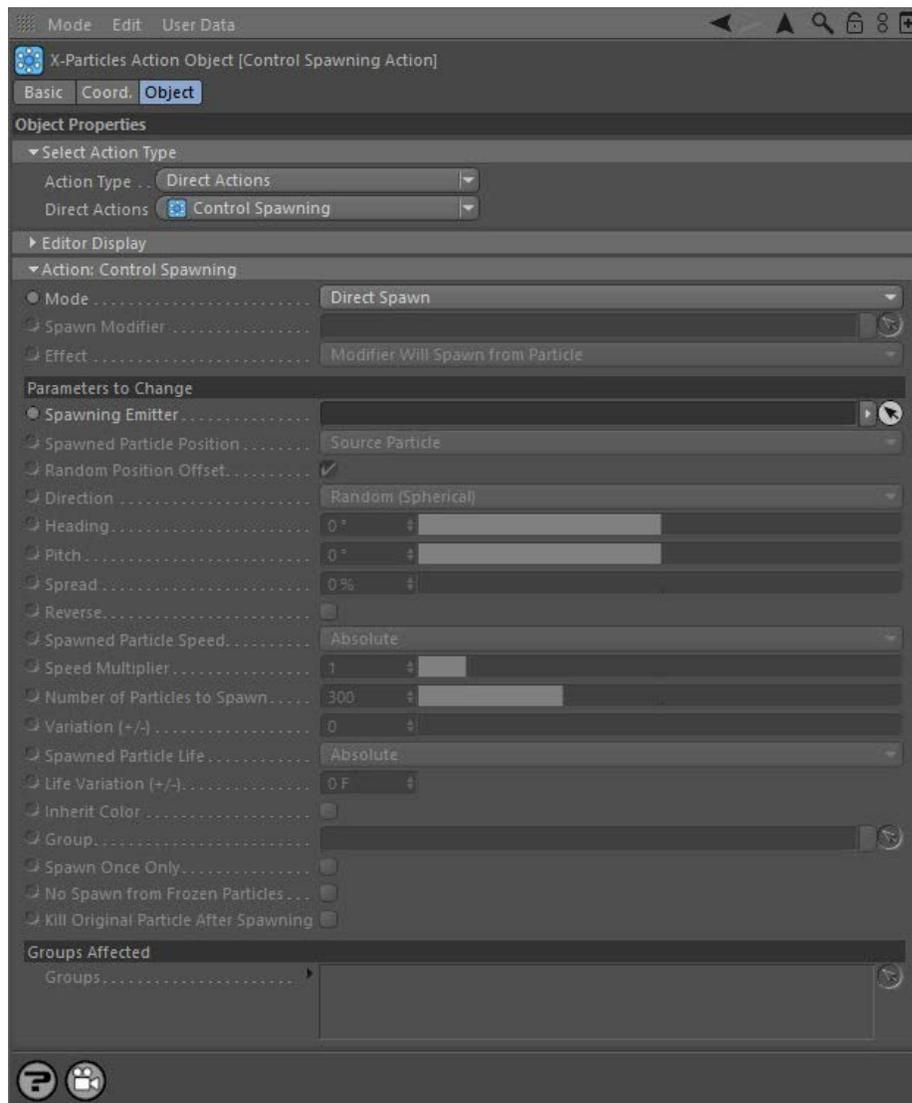
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Action: Control Spawning

This action will let you manage the spawning of particles. It can either spawn particles directly, or act by changing a Spawn modifier in the scene.

Interface

The Action's interface looks like this:



Parameters

Mode

This sets the operation mode of the Action. There are two options:

Direct Spawn

The Action will spawn new particles directly from a source particle. It does NOT require a Spawn modifier, but it does require that you specify a spawning emitter. This mode lets you spawn new particles at a precise point without having to work indirectly through a modifier, which can be a little convoluted for a simple operation.

Control Modifier

In this case the Action will let you control the operation of a Spawn modifier in the scene.

Control Modifier Mode

Spawn Modifier

This field is only available if you choose 'Control Modifier' in the Mode setting.

This field accepts a Spawn modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

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Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Direct Change Mode

These are the parameters which can be changed in 'Direct Spawn' mode.

Spawning Emitter

In Direct Spawn mode, an emitter must be dropped into this field. Particles will be spawned from this emitter.

All other settings

The remaining parameters are identical to those used in the [Spawn modifier](#) itself: please refer to the documentation for the [Spawn modifier](#) for details.

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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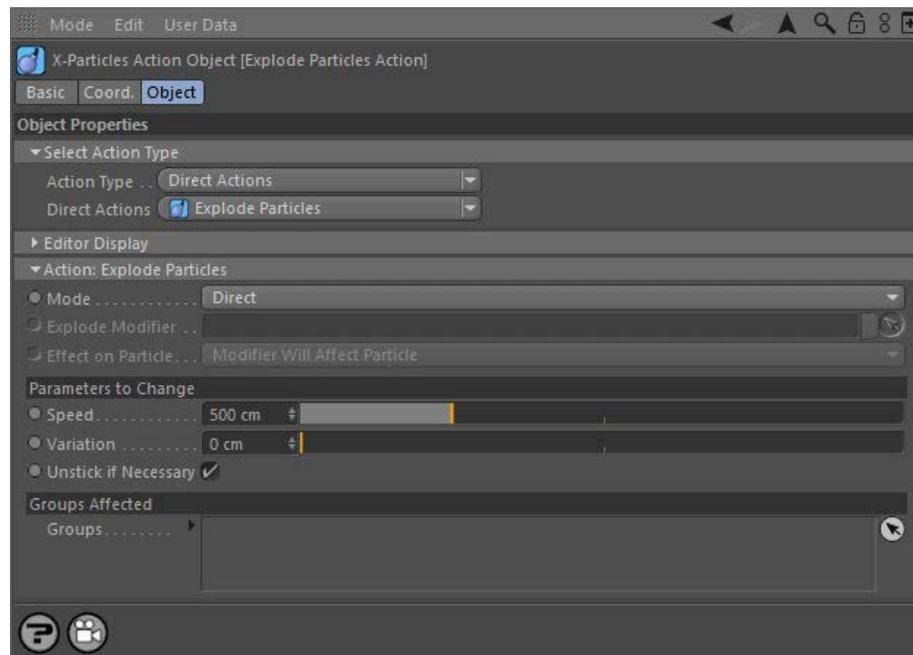
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Action: Explode Particles

This action will let you 'explode' particles away from their current position. It can either affect particles directly, or act by changing an Explode modifier in the scene.

Interface

The Action's interface looks like this:



Parameters

Mode

This sets the operation mode of the Action. There are two options:

Direct Change

The Action will cause the particles to be exploded away from their current position. It does NOT require an Explode modifier. This lets you explode the particles at a precise point without having to work indirectly through a modifier, which can be a little convoluted for such a simple alteration.

Control Modifier

In this case the Action will let you control the operation of an Explode modifier in the scene.

Control Modifier Mode

Explode Modifier

This field is only available if you choose 'Control Modifier' in the Mode setting.

This field accepts an Explode modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Direct Change Mode

These are the parameters which can be changed in 'Direct Change' mode.

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Speed and Variation

This the speed (with variation, if any) that the particles will be given when the explosion occurs.

Unstick if Necessary

If a particle is stuck to an object, for example by a Cover/Target modifier or by sticking the particle to an object at emission, the particle must be unstuck for this modifier to work. This will be done automatically if this switch is checked. Otherwise you will have to use another Action to unstuck the particle first.

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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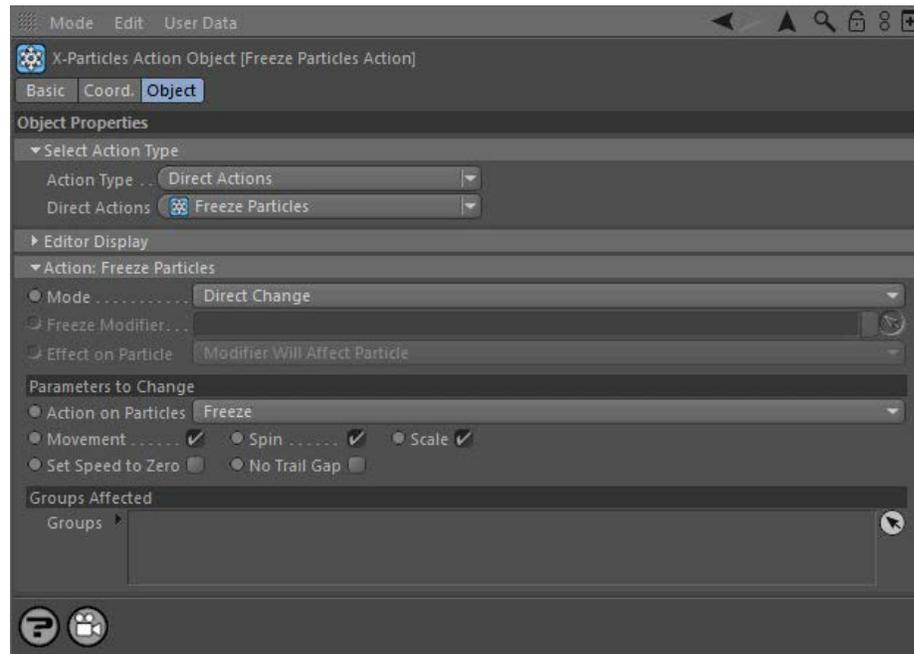
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Action: Freeze Particles

This action either lets you halt the movement, spin, or scaling of particles directly, or gives you control over a Freeze modifier in the scene.

Interface

The Action's interface looks like this:



Parameters

Mode

This sets the operation mode of the Action. There are two options:

Direct Change

The Action will freeze the movement, spin, or scaling of the particle directly. It does NOT require a Freeze modifier. This lets you halt or restart a particle at a precise point without having to work indirectly through a modifier, which can be a little convoluted for such a simple alteration.

Control Modifier

In this case the Action will let you control the operation of a Freeze modifier in the scene.

Control Modifier Mode

Freeze Modifier

This field is only available if you choose 'Control Modifier' in the Mode setting.

This field accepts a Freeze modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Effect on Particle

This drop-down menu has two modes:

Modifier Will Affect Particle

In this mode the modifier will start to influence the particular particle which is affected by this Action. Once the particle is influenced by a modifier, that influence will continue until the effect is turned off (e.g. by another Action).

Note that whether the modifier actually has any effect on the particle will depend on the modifier's parameters and especially on its falloff. Even if the modifier is set to effect a particle, it may have no effect on it if the particle never enters the field of effect of the modifier.

Modifier Will NOT Affect Particle

In this mode, the modifier's influence on the particle will be turned off and the modifier will never affect the particle, unless it is turned back on again (e.g. by another Action).

Direct Change Mode

These are the parameters which can be changed in 'Direct Change' mode.

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Freeze

The Action will freeze the particle (bring it to a stop).

Unfreeze

The Action will unfreeze frozen particles and they will start moving again. If a particle is not frozen then the Action will have no effect on it if this mode is selected.

Movement/Spin/Scale

Check these buttons to specify which parameters are frozen/unfrozen. For example, you can choose to stop a spinning particle from moving but keep spinning, or halt any change in scale but keep the particle moving. If no buttons are checked, the Action will have no effect.

Set Speed to Zero

When a particle is frozen, it keeps its current speed value, although it cannot be moved. If it is unfrozen again, it will move with the speed and direction it had before it was frozen. Occasionally this is a problem; suppose you test a particle for speed in a Question object, then you might expect a frozen particle to have a speed of zero, but it may not. If it is important that any frozen particle also has its speed set to zero, check this switch.

No Trail Gap

Sometimes, if you are generating a trail from a particle and you freeze the particle, the trail may not extend right up to the frozen particle, leaving a gap. This might not matter, but if it does, check this switch.

(This happens due to Cinema 4D's priority system, which forces certain events to take place before others. In this case, freezing a particle will stop the trail from extending in length but will only stop moving the particle after it has moved the distance it would move in that frame - this is why the gap appears. You can see more about priorities [on this page.](#))

Groups Affected

Drag any particle group objects into this list. If there is one or more groups in the list, only those particles which are in those groups will be affected by the action. But if there are no groups, all particles will be affected by the action.

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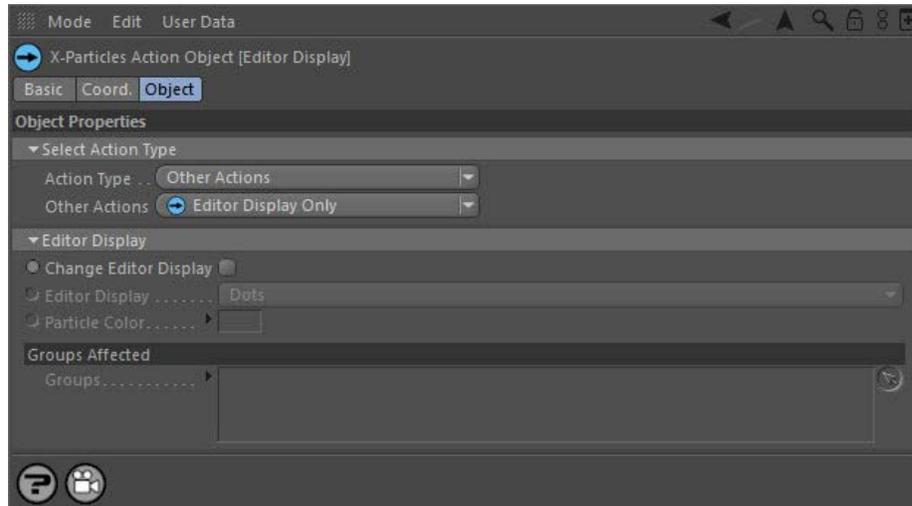
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Action: Editor Display Only

This action is always available, in addition to any other action type you select. It allows you to change the particle shape and the particle colour in the same way as in the emitter's Display tab. Normally, this only causes changes to the display of particles in the editor, and does not change anything at render time. However, if you render particles with the [X-Particles Material](#) and choose 'Use Particle Color' in that material then of course the particle colour is used.

The usefulness of this action becomes apparent when trying to work out why a setup isn't behaving as it should. By changing the colour, shape, etc. of the particles, you can see if and/or when an action should be taking place. If you don't see the change in the editor that you expect, either the Question object which triggers this action is not being passed, or the action is disabled, etc.



You can use the Action settings to change the particle shape and colour in the same way as in the [Display tab of the emitter](#).

Change Editor Display

Check this switch to change the particle type and colour.

Editor Display

The particle display type in the editor - Dots, Lines, etc.

Particle Color

The new particle color.

Groups Affected

Drag the particle Group object(s) you want to be affected by the modifier into the 'Groups Affected' list. If the list contains at least one group, groups not in the list will not be affected. But if no groups are in the list, all groups are affected.

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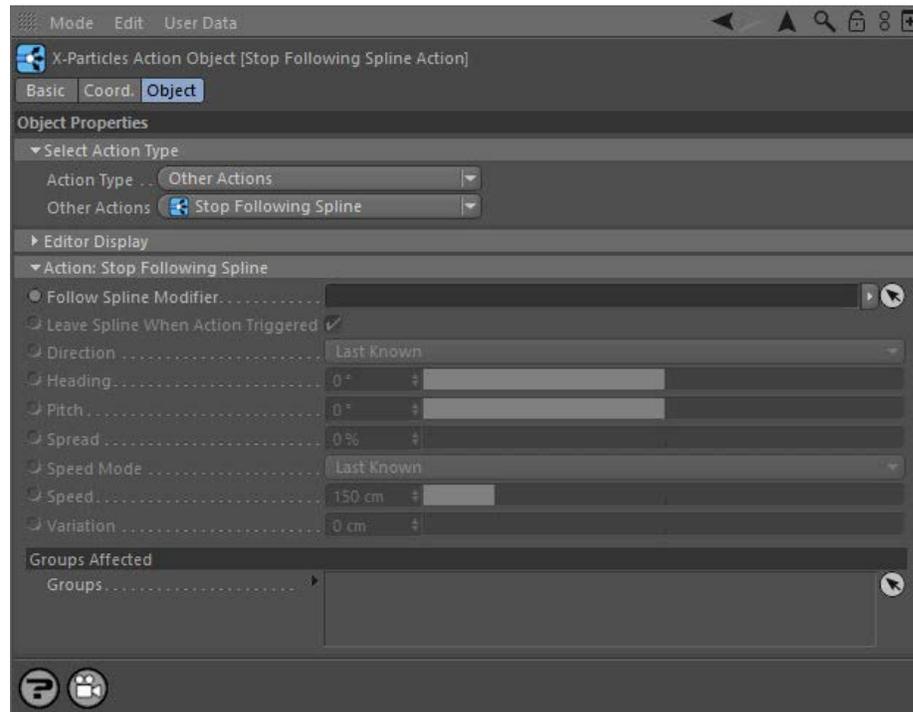
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Action: Stop Following Spline

This Action is only useful when particles are moving along a spline. It is used to break the particles away from the spline path.

Interface

The Action's interface looks like this:



Parameters

Follow Spline Modifier

This field accepts a Follow Spline modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

Leave Spline When Action Triggered

If this switch is checked, then when the Action is triggered the particle will stop moving along the path of the spline. What speed and direction they will take is determined by the 'Direction' and 'Speed mode' parameters. If this switch is unchecked, the particle will continue to move along the spline with unchanged speed and direction.

Direction

When the particle stops moving along the spline, it must have a direction and speed or it will just sit where it stops. The direction is determined by this setting:

Last Known

As the particle moves along the spline its direction of travel is constantly updated as the path changes. With this setting, when the particle stops following the spline it will use the direction it last had before it stopped moving along the spline.

Random

When the particle stops moving along the spline it will take a random direction - in practice a group of particles will adopt a spherical distribution.

New Direction

With this option you can set the new direction in the 'Heading' and 'Pitch' fields. These work in exactly the same way as the **Direction modifier** when the modifier's 'Operation' setting is set to 'Absolute'.

Heading, Pitch

These settings are only available in 'New Direction' mode. 'Heading' is the particle heading (corresponding to the 'H' angle in an object rotation). 'Pitch' is the particle pitch (corresponding to the 'P' angle in an object rotation). A 'Bank' setting (the 'B' angle in an object rotation) is not required to set the direction. Note that these are absolute values in the 3D world where a heading and pitch both set to zero will move the particles along the world's positive Z-axis.

Spread

This field is not available when 'Direction' is set to 'Random'. In other modes this will fan the particles out along the axis of movement. 'Spread' is a deviation to the particle direction, in percentage terms, from the direction given by the 'Heading' and/or 'Pitch' settings. Given a low value

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of, say, 10%, this causes the particles to produce a narrow cone either side of the initial path; set to 100%, you will get a hemisphere of particles.

Speed Mode

As with Direction, the particle speed when it stops following the spline is determined by this setting:

Last Known

The particle keeps the same speed that it had when moving along the spline.

New Speed

With this option you can set a new speed for the particles in the 'Speed' field. This is identical to the Speed setting in the Emitter.

Speed

The new particle speed if 'New Speed' was selected in the 'Speed mode' drop-down.

Variation

This will build some variation into the actual speed of each particle.

Groups Affected

Drag the particle Group object(s) you want to be affected by the modifier into the 'Groups Affected' list. If the list contains at least one group, groups not in the list will not be affected. But if no groups are in the list, all groups are affected.

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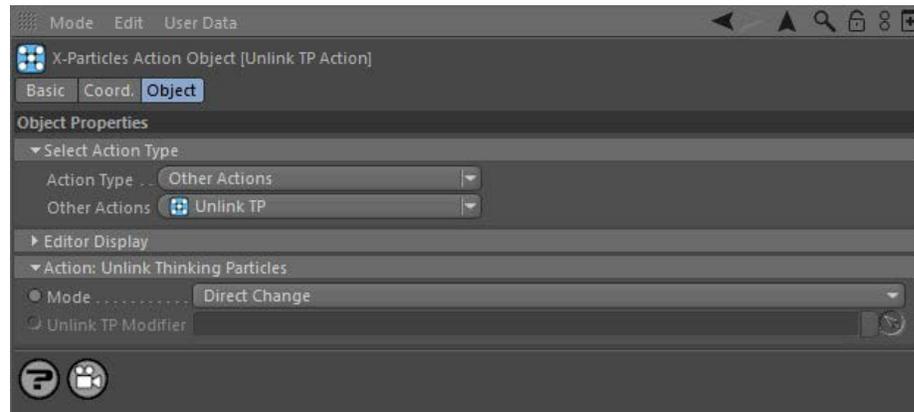
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Action: Unlink TP

This action unlinks a Thinking Particles (TP) particle from its corresponding X-Particle. It can either do so directly, or can act by changing an Unlink TP modifier in the scene.

Interface

The Action's interface looks like this:



As explained in the [Emitter object](#), X-Particles can be set to generate Thinking Particles as well as its own, internal particles. It is possible, using a switch in the emitter, to disconnect the generated Thinking Particles from the control of the X-Particles system. This is a global, all-or-none setting.

But what if you want to keep a specific Thinking Particle under X-Particles control until a certain time, then release it so that you can use other TP forces, presets, etc. on it? That is what this Action does. When triggered, it will unlink a Thinking Particle from its corresponding X-Particle. You can do this by using the Action in direct mode, or by using it to control an Unlink TP modifier.

Parameters

Mode

This sets the operation mode of the Action. There are two options:

Direct Change

The Action will directly unlink the particle affected by the Action. It does NOT require an Unlink TP modifier. This lets you unlink Thinking Particles at a precise point without having to work indirectly through a modifier, which can be a little convoluted for such a simple alteration.

Control Modifier

In this case the Action will activate an Unlink TP modifier so that it will unlink the particle.

Note: this action can only enable a modifier for a particle. It cannot disable such a modifier because there is no effect the modifier carries out which can be turned off.

Control Modifier Mode

Unlink TP Modifier

This field is only available if you choose 'Control Modifier' in the Mode setting.

This field accepts an Unlink TP modifier which you drag into the field from the Object Manager. Without a linked modifier, you cannot access any of the other parameters and the Action will have no effect. In addition, in the modifier's interface the Mode parameter MUST be set to 'Action-Controlled'. If it is set to 'Independent' the modifier will simply work on its own like any of the standard Cinema 4D modifiers and the Action will have no effect on it.

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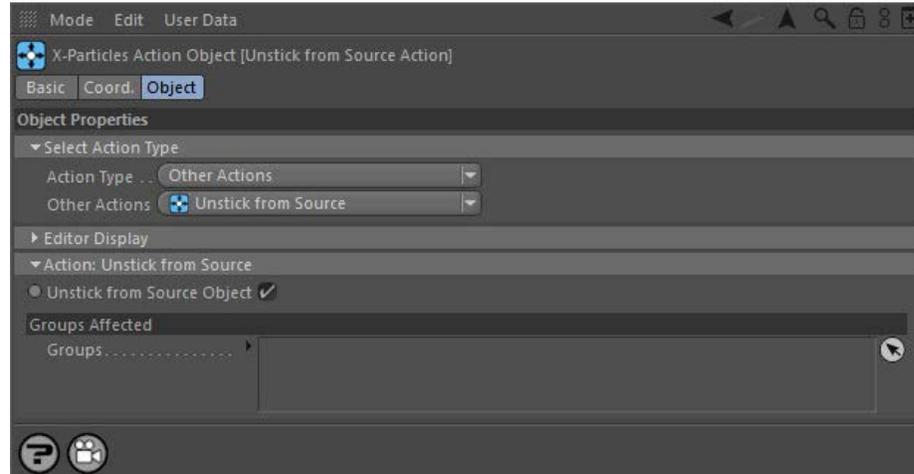
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Action: Unstick From Source Object

This action will 'unstick' particles emitted from a source object and which were stuck to the object on emission.

Interface

The Action's interface looks like this:



Parameters

Unstick From Source Object

The interface is extremely simple and only has this one setting. If a particle was stuck to its source object on emission (see the Emitter object for details) then it will remain stuck until unstuck by this action.

Note that this is quite different from the Cover/Target modifier which moves particles to an object and sticks them to it - the Unstick action only affects particles which were stuck to the object they were emitted from. It has NO effect on the Cover/Target modifier.

Groups Affected

Drag the particle Group object(s) you want to be affected by the modifier into the 'Groups Affected' list. If the list contains at least one group, groups not in the list will not be affected. But if no groups are in the list, all groups are affected.

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Online Updater

X-Particles includes an online updating system. This allows us to distribute bug fixes and updates much faster than if we have to bundle them all up in a service release and notify you so that you can download and install them.

How it works

By default, the updater is set to check for new updates every time you start up Cinema 4D. After that it won't check again until you close and restart Cinema, but you can make it perform a check at any time by clicking the 'X-Particles Online Updater' entry in the X-Particles main menu. The updater performs two separate checks: firstly, for updated documentation and secondly for updates to the plugin files themselves. If it finds any updates, it then offers you the chance to install them. Updating the documentation occurs without the need to restart Cinema, but if the plugin itself is updated, Cinema will be restarted automatically during the process.

If you don't want the updater to check for updates when Cinema starts, you can turn this option off in the [X-Particles preferences](#).

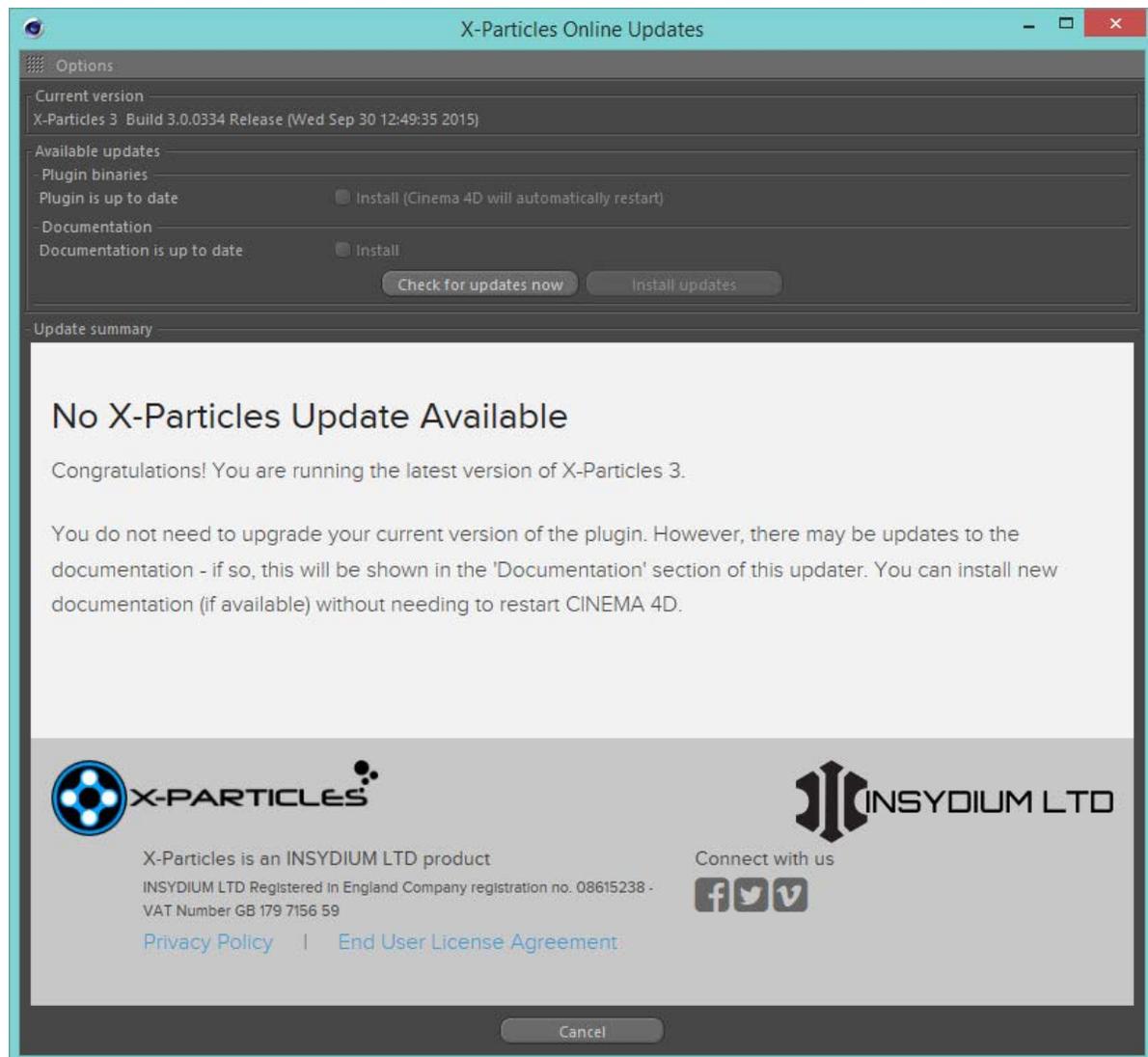
Requirements

This feature requires two things:

1. Internet access so that the plugin can access a remote server and download updated files. If you have no internet access, attempting to use this feature will cause the message 'Error in contacting server' to appear.
2. X-Particles **must** be installed in the plugins folder in the user data folder rather than in the main Cinema 4D folder's plugins folder. The reason is that the plugin will save downloaded files temporarily to the X-Particles folder and will rename/delete files in that folder. On Windows Vista and later, and on OSX, the main folder is protected by the operating system and attempting to save or alter files in this folder will potentially cause the operating system to block the process, depending on the access permissions you have to that folder.

The interface

When you click 'X-Particles Online Updater' from the main X-Particles menu, this dialog box appears:



Important: the check which is automatically performed on starting up Cinema 4D will not show this dialog UNLESS updates have been detected.

When the dialog box appears, then if the default startup check was carried out, you are shown that plugin and/or documentation updates are available, or else that everything is up to date. (The third possibility is that you are told that there was a problem connecting to the server, but that should hopefully be rare.) If updates are available, a checkbox will appear allowing you to choose to install the updated plugin files or documentation or both. To install the selected updates, click the 'Install Updates' button. If you decide not to install the updates, click the 'Cancel' button.

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When you click the 'Install Updates' button, and if you are going to update the plugin files you are asked to confirm that you want to do this, since it will require an automatic restart of Cinema 4D. Assuming you do want to update, a small dialog box will appear. The dialog box will then show you what the plugin is doing. Typically, you will see messages indicating that the updated files are being downloaded and then unzipped into the correct locations. If you are only updating the documentation, that is all you see. If you are updating the plugin files, you will see a message that Cinema is now restarting. When it does, the updated plugin files will be loaded.

Options

From the Options menu you can close the dialog (equivalent to clicking the 'Cancel' button) or show this help file.

Buttons

Check for Updates Now

Click this button to perform a check for updates. This will NOT install anything until you click the 'Install now' button.

Install Updates

If updates to the plugin and/or the documentation are available, click this button to install them. Note that only the updates where the 'Install' check box is checked will actually be installed. This button is not available if there are no updates to install.

Cancel

Closes the dialog box without installing anything.

If you have problems

The usual reason that the updater fails is when it can't save files to the X-Particles folder. That in turn is usually because it is located in the plugins folder in the same location as the Cinema 4D executable file. The operating system protects the Program Files (Windows) or Applications (OSX) folders against unauthorised modification, so it may stop the updater from saving the new files.

To prevent this, always install X-Particles in the plugins folder in the user data folder, as explained on the installation page.

If something goes wrong and X-Particles stops working correctly, you can try again by clicking 'Check for Updates Now' and repeating the process. If it still fails, the solution is simple. Delete your current X-Particles folder, download the full archive from the personalised web link you were given when the plugin was purchased, and install that instead. This will give you a fresh install of the most recent version.

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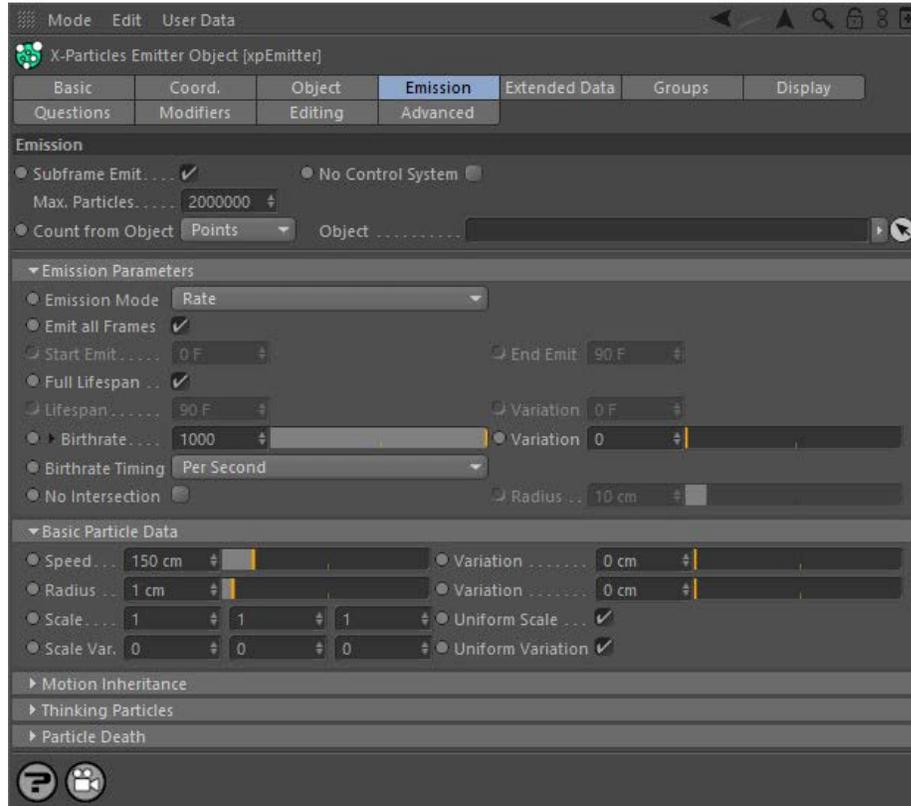
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Emitter: Emission Tab

This tab deals with emission of the particles.

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Subframe Emit

One problem with any particle system is that since particles are emitted each frame, regular 'bands' of particles may be generated. This is especially noticeable when the emitter itself is animated. For example, you might want to produce the trail from a rocket but find that instead you get a series of pulses or bands of particles. Sub-frame emission helps to overcome this. Normally you should leave this enabled, but if you need to turn it off, uncheck this switch.

The number of sub-frames cannot be set differently for each emitter. Therefore, the setting is found in the [project settings \(X-Particles tab\)](#).

No Control System

If this switch is checked, the [X-Particles control system](#) will be ignored by the emitter. That is, no Question objects will be tested and no Actions carried out.

Max. Particles

The maximum number of particles the emitter can handle at any time. By default this is set to 2 million. You can increase it as much as you like (subject to system RAM) but if you change it while playing an animation you will lose all existing particle data and particle emission will start again from the point at which you altered this value.

Count From Object

Sometimes you would like to emit one particle for each polygon or vertex in an object. For this you can use the 'One Particle Per Source Element' switch in the Object tab. To limit the number of particles to exactly that number you can use the 'Max. Particles' setting. But how many polygons or points are there in the object?

This is a convenience setting so you don't have to calculate the number. Simply drag the object into the 'Object' field and select either Points, Polygons, or Edges from this drop-down. The number will be inserted into the 'Max. Particles' field. If you need to reset that number, remove the object from the 'Object' field and 'Max. Particles' becomes available again.

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The object to use for the 'Count From Object' function. If you clear this field, 'Max. Particles' reverts back to its default setting.

Emission Parameters

Emission Mode

The 'Emission Mode' drop-down has four settings:

Rate

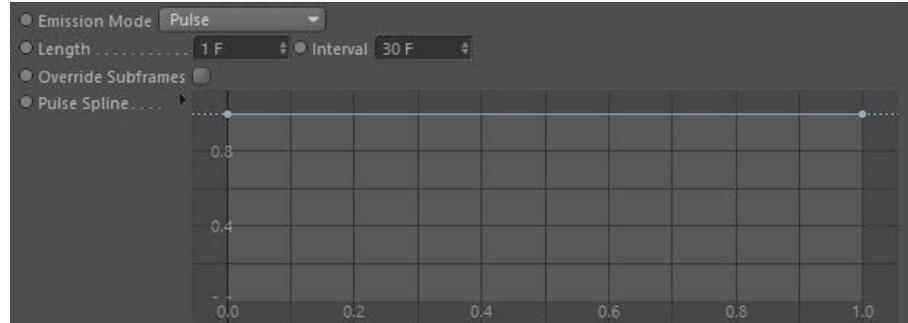
This is the default setting; particles are emitted each frame at a rate determined by the Birthrate settings (see below).

Pulse

Normally, the emitter emits particles in all frames. If you want the emitter to emit one big pulse of particles in one frame, turn on this option. The number of particles emitted in each pulse is found in the 'Birthrate' parameter.

Note that with a high number of subframes, the number of particles emitted may be slightly higher than expected. This is due to arithmetical rounding in the calculation of the number of particles to be emitted.

The pulse length and interval between pulses can also be set:



Length

You can specify the number of frames the pulse will last for here. So if you want a 5-frame pulse every 30 frames, set the 'Interval' to 30 and the 'Length' to 5.

Interval

Set the number of frames between pulses here. If you want just one pulse to be emitted in the scene, simply set this value to a higher number than the scene length.

Override Subframes

New Feature This switch is intended for use when you have a pulse emitter which emits very small numbers of particles each pulse and the X-Particles subframe count is greater than 1. Consider a scenario in which you want to emit 1 particle every 10 frames. With subframes set to 1, that is what you will get, but if you increase the number of subframes to 3 (for example) you will only get about one-third of the number of particles expected. This is because the emitter tries to divide the number of particles up into a certain number per subframe, but of course it can't divide 1 particle into 3!

The solution is to check this switch. This will cause the emitter to ignore the increased subframes when emitting in pulse mode and emit them only on the first subframe. This is not useful for larger particle counts as you may see banding in the particle emission, but for larger counts this switch isn't needed anyway. It is recommended that you leave this unchecked unless you are using multiple subframes in pulse mode and don't see the correct number of particles.

Pulse Spline

New Feature If you have a pulse with a Length of greater than 1 frame you can control the emission over the pulse with this spline. This will let you give a feathered edge to the pulse rather than a solid block of particles. The spline gives best result with medium or large numbers of particles and a pulse length of 5 frames or more (any less and you won't see much effect).

Shot

In this mode the emitter fires a single shot of particles on one or more frames. Additional parameters become available in this mode:



Shot Time

The time when the shot will take place. This can be animated to fire multiple shots.

Duration

The length of time for the shot. It is recommended that the duration is left as a whole number of frames (e.g. 3F). If part frames are used (e.g. 10.5F) then arithmetical rounding during the calculation of the number of particles to emit may mean that slightly fewer particles than expected are emitted. This will not happen with whole frames.

Shot Count

The number of particles in the shot.

Per-Frame

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If this switch is checked, on each frame the number of particles emitted is the value in 'Shot Count'. If it is unchecked, the value in 'Shot Count' is a value per second. For example, if the value in 'Shot Count' is 1200, the 'Duration' is three frames, and this switch is checked, 3600 particles will be emitted in total (1200 x 3 frames = 3600). But if this switch is unchecked, and the project frame rate is 30 frames per second, 120 particles are emitted (1200 / 30 = 40 particles per frame for 3 frames = 120).

Note that arithmetical rounding in the calculation of how many particles to emit per frame may result in slightly fewer particles being emitted than expected.

Also note that if the shot count is less than the number of frames specified in the 'Duration' setting, no particles are emitted. This is because the number of particles per frame will be calculated at less than 1 (which is clearly not possible - less than 1 particle cannot be emitted).

Trigger

With this setting three other parameters become available:



The purpose of this mode is to allow you to fire a burst of particles at any desired time, rather than using continuous or pulsed emission. Particles will ONLY be emitted when the switch 'Pull Trigger' is checked. You can do this in several ways:

- keyframe the 'Pull Trigger' switch - this will turn the emitter on and off at set frames
- use Xpresso to set and unset the switch. The input to the 'Pull Trigger' switch is a Boolean so you can use any expression which evaluates to a Boolean to make particle emission start and stop
- use the 'Change Emitter' action to pull or release the trigger (the 'Trigger Count' option must be set to 'Set by Action' for this to work, if it is not then no particles will be emitted)

Trigger Count and Count

The number of particles emitted in trigger mode uses the Birthrate by default. You can change the 'Trigger Count' drop-down to alter this:

- Use Birthrate: uses the 'Birthrate' setting to determine the number of particles to emit
- Specify: the number of particles is given in the 'Count' field
- Set by Action: the number is set by the Change Emitter action

Pull Trigger

Check this switch to fire a burst of particles. Only useful when turned on and off by one of the methods described above.

Controlled Only

Note: this mode replaces the 'Spawn Only' switch found in version 2.5 of X-Particles.

If this option is selected, the emitter will not emit any particles until told to do so. This option will be set automatically by any other object which requires an emitter to generate spawned particles - for example, a Spawn modifier, Collider tag, Particle-Particle Collisions object, etc. - to avoid the problem of 'self-spawning' (see the [Spawn modifier](#) for details).

It can also be used when the emitter [Initial State](#) is used or when an emitter is partially cached. In both cases, you can set the emitter to this mode and it will only emit those particles stored in the initial state or by the cache, and no more.

Important: this option is automatically selected when you drag an emitter into the link field of any X-Particles object which has a link for a spawning emitter. This is to prevent the phenomenon of '[self-spawning](#)' described on the [Spawn modifier](#) page. If you really want your emitter to self-spawn, you can choose another mode after dragging the emitter into the object's link field.

A number of emitter settings are unavailable when this button is checked because they are not relevant when an emitter only spawns. These are:

- Emit all Frames
- Start Emit/End Emit
- Birthrate and Variation

Emit all Frames

When this is set (it is on by default) the emitter will continue to emit particles from the start of the animation until the end (or until the maximum number of particles is reached). If you uncheck this switch, you can then set when the emission starts and when it ends using the 'Start Emit' and 'End Emit' fields.

Start Emit and End Emit

These settings determine when particle emission starts and stops once you have unchecked the 'Emit all Frames' options.

Full Lifespan

This is a convenience feature which simply sets the lifespan of the particles to the length of the document. When this is selected, the 'Lifespan' option is unavailable.

Lifespan and Variation

The life of the particle in time units. Once the particle's life exceeds this value, it is removed from the scene. This option is not available if 'Full Lifespan' is checked. You can add some variation to the particles' lifespan with the 'Variation' setting.

Birthrate and Variation

The number of particles emitted per second (not per frame), or per pulse if 'Pulse Emission' is turned on. Click the small black arrow to the left of the parameter to open the Birthrate spline as an alternative way to set the birthrate.

Birthrate Timing

Access this setting by clicking the small black arrow next to the word 'Birthrate'. The drop-down has two options:

Per Second

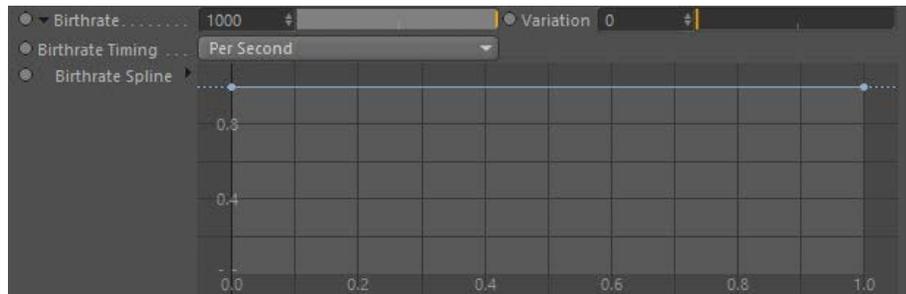
This is the default setting and means that the birthrate value is the number of particles per second.

Per Frame

With this option the birthrate value is the number of particles per frame.

Birthrate spline

Access this spline by clicking the small black arrow next to the word 'Birthrate':



You can use the Birthrate Spline to vary the birthrate over time. The value in the spline is used to multiply the Birthrate value. For example, if the spline has two points and the leftmost point is set at zero while the rightmost point at 1, the birthrate will increase over time up to its maximum at the end of the animation.

When a point is set at 1, the actual birthrate is the same as the value in the 'Birthrate' parameter. Values smaller than 1 will reduce the birthrate in proportion.

No Intersection and Radius

If checked, the emitter will try to prevent particles intersecting at birth (useful if particle-particle collisions are enabled). The Radius is the size of the virtual sphere around the particle to check for intersections.

Basic Particle Data

Important: these settings will be unavailable if there is one or more Group objects in the 'Groups to Use' list in the Groups tab, since then these settings are taken from the particle's group.

This section lets you set the 'basic' particle data that all particles have. This includes:

Speed and Variation

The particle's initial speed in screen units per second.

Radius and Variation

The particle radius, in scene units. This is used for collisions, the Skinner object, and also determines the size of the particles in the editor when 'Spheres', 'Circles' or 'Boxes' are selected as the particle shape.

Scale and Scale Var.

The particle scale. This is used by the Generator, Sprite and Fragmenter objects to scale the generated geometry.

Uniform Scale and Uniform Variation

If these switches are checked, the value in each of the Scale and/or Scale Var. fields are changed uniformly - that is, a change in one vector component is made in the other two components. This is a convenience feature to save having to change all three components to match. If you need to set the components to different values, uncheck either or both switches.

Motion Inheritance

If the emitter or the emission object moves or rotates, particles can inherit their speed and direction from them. These settings will have no effect if the emitter or emission object are completely static.

Please note : if using expressions to animate the emitter or emission object then please see the [Priorities](#) section. It is important that the animation is done before the emission of particles to correctly inherit the velocity.



Use Motion Inheritance

Check this switch to enable motion inheritance.

Linear Direction

If checked, this switch will cause the particles to inherit speed and direction from any linear motion of the emitter.

Rotational Direction

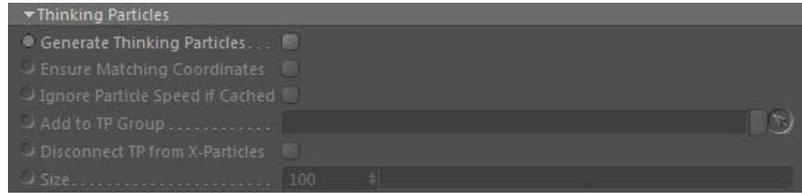
If checked, this switch will cause the particles to inherit speed and direction from any rotational motion of the emitter.

Speed Blend

A value of 100% in this field will add the full contribution of the emitter's motion to that of the particles. If set to 0%, it would be the same as if motion inheritance was not used.

Thinking Particles

X-Particles can generate Thinking Particles in addition to its own particles. This is essential if you want to render your particles with Pyrocluster or the Hair renderer, or you want to use particles with the Proximal shader. It is also required for use with some other plugins which specifically require Thinking Particles. When you generate Thinking Particles, X-Particles is still generating its own particles, but it generates Thinking Particles as well.



Generate Thinking Particles

Check this switch to enable the generation of Thinking Particles. Checking this switch will automatically turn off the editor drawing of X-Particles own particles. If you want to see them as well as the Thinking Particles display (the colour and shape of those is taken from the Thinking Particles settings dialog) then check the 'Show particles' switch in the Object tab.

Ensure Matching Coordinates

This switch is a workaround for an issue which may or may not cause you a problem. If you generate Thinking Particles, and show the X-Particles in the editor as well as the Thinking Particles, you will see that each Thinking Particle is separated by a slight offset from its corresponding X-Particle. This is due to conflicting priorities of the emitter, the other generator objects in the X-Particles system, and Thinking Particles. To get round this, turn on this switch. This will ensure that the Thinking Particles and their matching X-Particles have the same coordinates, BUT - you will see a lag between the emitter and any splines or objects produced by the Trail, Generator, and Sprite objects.

If the offset between the two particle types is not a problem in your scene, it is strongly recommended that you leave this switch off. If it is an issue for you, try turning it on and checking the effect on any other objects produced by the X-Particles system.

Ignore Particle Speed if Cached

Used when caching an emitter which generates Thinking Particles. See the [Cache object - Issues to note](#) for more details.

Add to TP Group

You can drag a Thinking Particles group from the Thinking Particles settings dialog. Then the generated particles will belong to that group and take their visual appearance from the group settings.

Disconnect TP from X-Particles

Normally, X-Particles controls the position, speed and lifespan of the generated Thinking Particles. They are therefore subject to the various X-Particles modifiers, Actions, etc. You cannot control the Thinking Particles with Xpresso or use the presets supplied with Cinema 4D.

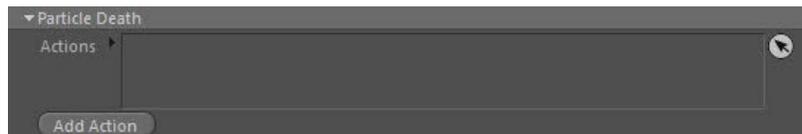
If you want to generate Thinking Particles but let them be influenced by these other components then check this switch. When you do this the X-Particles modifiers and control system will have no effect on the generated Thinking Particles. In effect, the X-Particles emitter becomes a Thinking Particles emitter with certain additional capabilities but missing some found in the Thinking Particles emitters.

Size

This setting is mostly used with the Proximal shader. It influences the size of the effect of the shader.

Particle Death

It is possible for Actions to be triggered when a particle dies. Drag the Action(s) into the 'Actions on death' list, or click the 'Add Action' button to add an Action.



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Morphing generated objects

You can use a combination of the Generator object and Morph modifier to change generated objects from one to another. This page shows how this can be done.

In its current version, morphing is a little tricky to set up and use. Please read this section before attempting to do this. We welcome feedback on how this could be simplified and improved.

Purpose and prerequisite

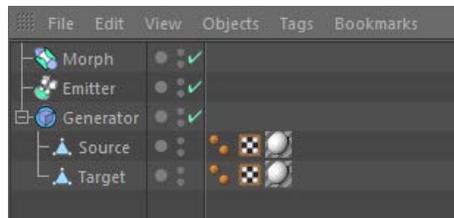
The purpose of this modifier is to allow an object generated by the Generator object to morph over a period of time into another object. This means that you have an initial or source object (this is the object you want to change) and at least one morph target (this is the object you want it to change into). For this to happen, your scene must be set up in this way:

- the initial object and all the morph targets MUST have the same vertex count. They cannot differ, not even by 1 vertex. If they do, no morphing will occur
- the initial object MUST be the first child object of the Generator
- the morph targets must also be child objects of the Generator, in the order you want the changes to take place. For example, if you want an object to morph to 1 target, then for that object to morph into a second target, the initial target must be the first child, the first morph target must be the second child, and the second morph target must be the third child object, etc.
- all the morph targets (but not the initial object) must be dropped into the 'Morph targets' list in the Generator, in the same order as above

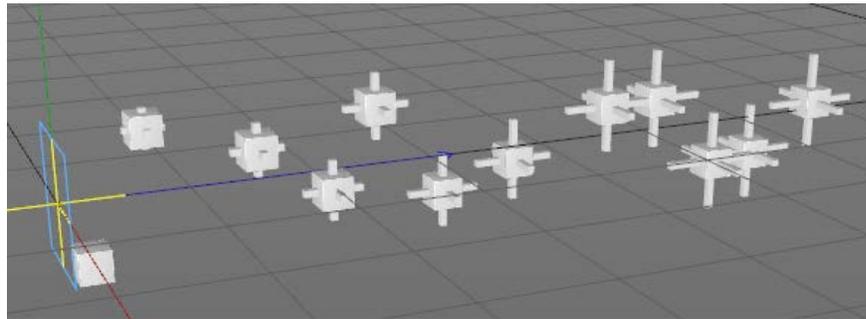
Using the Morph modifier

Once you have set the scene up as described above, add a morph modifier to the scene. By default this will morph the generated object from the initial object into the first object in the 'Morph targets' list in the Generator. You can change the morph target in the Generator by changing the 'Morph target index' from the default value in the Generator.

This simple scene would then look like this in the Object Manager:



Played in the editor you would see something like this:



You can see the cube gradually changes into a cube with extrusions.

On morph completion

The morph is complete when the morph reaches the 'Morph Maximum' value in the modifier. By default this is 100%, meaning that the initial object will completely change into the morph target object. At that point you can add Actions to the morph modifier, and there is another very important switch in the modifier - 'Switch Generator to Morph Target'.

If this switch is unchecked, then each frame the Generator will have to morph the initial object into the target. This takes time, especially with objects which have many vertices. If this switch is checked, the Generator will simply generate the morph target object instead of the original one, once the morph is completed. Of course, for this to work correctly the initial object must be fully morphed into the target, otherwise you will see a sudden jump from the partially-completed morph to the morph target object.

In general it is recommended that this switch is checked and only unchecked if you want morph values of less than 100%. In that case, uncheck it so that you don't see a jump in the object when the generator changes the object generated.

For more information please see the [Morph modifier](#) and [Morph action](#) pages.

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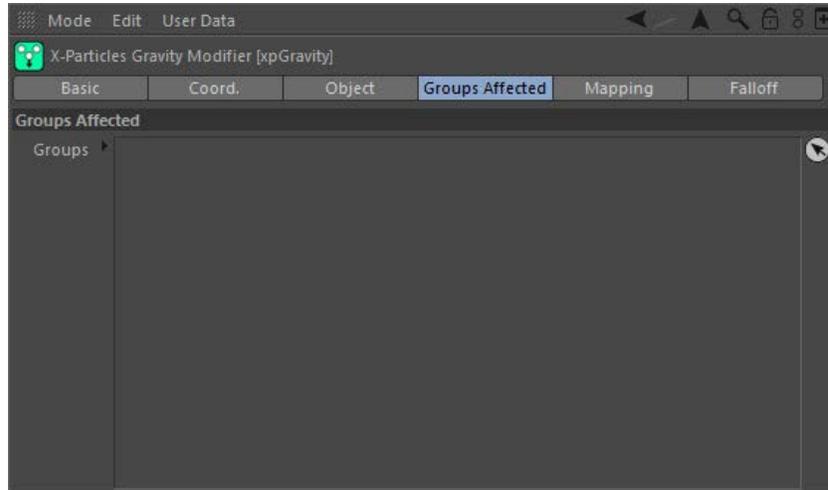
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Common Interface Elements in X-Particles

Many objects in X-Particles share certain common elements in the user interface (UI). These are explained here rather than on each object page.

Groups Affected tab

Most objects have this tab. It indicates which particle groups are affected by the object, and contains a list box into which particle groups can be dragged and dropped. The example here is from the Gravity modifier, but the interface is consistent across all objects:



To use the list drag all particle groups to be affected by the object into this list. If there are no groups in the list, all groups are affected by the object.

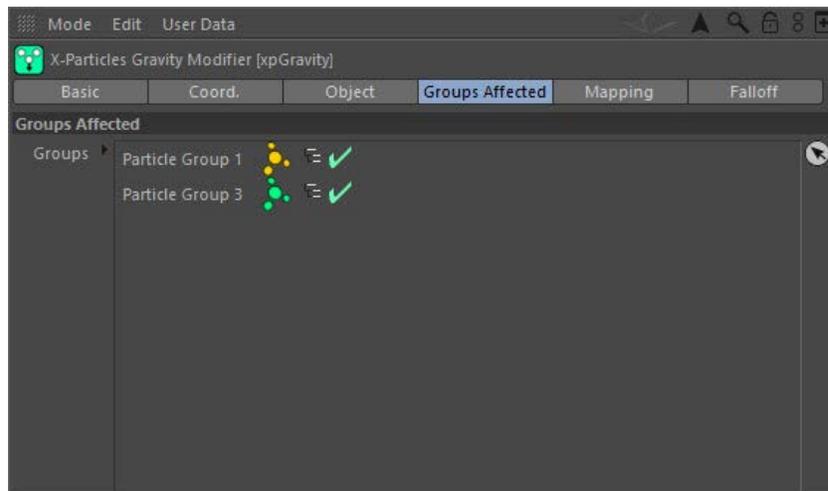
Group flags

New Feature The modifiers Groups list now uses flags to alter which groups are affected by the modifier. There are two flags you can use: the hierarchy flag and the on/off flag. These use the same icons as are found in many other lists in Cinema 4D.

Suppose you have a scene with three groups which looks like this in the Object Manager:



As you see, group 2 is a child object of group 1. Now suppose two of these groups are dragged into the groups list of a modifier:



In previous versions of X-Particles, only groups 1 and 3 would have been affected by the modifier, despite group 2 being a child of group 1. Now all groups in the hierarchy will be affected. You can stop this behaviour by turning off the hierarchy flag, in which case only the parent group will be affected.

In addition, you can temporarily prevent the modifier from affecting any group - or a complete hierarchy - by clicking the on/off flag (a green tick) so it becomes a red cross.

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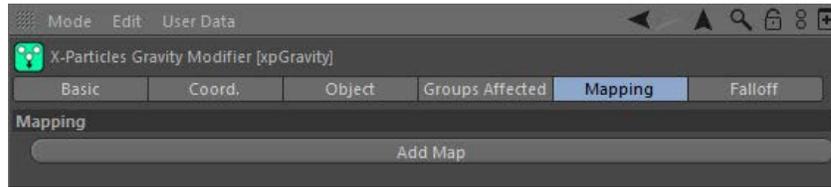
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Most (not all) modifiers have a Mapping tab. By default it is empty but maps can be added by clicking the 'Add Map' button. For more details, please see the [data mapping page](#) in this manual.

Falloff tab

Almost all the modifiers in X-Particles can use a falloff value, and certain other objects also can. Objects which can use a falloff will have a separate falloff tab. The falloffs in this tab are identical to those built in to Cinema 4D, and information on their use can be found in the C4D reference documentation.

X-Particles includes two additional falloffs, a '[Noise' falloff](#) and a '[Particles' falloff](#). See their respective pages for details.

Command Buttons

Almost all objects will have at least one command button at the bottom of the object's UI. Not all objects have all these buttons but the possible buttons are shown here.



 brings up the manual page for this object.

 displays the relevant page from the online video manual for this object.

Reset to Defaults: resets the object's settings to their default values.

Save Preset... and Load Preset...: these buttons handle the saving and loading of object presets. For more details on how to use them, please see the main [Presets page](#).

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Python API Reference

The full API reference is shown below, but please note that it does change and this manual may not show the most up-to-date version. The most recent API can be seen in the console and this is shown on the main [XP Python page](#).

API Reference

NAME

xparticles - X-Particles

FILE

(built-in)

CLASSES

`__builtin__.object`

Collider

ColliderConstraint

Constraint

Emitter

Neighbor

Particle

Ray

`class Collider(__builtin__.object)`

| X-Particles Collider

Methods defined here:

`AddObject(...)`

[object] : Add the polygon object to the collider

`Collide(...)`

[pos, vel, rad] : Collide particle with objects in the collider, use `GetCollision__`

`Flush(...)`

Free the particle to polygon collider data

`GetClosest(...)`

[pos, rad] : Calculate the closest position to the particle within the radius, returns dist (-1 if nothing found), use `GetClosest__`

`GetClosestNormal(...)`

Returns the closest positions normal, use `GetClosest first`

`GetClosestObject(...)`

Returns the closest collider object, use `GetClosest first`

`GetClosestPoint(...)`

Returns the closest position on the closet collider object, use `GetClosest first`

`GetClosestPolygon(...)`

Returns the closest positions polygon, use `GetClosest first`

`GetCollisionDelta(...)`

Returns the hit time delta (0.0 - 1.0 of the velocity) (use `Collide first`)

`GetCollisionNormal(...)`

Returns the hit position normal (use `Collide first`)

`GetCollisionObject(...)`

Returns the object hit (use `Collide first`)

`GetCollisionPoint(...)`

Returns the hit position (use `Collide first`)

`GetCollisionPolygon(...)`

Returns the polygon hit (use `Collide first`)

`GetCollisionRS(...)`

Returns the hit positions (r,s), see `Mix/GetRS` (use `Collide first`)

`Init(...)`

Init the particle to polygon collider (objects must be added before calling)

Data and other attributes defined here:

`__new__` = <built-in method `__new__` of type object at 0x000000005998EB...>

T.`__new__(S, ...)` -> a new object with type S, a subtype of T

`class ColliderConstraint(__builtin__.object)`

| X-Particles Particle Collider Constraint

Methods defined here:

`GetColliderID(...)`

Returns the constraints collider ID

`GetFlags(...)`

Returns the constraints flags

`GetID(...)`

Returns the constraints ID

`GetIndex(...)`

Returns the constraint index

`GetLastPosition(...)`

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Returns the constraints last position

GetLength(...)

Returns the constraints length

GetPositionRS(...)

Returns the constraints collider position (r,s) within the polygon ; see GetRS/MixRS

SetColliderID(...)

[id] : Sets the constraints collider ID

SetFlags(...)

[flags] : Sets the constraints flags

SetID(...)

[id] : Sets the constraints ID

SetIndex(...)

[index] : Sets the constraints index

SetLastPosition(...)

[pos] : Sets the constraints last position

SetLength(...)

[len] : Sets the constraints length

SetPositionRS(...)

[pos] : Sets the constraints position (r, s) within the polygon ; see GetRS/MixRS

Data and other attributes defined here:

__new__ = <builtin method __new__ of type object at 0x000000000599897...
T.__new__(S, ...) -> a new object with type S, a subtype of T

class Constraint(__builtin__ object)
| X-Particles Particle Constraint

Methods defined here:

GetFlags(...)

Returns the constraints flags

GetID(...)

Returns the constraints particle ID

GetIndex(...)

Returns the constraint particle index

GetLength(...)

Returns the constraints length

SetFlags(...)

[flags] : Sets the constraints flags

SetID(...)

[id] : Sets the constraints particle ID

SetIndex(...)

[index] : Sets the constraints particle index

SetLength(...)

[len] : Sets the constraints length

Data and other attributes defined here:

__new__ = <builtin method __new__ of type object at 0x00000000059987B...
T.__new__(S, ...) -> a new object with type S, a subtype of T

class Emitter(__builtin__ object)
| X-Particles Emitter Object

Methods defined here:

CreateParticle(...)

Create a new live particle

GetAliveCount(...)

Returns the total number of live particles

GetDeadCount(...)

Returns the total number of dead particles

GetFirstAlive(...)

Return the first live particle

GetFlags(...)

Return the flags for this emitter

GetLastAlive(...)

Return the last live particle

GetMaxCount(...)

Returns the maximum number of particles

GetObject(...)

Returns the BaseObject

GetParticle(...)

[index] : Return the x-particle at the passed index

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```
GetParticleCount(...)
Returns the total number of particles

SetFlags(...)
Set the emitters flags

SetMaxCount(...)
[count] : Set the maximum number of particles

SetParticleCount(...)
[count] : Set the number of live particles

-----
Data and other attributes defined here:

__new__ = <built-in method __new__ of type object at 0x00000000599843...
T.__new__(S, ...) -> a new object with type S, a subtype of T

class Neighbor(__builtin__.object)
| X-Particles Particle Neighbors

Methods defined here:

AddEmitter(...)
[emitter] : Add the emitters particles into the neighborhood data

AddGroup(...)
[group, emitter] : Add all particles in a group (can be from multiple emitters or pass an emitter to restrict it) into the neighborhood data

AddParticle(...)
[pos, index, data] : Add a particle (or position) into the neighborhood data, optionally give it an index and data (GeData)

FindClosest(...)
[pos, radius] : Find all particles with the radius from the passed position, use GetClosest to get the particles, returns the count found

Flush(...)
Free the neighborhood search

GetClosestIndex(...)
[index] : Returns the particle index of [index] within the found closest particles, use FindClosest before calling this and the index with
GetParticle__

GetClosestPosition(...)
[index] : Returns the particles position of [index] within the found closest particles, use FindClosest before calling this

GetParticle(...)
[index] : Returns the particle (if from an emitter) at [index]

GetParticleCount(...)
[index] : Returns the number of particles in the neighborhood

GetParticleCustomIndex(...)
[index] : Returns the particles index (if from AddParticle) of the neighborhood particle at [index]

GetParticleEmitter(...)
[index] : Returns the particles emitter (if from AddEmitter/AddGroup) of the neighborhood particle at [index]

GetParticleIndex(...)
[index] : Returns the particles index of the neighborhood particle at [index]

GetParticlePosition(...)
[index] : Returns the particles position of the neighborhood particle at [index]

Init(...)
[radius] : Init the neighborhood search, must be done after adding particles. If using a fixed search radius enter it here (to speed up the
search), otherwise 0.0

-----
Data and other attributes defined here:

__new__ = <built-in method __new__ of type object at 0x000000005998B3...
T.__new__(S, ...) -> a new object with type S, a subtype of T

class Particle(__builtin__.object)
| X-Particles Particle

Methods defined here:

AddBirthConstraint(...)
Returns a birth constraint

AddColliderConstraint(...)
Returns a collider constraint

AddCustomData(...)
[id, name, data] : Add custom data (GeData) to the particle, returns the index

AddDistanceConstraint(...)
Returns a distance constraint

AddParticleConstraint(...)
Returns a particle-particle constraint

FindCustomData(...)
[id, name] : Finds a custom data with id/name (optional), returns the index

GetBirthConstraint(...)
[index] : Returns the birth constraint

GetBirthConstraintsCount(...)
```

Returns the number of birth constraints

GetBits(...)
Returns the particles internal bit flags [XPARTICLE_BITS_]

GetColliderConstraint(...)
[index] : Returns the collider constraint

GetColliderConstraintsCount(...)
Returns the number of collider constraints

GetColor(...)
Returns the particles color

GetCustomData(...)
[index] : Get the particles custom data at index

GetCustomDataCount(...)
Returns the number of custom data items

GetDensity(...)
Returns the particles density

GetDisplay(...)
Returns the particles display type

GetDistanceConstraint(...)
[index] : Returns the distance constraint

GetDistanceConstraintsCount(...)
Returns the number of distance constraints

GetDistanceTravelled(...)
Returns how far the particle has moved since birth

GetFlags(...)
Returns the particles flags [XPARTICLE_FLAGS_]

GetGroupID(...)
Returns the particles group ID

GetID(...)
Returns the particles ID

GetIndex(...)
Returns the particles index

GetLife(...)
Returns the particles life (time until death)

GetMass(...)
Returns the particles mass

GetMatrix(...)
Returns the particles rotation as a matrix

GetNext(...)
Returns the next alive particle

GetParticleConstraint(...)
[index] : Returns the particle-particle constraint

GetParticleConstraintsCount(...)
Returns the number of particle-particle constraints

GetPosition(...)
Returns the particles position

GetRadius(...)
Returns the particles radius

GetRotation(...)
Returns the particles rotation

GetSpeed(...)
Returns the particles speed

GetSpin(...)
Returns the particle spin

GetTime(...)
Returns the particles time since birth

GetVelocity(...)
Returns the particles velocity

IsSpinEnabled(...)
Returns if the particles spin is enabled

RemoveBirthConstraint(...)
[index] : Removes a birth constraints

RemoveColliderConstraint(...)
[index] : Removes a collider constraints

RemoveCustomData(...)
[index] : Removes a custom data from the particle

RemoveDistanceConstraint(...)
[index] : Removes a distance constraints

```

RemoveParticleConstraint(...)
[index] : Removes a particle-particle constraints

SetBits(...)
[bits] : Sets the particles internal bit flags [XPARTICLE_BITS_], use with caution

SetColor(...)
[color] : Sets the particles color

SetCustomData(...)
[index, data] : Sets the particles custom data at index

SetDensity(...)
[density] : Sets the particles density

SetDisplay(...)
[display] : Sets the particles display type

SetDistanceTravelled(...)
[dist] : Sets how far a particle has moved since birth

SetFlags(...)
[flags] : Sets the particles flags [XPARTICLE_FLAGS_]

SetGroupID(...)
[group] : Sets the particles group ID

SetID(...)
[id] : Sets the particles ID

SetLife(...)
[life] : Sets the particles life (until death)

SetMass(...)
[mass] : Sets the particles mass

SetMatrix(...)
[matrix] : Sets the particles rotation from a matrix

SetPosition(...)
[position] : Sets the particles position

SetRadius(...)
[radius] : Sets the particles radius

SetRotation(...)
[rot] : Sets the particles rotation

SetSpeed(...)
[speed] : Sets the particles speed

SetSpin(...)
[spin] : Set the particles spin

SetSpinEnabled(...)
[enable] : Set if the particle should spin

SetTime(...)
[time] : Sets the particles time since birth

SetVelocity(...)
[velocity] : Sets the particles velocity

```

Data and other attributes defined here:

```

__new__ = <built-in method __new__ of type object at 0x0000000059985F...
T.__new__(S, ...) -> a new object with type S, a subtype of T

```

```

class Ray(__builtin__.object)
| X-Particles Ray Casting (Polygons and Particles)

```

Methods defined here:

```

AddEmitter(...)
[emitter] : Add the emitters particles into the ray cast data

AddGroup(...)
[group, emitter] : Add all particles in a group (can be from multiple emitters or pass an emitter to restrict it) into the ray cast data

AddObject(...)
[object] : Add a polygon object into the ray cast data

Flush(...)
Free the ray cast data

GetHitCount(...)
Returns the hits from a TraceRay

GetHitIndex(...)
[index] : Returns the hit index (particle or polygon) from a TraceRay

GetHitObject(...)
[index] : Returns the hit object/emitter

GetHitPosition(...)
[index] : Returns the hit position (world coordinates)

Init(...)
Init the ray cast data, all objects/emitter must be added first

```

| TraceRay(...)
| [pos, dirn, maxdist] : Trace a ray from pos in the direction given (doesn't need to be normalized), get the hits with the GetHit__ functions,
| return True if hit

| Data and other attributes defined here:

| __new__ = <built-in method __new__ of type object at 0x0000000005998CF...
| T.__new__(S, ...) -> a new object with type S, a subtype of T

FUNCTIONS

CreateEmitter(...)
Create an emitter object

GetRS(...)
[p, va, vb, vc, vd, quad] : Returns the (r, s) as a Vector of the position 'p' within the quad/triangle va-vd, quad True if a quadrangle (False for triangle)

MixRealRS(...)
[rs, ra, rb, rc, rd, quad] : Returns Real (float) from (r,s) position within the reals ra-rd, quad True if all four used (False for a triangle)

MixVectorRS(...)
[rs, va, vb, vc, vd, quad] : Returns Vector from (r,s) position within the vectors va-vd, quad True if all four used (False for a triangle)

ToEmitter(...)
[object] : Get emitter class from object

DATA

MXPmaterial = 1027417
OXPEmitter = 1027133
OXPGenerator = 1027654
OXPSkinner = 1029227
VXPrender = 1030488
XPARTICLE_BITS_COLLIDED = 32
XPARTICLE_BITS_COLLISION_SKIP = 8388608
XPARTICLE_BITS_COLLISION_STEP_SKIP = 16777216
XPARTICLE_BITS_CUTTRAIL = 262144
XPARTICLE_BITS_DEFLECTED = 128
XPARTICLE_BITS_DEFORMED = 536870912
XPARTICLE_BITS_DIRECTKICK = 2097152
XPARTICLE_BITS_DOFREEZE_MOVE = 32768
XPARTICLE_BITS_DOFREEZE_SCALE = 131072
XPARTICLE_BITS_DOFREEZE_SPIN = 65536
XPARTICLE_BITS_DONESPAWN = 8192
XPARTICLE_BITS_DOSTICK = 16384
XPARTICLE_BITS_FREEZE = 4
XPARTICLE_BITS_FREEZE_SCALE = 1024
XPARTICLE_BITS_FREEZE_SPIN = 512
XPARTICLE_BITS_INVISIBLE = 4194304
XPARTICLE_BITS_ISSTUCK = 16
XPARTICLE_BITS_KILLZEROTRAIL = 524288
XPARTICLE_BITS_NOSTUCKACTION = 1048576
XPARTICLE_BITS_POLY_PRIMECOLLISION = 134217728
XPARTICLE_BITS_PPCOLLISION = 33554432
XPARTICLE_BITS_PPOLYCOLLISION = 67108864
XPARTICLE_BITS_PP_PRIMECOLLISION = 268435456
XPARTICLE_BITS_ROTATED = 4096
XPARTICLE_BITS_STICK = 8
XPARTICLE_BITS_STICKSOURCE = 64
XPARTICLE_BITS_TARGETMODE = 256
XPARTICLE_BITS_TP_DISCON = 2048
XPARTICLE_BITS_TRAIL = 1
XPARTICLE_BITS_USEGRAD = 2
XPARTICLE_FLAGS_ALIVE = 1
XPARTICLE_FLAGS_BORN = 2
XPARTICLE_FLAGS_DIE = 4
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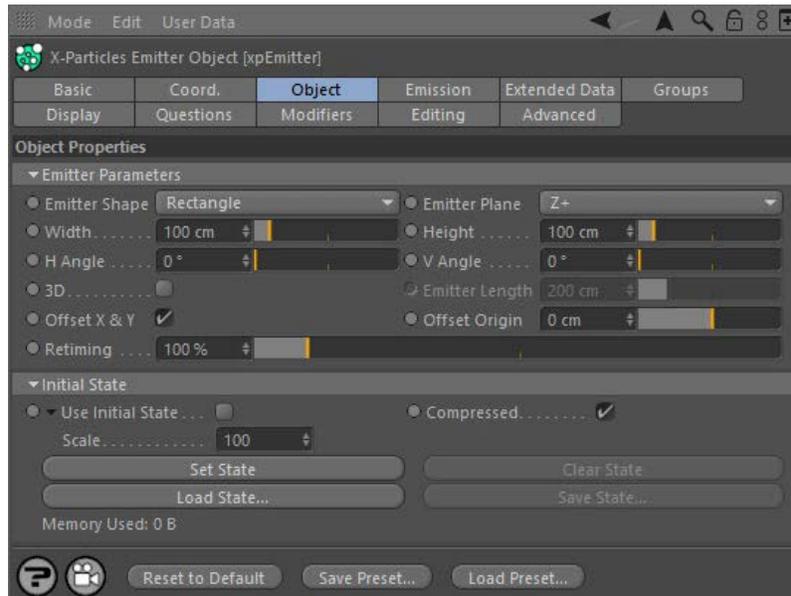
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Emitter: Object Tab

This tab deals with the emitter object itself.

Interface



For the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

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Settings

Emitter parameters

The first section in the Object tab concerns parameters to do with the shape of the emitter and how particles are emitted from it. The parameters are:

Emitter Shape

There are six inbuilt shapes, plus you can use any object from which to emit particles, and a special mode named '[Defined Emission](#)'. The inbuilt shapes are:

Rectangle

A rectangular emitter with these settings:

- Width: the width of the rectangle.
- Height: the height of the rectangle
- H Angle and V Angle: the angles at which the particles are emitted. Particles are always emitted along the Z-axis of the emitter.
- 3D: the emitter is drawn as a 3D box, which makes it much easier to see where the particles will go, particularly when the horizontal and/or vertical angles are greater than zero.
- Emitter length: only used when 3D representation is checked. Determines the length of the emitter box along its Z-axis.

Circle

A circular emitter with these settings:

- Radius: the radius of the circle.
- Cone Angle: the angle at which particles are emitted. Particles are always emitted along the Z-axis of the emitter.
- 3D: the emitter is drawn as a 3D cone, which makes it much easier to see where the particles will go, particularly when the cone angle is greater than zero.
- Emitter Length: only used when 3D representation is checked. Determines the length of the emitter cone along its Z-axis.
- Ring Only: if this is checked, particles are only emitted from the circumference of the circle, not its area. The Cone Angle can still be used to generate a hollow cone of particles and a Variation setting can be applied to this to add some variation in the angle.

Ellipse

An elliptical emitter. Settings are the same as for the Circle emitter except that there are two radius settings - H-Radius and V-Radius - for producing the elliptical shape.

Sphere

A spherical emitter with these settings:

- [Limit](#)
- [Network](#)
- [Rotator](#)
- [Sound](#)
- [Speed](#)
- [Spin](#)
- [Turbulence](#)
- [Vortex](#)
- [Vorticity](#)
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Rendering:

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- [Vortex Modifier](#)
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- [Wind Modifier](#)
- --- Direct Actions ---
- [Change Geometry](#)
- [Change Group](#)
- [Change Life](#)
- [Change Lights](#)
- [Change Scale](#)

- Surface Only: particles are emitted from the virtual "surface" of the sphere, rather than the interior of the sphere.
- Direction: a drop-down menu with these settings:
 - Normal: particles move out from an imaginary surface normal of the sphere.
 - Random: particles move in a random direction, this gives a chaotic distribution of particles.
 - the three axes of the emitter, either positive or negative, in terms of object space.

Box

 **New Feature** A cubic emitter with these settings:

- Size: the size of the box in three dimensions.
- Faces Only: if checked, particles are only emitted from the 'surface' of the virtual cube; if unchecked, they are emitted from anywhere on or inside the cube.
- Emit Mode: a drop-down menu with two options:
 - Random: the emitting position is chosen randomly.
 - Grid: the emitting position is calculated from a grid whose size is set in the 'Grid Size' option; this is a very easy way to emit a cubic grid of particles without the overhead of using a Cube in object mode, for example.
- Grid Size: the size of the grid when 'Emit Mode' is set to 'Grid'
- Direction: a drop-down menu with seven options:
 - Faces: the particle direction is along the 'normal' of the virtual face.
 - X+, X-, Y+, Y-, Z+, and Z-: the particle direction is along the selected axis of the object (i.e. this is in object space, not world space).

Cylinder

 **New Feature** A cylindrical emitter with these settings:

- Radius: the cylinder's radius.
- Height: the cylinder's height (or length, if you prefer!).
- Direction: a drop-down menu with three options:
 - Radial: the particle direction is outwards from the axis of the cylinder (no particles are emitted from the ends of the cylinder).
 - Standard: the direction is along the Z-axis of the cylinder, just like a Circle emitter except that the particles are emitted from anywhere along the length of the cylinder.
 - Bi-Directional: as with the 'Standard' setting except that the direction is either along the Z+ or Z- axes.
- Ring Only: if checked, particles are only emitted from the 'surface' of the virtual cylinder; if unchecked they are emitted from anywhere on or inside the cylinder.

Object

This is described in the section '[Emission from an object](#)'.

Defined Emission

This is described in the section '[Defined Emission](#)'.

Emitter Plane

The direction of particle emission is along the Z-axis of the emitter, which in turn points along the world Z-axis. With this setting you can rotate the emitter to point along the world X- or Y-axis instead. If you save the emitter options (see below) this setting is retained for all new emitters you create. This setting only applies to the Rectangle or Circle emitters.

Offset X & Y

If you select a Rectangle, Circle, or Ellipse emitter, then normally you want particles to be emitted from the area of the emitter, with the starting position set randomly. However, if you only generate one particle, if for example you are using the emitter in conjunction with a Trail object and a Sweep object, then you may find that you would like the particle to be emitted from the centre of the emitter so that you know exactly where it will originate from. Unchecking this switch will ensure that all particles start from the centre of the emitter. Note that this only applies to Rectangle, Circle, and Ellipse emitters.

Offset Origin

If you look closely at the particle starting position, you will see that each particle starts at a small distance 'in front of' the emitter. This is a consequence of how the emitter works (you can also see it with the standard Cinema 4D emitter). If that causes a problem, you can use this slider to offset the starting position so that particles emit 'behind' the emitter, or even well in front of it. Typically, only a few screen units are needed to achieve the required effect.

Retiming

This setting can be used to speed up or slow down the emitter. For example, suppose you have an emitter which uses a particle speed of 150 units and a particle lifespan of 90 frames. With this setting at 100% (the default) the particles will reach a certain point in the scene at 90 frames and will then die.

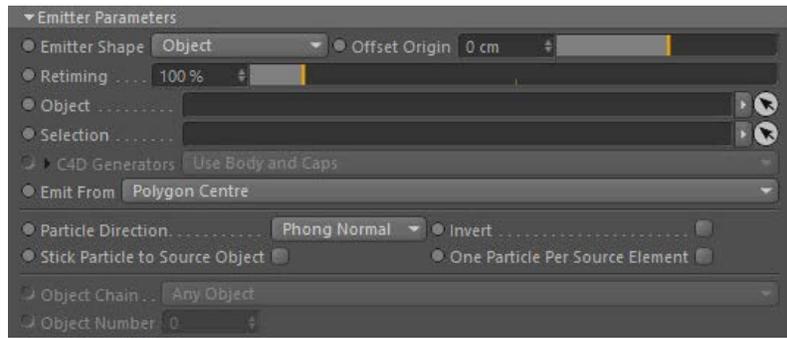
If you now increase this value to 200%, the particles will travel faster and reach the same point at 45 frames, and will then die, also at 45 frames. Reducing the value below 100% will make the particles travel slower and die later. But when they die they will still have reached the same position they would have done if this value was at 100%.

Emission from an object

X-Particles can emit from almost any Cinema 4D object. The exception is a null object: null objects cannot be used as an emission source. Null objects with child objects can be used, however. Almost every other object can be used, including lights, C4D generator objects, and objects which are themselves being generated by a Generator, Sprite, or Trail object and another emitter.

Important: if you emit from an object the object scale set in the Attribute Manager MUST NOT contain negative values. You can scale the object using the Scale tool or change its scale in the Coordinates manager using negative values, but in the object attributes the scale must all be positive values. This is currently a limitation.

When you select an Object as the emission shape, the top part of the interface changes and you see this:



You have a number of parameters to set. These are:

Object

A link field into which you drag the object to emit particles from. If this is a null object with child objects, the actual emission object will be selected randomly from one of the null's child objects.

Selection

A polygon selection tag, point selection tag, edge selection tag, or vertex map can be dragged into this field; particles will only be emitted from the selected polygons, points, or edges on the linked object.

However, what happens if the 'Emit from' setting does not match the selection tag? Suppose you want to emit from 'Polygon centre' but supply a point selection tag. How is this handled?

If the linked object is a polygon object, and 'Emit from' is set to 'Polygon centre' or 'Polygon area', and you enter a point selection (or edge selection) tag here, X-Particles will attempt to convert the point (or edge) selection into a polygon selection. If it succeeds, particles will be emitted from the resulting selected polygons; if it fails, then particle emission will be from any randomly-selected polygon on the object.

If you try to emit from the object's vertices and supply a polygon or edge selection, X-Particles will try to convert this to a point selection and emit from the resulting selected points. If it fails it will emit from a randomly-selected point on the object.

Vertex maps are only used when the object is a polygon object (or can be converted to one internally by X-Particles) and 'Emit from' is set to points. In all other modes vertex maps are ignored.

If the object has neither points nor polygons, selection tags are ignored.

C4D Generators

This drop-down menu determines what part of a C4D generator object the particles will be emitted from. It is only available if the source object is a Cinema 4D generator object (i.e. Lathe, Sweep, Extrude or Loft but not including the Subdivision Surface object). It has three options:

Use Body and Caps

Particles are emitted from the body of the object and its caps.

Use Body Only

Particles are only emitted from the body of the object and not its caps.

Use Caps Only

Particles are not emitted from the body of the object but only its caps.

Refining particle emission from generator object caps

If you click the small arrow to the left of the 'C4D Generators' parameter, you can refine the caps emission if you selected anything other than 'Use Body Only'. Four switches are then available. These correspond to the special selections that are formed on a C4D generator object - C1 and C2 are the polygons/points making up the main part of the cap, while R1 and R2 are the polygons which form the 'rounded' part of the cap, and are only available if filleted caps are turned on in the C4D generator objects.

Check any of these switches to emit from that part of the cap.

Emit From

This determines the source of the emitted particles. You can choose from:

1. Polygon Centre: particles are emitted from the centre of the object's polygons. Polygons are weighted (that is, larger polygons are more likely to emit particles than small polygons).
2. Polygon Area: particles are emitted from a random position on the polygon faces. As with Polygon centre, the polygons are weighted by size.
3. Texture: emission from the object is controlled by a texture. This is the same as 'Polygon Area' mode but with additional settings for the texture.
4. Illumination: emission from the object is determined by the illumination of the surface by specific scene lights.
5. Points: particles are emitted from the object's points.
6. Edges: particles are emitted from the object's edges (polygon objects only) or from along the length of a spline.
7. Object Position: particles are simply emitted from the object's world position.
8. Object Volume: particles are emitted from a random point *inside* the object. If you set the particle speed to zero you can use this setting to fill an object with particles
9. Voxel Grid: the object is divided up into a grid of square cells, and a particle is emitted from the centre of the cell. This is described more fully below.

Edge emission: polygon objects

- [Change Speed](#)
- [Change Spin](#)
- [Change Sprites](#)
- [Control Morphing](#)
- [Control Spawning](#)
- [Explode Particles](#)
- [Freeze Particles](#)
- Other Actions ---
- [Editor Display Only](#)
- [Stop Following Spline](#)
- [Unlink TP](#)
- [Unstick from Source Object](#)

Other:

- [Online updater](#)
- [Load Palette](#)

If you choose 'Edges' as the emission source, and the object is a polygon object, two further options become available:



Even Distribution

By default the emission point along the edge is chosen randomly, which can lead to irregular distribution of particles. To get an even distribution, check this box. The particles are then spaced evenly according to the 'Spacing' setting.

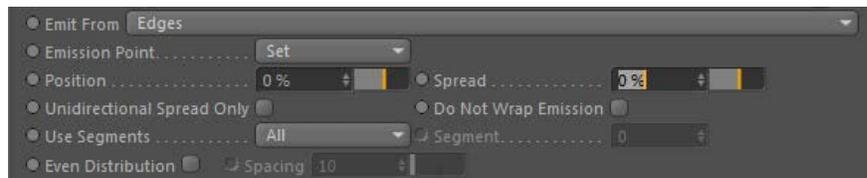
Spacing

This number indicates how many emission points there will be along the edge. It is not a percentage value or an actual distance in screen units, but is used together with the edge length to determine the number of emission points. This ensures that the spacing of the emitted particles is always the same, regardless of the length of the edge. The higher the number, the greater is the space between the emitted particles.

For any edge, if the value is greater than the length of the edge, particles will only be emitted from the two ends of the edge and not along its length.

Edge emission: splines

If the object is a spline, several more options are shown:



In this mode, particles are emitted from the spline length rather than just its vertices.

Emission Point

This drop-down has two settings:

- Set: the position along the spline to emit from, in terms of a percentage of the spline's length. That percentage is given in the 'Position' field.
- Random: particles are emitted from positions randomly chosen along the spline.

Position

If 'Emission Point' is set to 'Set' then the emission point along the spline is given as a percentage of the spline's length.

Spread

Only available if 'Emission Point' is set to 'Set'. This will spread the particles around the emission point. For example, a position of 0% with a Spread of 10% will emit particles between -5% and 5% along the spline. (Note that '-5%' along the spline is the same as 95% along its length.)

Unidirectional Spread Only

If you do not want the 'Spread' value to be used either side of the emission point, check this switch. Then a position of 0% with a Spread of 10% will emit particles between 0% and 10% along the spline.

Do Not Wrap Emission

Checking this switch will confine emission between 0% and 100% of the spline length. Suppose you set 'Position' to 0% and 'Spread' to 10%, with 'Unidirectional Spread Only' checked. Then you animate 'Position' by keyframing it. When the position reaches 91% or higher, by default the particles which would then be emitted at 101% of the length will be emitted at 1%, giving the effect that the particles wrap around the length. If you don't want this, so that emission ceases when the position reaches 100%, check this switch. It will prevent the wrap round effect from occurring.

Use Segments

This drop-down has two settings:

- All: in a multi-segment spline, a particle will be emitted from a randomly-chosen segment.
- Select: in a multi-segment spline, all particles will be emitted from the segment given in the 'Segment' setting.

Segment

If 'Use Segments' is set to 'Select' the segment to use is given in this field. Note that the segments are zero-based, that is, the first segment has the number 0; if there are 5 segments, the last segment has number 4.

It is up to you to make sure that the value you specify is a valid one. If the spline has 5 segments and you enter '5' or higher in this field, no particles will be emitted.

Even Distribution

This option is only available if 'Emission Point' is set to 'Set'. If this switch is checked, the 'Position' setting is ignored and particles are spaced evenly along the spline. You can still use the 'Spread' setting to produce small clumps of particles at regular intervals. The 'Spread' setting may need to be very small (less than 1%), depending on the spacing, otherwise the particle clumps may overlap and the distribution will seem to be random.

Spacing

This number indicates how many emission points there will be along the spline. It is not a percentage value or an actual distance in screen units, but is used together with the spline length to determine the number of emission points. The higher the number, the smaller is the space between the emitted particles.

Note that the 'Spacing' setting works in the opposite fashion for splines as it does for edges on polygon objects.

Max. Retries

This setting only appears if you choose 'Object Volume' or 'Voxel Grid' as the emission type. In both cases the emitter must determine if the chosen emission point is within the object. If it is not, another point is selected. This is very easy with objects such as cubes, but more difficult with spheres, pyramids, etc. Then it may take several attempts to find a suitable emission point. With very irregular objects, many retries may be necessary and that number could be so large that it would significantly slow down the animation.

For this reason, a limit is placed on the maximum number of attempts to find an emission point. If this number is exceeded, no emission occurs. If you find that you are getting areas in the object where no emission seems to occur, you can increase this setting, but it may slow down the particle emission.

Particle Direction

This determines the initial direction of each emitted particles. The choices are:

1. Phong Normal: particles are emitted along the phong normal of the selected point on the surface. If 'Points' are chosen as the emission source, the vertex normal is used instead.
2. Normal: particles are emitted along the face normal (for polygon centre/ polygon area modes) or the vertex normal (for point mode). This only applies to polygon objects. For point objects such as splines, which do not have normals, the particles are emitted radially away from the spline.
3. Random: particles are emitted in a completely random direction.
4. X+ Axis/X- Axis: particles are emitted along the object's positive or negative X axis (NOT the world X-axis)
5. Y+ Axis/Y- Axis: particles are emitted along the object's positive or negative Y axis (NOT the world Y-axis)
6. Z+ Axis/Z- Axis: particles are emitted along the object's positive or negative Z axis (NOT the world Z-axis)

Invert

If checked, this switch inverts the selected direction.

Stick Particle to Source Object

If this switch is checked, once the particle has been generated it will stick to the object which acted as the emission source. The particles will stay stuck even if the object is animated. You can unstick them at any point using an [Unstick Particles Action](#).

Note: for this function to work, the object must be something other than a null object or one which, when collapsed, results in a null object with child objects.

Emit One Particle Per Source Element

This switch is only available when 'Emit From' is set to 'Polygon Centre', 'Points', or 'Object Position'. It forces the emitter to emit one, and only one, particle for each element (polygon or point) in the object, or in the case of 'Object Position', from the position of each object in a chain of objects.

If this switch is enabled, the Birthrate parameter in the Emission tab is ignored, since the birthrate now depends on the number of vertices in the object. Note that it may result in a large number of particles being generated. For example, a Birthrate of 100 when this option is off would generate 100 particles per second - or 3 to 4 per frame if the frame rate is 30 fps. But if this option is on, and the source object has 100 vertices, this will result in 100 particles being generated per frame - equivalent to a normal birthrate of 3,000 per second.

See also the 'Count from Object' setting in the [Emission tab](#).

Object Chain

If you drag a generator-type object, such as a Cloner or Array object into the Object link field, the emitter converts the object to a polygon object internally before calculating where to create the particle. However, generators can create a chain of objects when converted. For example, an Array with default settings and a sphere child object will, when converted, result in a null object with eight child spheres. Which of the child spheres should be selected to emit from?

This drop-down menu gives you five choices:

- Use First Object: the first object in the chain is used
- Use Last Object: the last object in the chain is used
- Use Specific Object: the object given in 'Object Number' is used
- Any Object: an object is selected randomly from the chain
- Connect Objects: the child objects are joined into one large object and that is then used as the emission source

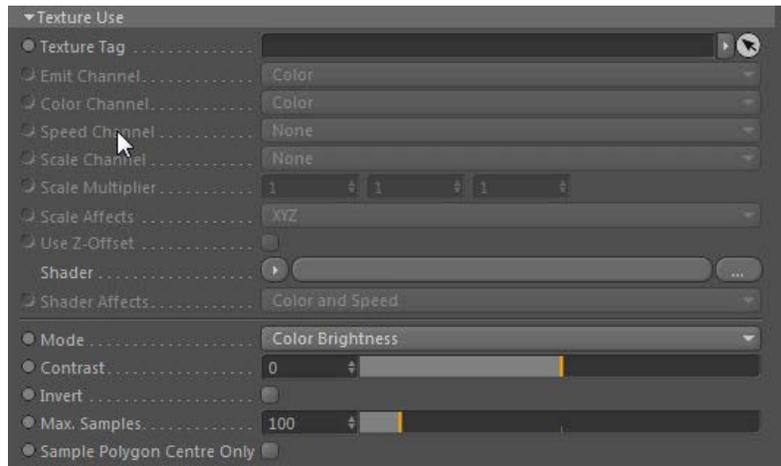
Note that using these options will affect the particle direction if that is set to use one of the object axes. For example, suppose you set the particle direction to the positive X-axis. If you now select any of the first four options in the 'Object Chain' list, the particles are emitted along the object's positive X-axis, not the 3D world X-axis. This is consistent with the options in 'Particle Direction' above. But what if you choose 'Connect Objects'? In that case the various objects could all have different rotations so an object axis cannot be used; in this case, the world X-axis would be used instead.

Object Number

The number of the object in an object chain to use if 'Object Chain' is set to 'Use Specific Object'. The number is zero-based, i.e. the first object has number 0. It is up to you to make sure that this number is valid. If you want to emit from a cloner which produces 10 clones, and you specify 10 or higher no particles will be emitted (the last object in the chain will have number 9).

Texture Use

This section lets you control the emission of particles with a texture. You can also set the particle colour and speed from the same texture.



Texture Tag

You can drag a texture tag into this field and the emitter will use the material referenced by that tag. Any of the texture tags assigned to the object may be used, but they must have UVW mapping. No other form of mapping will work correctly.

Using a tag is convenient if you have already set up a material and don't want to have to duplicate it in another shader. Once you add the tag to this field, you can select the channel to sample in the 'Channel' drop-down menu, but you can no longer use the 'Shader' field - that is, you can't use a texture tag and a shader simultaneously.

Emit Channel

This is the material channel which governs the emission of particles.

If you have dragged a texture tag into the 'Texture Tag' field, you can choose the channel to use from the material. By default this is the Color channel, but you can choose from several others. One thing you can do is use a channel which is not being used in the material. For example, you could set up a shader to govern particle emission in the displacement channel but leave that turned off in the material editor. The emitter can still sample that channel even though it is not being used in the material.

If you set this channel to 'None' then the texture will not control the emission of particles but you can still use the 'Color Channel' and 'Speed Channel' settings.

Color Channel

This is the material channel which controls the particle colour. The particles will take their colour from this channel, which is the Color channel by default. This does not have to be the same channel as the Emission channel.

Speed Channel

This is the material channel which controls the particle speed. The particles will take their speed from this channel, which is turned off by default. This does not have to be the same channel as the Emission or Color channels.

Scale Channel

This is the material channel which controls the particle scale. The particles will take their scale from this channel, which is turned off by default. This does not have to be the same channel as the Emission, Color, or Speed channels.

When this channel is used, two more controls become available. These are the 'Scale Multiplier' and 'Scale Affects' controls.

Scale Multiplier

The sampled colour from a texture will always return values between 0 and 1. Clearly, the particle scale cannot be restricted to such a narrow range. The value in this setting is multiplied with the colour value to give the actual scale. This allows you to scale the particles up (or down) as much as desired.

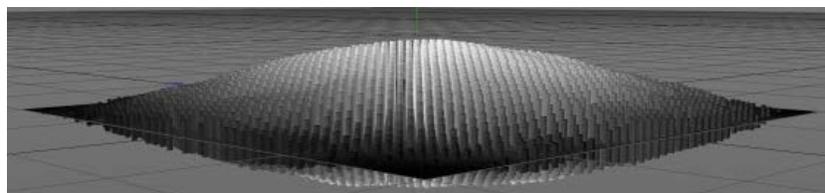
Scale Affects

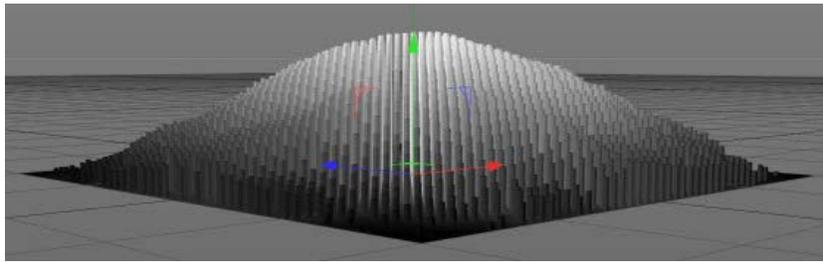
By default, the scale colour will affect all three axes in the scale. But you may want to restrict its effect to one or two axes instead. This drop-down has all seven possible combinations ranging from only one axis up to all 3, in any combination.

Use Z-Offset

If the particle scale is affected by the texture, then the particle will continue to be emitted at the same point. This will cause larger particles to be 'embedded' more deeply in the polygon surface. In some cases you might prefer the 'base' of the particles to be aligned to the same level. To do that, check this switch. In most cases you will also need to turn on particle rotations and set them to 'Tangential' to align the Z-axis of the particle along the direction of travel (Normal or Phong Normal work best here). You may also need to adjust the offset from the surface with the 'Offset Origin' slider.

These two images show the difference. In both the scale is controlled by the texture (affecting the Z-axis only) and the particles are oriented along the Z-axis. In the first image 'Use Z-Offset' is unchecked, and in the second it is checked.





Shader

Instead of using an existing texture tag, you can set up any shader in exactly the same way as if you were using the material editor. Or, you can copy a channel from a material and paste it into this field. Note that the 'Shader' field is disabled if there is a texture tag in the 'Texture Tag' field. If you set up a shader, then add a texture tag, only the tag is used; the shader will be ignored.

Shader Affects

This drop-down governs which parameters of the particle are affected by the shader. The options are:

- Color
- Speed
- Color and Speed
- Neither

Mode

This is used when controlling particle emission with a texture. It has no effect on particle colour. It has four settings:

- Color Brightness: the brighter the colour, the more particles are emitted. If you find that more particles are being emitted from darker areas than you would like, you can increase the 'Contrast' setting to reduce emission from dark areas. Conversely, turning down the contrast below zero will increase emission from darker areas.
- Red, Green, Blue: these options will emit more particles where there is a higher proportion of red (or green, or blue) in the colour. Again, the contrast can be used to increase or decrease emission.

Invert

Checking this switch will invert the emission so that (for example) if 'Color Brightness' is being used, checking this switch will emit more particles from darker areas than bright ones.

Contrast

This is used in conjunction with the 'Mode' setting. See above for details.

Max. Samples

The emitter samples the colour of the object to find a point where a particle can be emitted. Imagine a surface which is pure black and the 'Invert' switch is unchecked. The emitter will never find a point where a particle can be emitted, so would potentially search for one for ever, which would lock Cinema up. To prevent that, the emitter only tries the number of samples in this field and then gives up if it can't find a suitable point. If you have a very dark surface with only one or two bright spots, you can increase this value to increase the chance of an emission point being found, but doing so will slow down playback time.

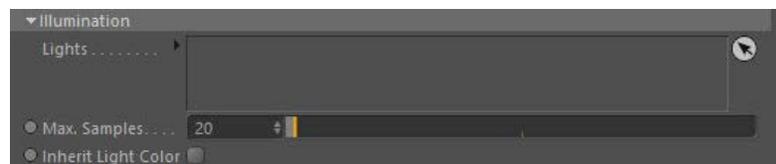
Sample Polygon Centre Only

Normally, emission from a texture works by sampling all areas of a polygon. If you only want to sample the centre of the polygon, check this switch. Note: this will cause particles to be emitted only from the centre of each polygon.

Illumination

 In this mode you can control emission from an object by the illumination of its surface by scene lighting.

Selecting this option brings up these settings:



Lights

Drag the lights you want to control emission into this list. If there are no lights in the list, no particles will be emitted.

Max. Samples

If you use a spotlight, the emitter will sample the surface of the object in an attempt to find an area which is illuminated. If the spot is very small, this may take a long time, so this setting controls how many samples are taken before the emitter assumes that the object is not illuminated. Increase this value if you use a small spot and don't get many particles being emitted.

Inherit Light Color

If this is checked, the emitted particle will inherit the colour of the light falling on the surface.

Caveats when using Illumination mode

1. Illumination control only works when using actual lights (omni, spot, etc.). It will not work with GI or image-based lighting or IES lights.
2. Note that increasing light brightness over 100% will not increase the maximum number of particles emitted. This is still determined by the Emission tab of the emitter. Lower brightness may cause a reduction in the number of emitted particles, but the number set in the

- Emission tab cannot be exceeded.
- 3. Shadows are not taken into account as this causes very large increases in computation time.
- 4. Best results are obtained with spotlights which give you better control over the area of the object which is illuminated.
- 5. Using two lights with overlapping areas of illumination will result in a particle being emitted using the characteristics of one of the lights. The illumination from multiple lights is not combined before emitting a particle. This is currently a limitation which may be changed in future versions.

Voxel grid emission

A voxel is simply a cubic cell of fixed size, representing a cube of 3D space. Any object can be divided up into voxels, the number of which will depend on the size of the voxel. You can use this mode, for example, to divide an object into a number of small invisible cubes, each containing a single particle.

When you select this emission type, you see the additional settings:



Max. Retries

[See above](#) for discussion of this setting.

Voxel Grid Size

This is the size of the grid in scene units. It determines how many voxels are used and therefore the number of generated particles. It is not always easy to decide what size this should be. For example, a grid size of 10 in a Cube primitive of 200 units on each side will result in a total of 8000 voxels ($200 / 10 = 20$, $20 \text{ cubed} = 8000$). But for an irregular object deciding on the correct size may take a certain amount of trial and error.

Caution: setting the grid size too small may require a very large number of particles to fill the grid!

Voxel Fill Mode

This drop-down has two settings:

- Random: voxels are selected randomly and a particle emitted from that voxel.
- Ordered: the voxels are used in order. You can select the order in which to use the voxel grid with 'Voxel fill axis' setting.

Voxel Fill Axis

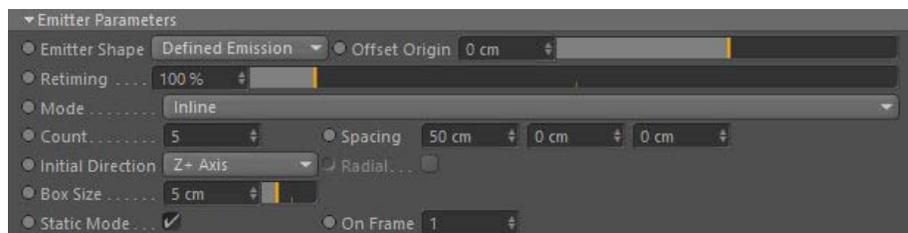
if 'Ordered' fill mode is selected, the grid can be filled along the X, Y, or Z axis using this drop-down menu. If you set the particle speed to zero, and check 'Stop on Grid Full' you will end up with the object filled with a grid of particles.

Stop on Grid Full

This is only available if 'Ordered' fill mode is selected. Emission of new particles will stop when a particle has been emitted from each voxel.

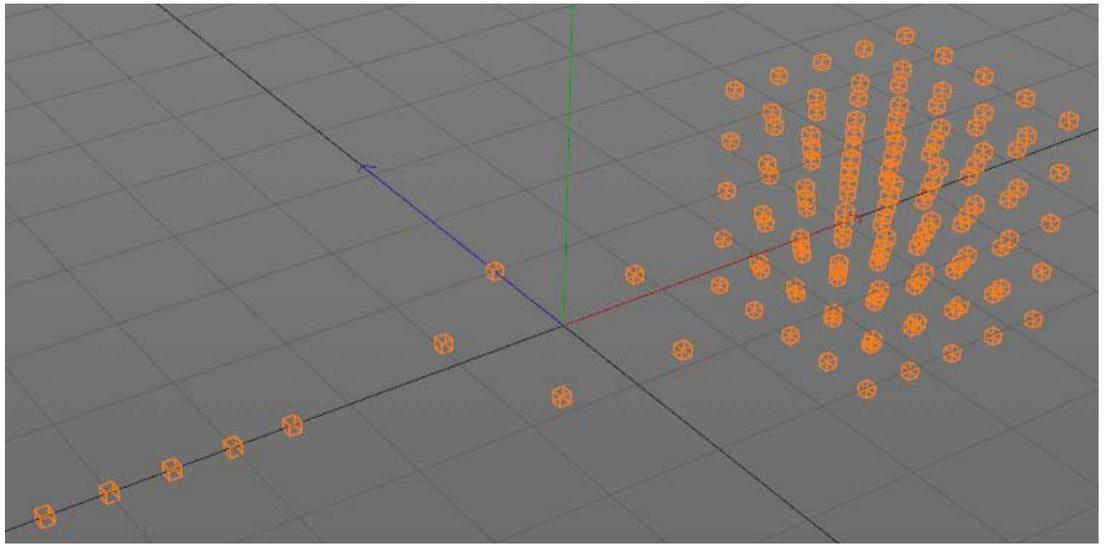
Defined Emission

Defined Emission allows you specify exactly where and how many particles will be emitted using a variety of adjustable patterns.



Mode

This allows you to choose the pattern to use. Currently there are three (Inline, Circular, and 3D Grid, plus a fourth special mode for use with the Fragmenter object). The three pattern modes appear in the editor like this:



In each mode, one particle will be emitted from every box, each frame.

Inline mode

There are two settings:

- Count: the number of boxes in the line
- Spacing: the spacing between them, on the X, Y, and Z axes

Circular mode

There are six settings:

- Count: the number of boxes in the circle
- Radius: the circle's radius
- Repeat: the number of circles; these will be stacked on top of each other along the Y-axis of the emitter
- Repeat Spacing: the distance between the circles if there is more than one
- Slice Start and Slice End: by default the circle is the full 360 degrees, but you can use these settings to make a part-circle from (for example) 90 to 270 degrees, or any other combination

3D Grid mode

There are two settings:

- Count: the number of boxes in the grid along each of the three axes
- Spacing: the spacing between them, on the X, Y, and Z axes

Fragmenter List

This option causes the emitter to work in conjunction with a [Fragmenter](#) object in 'Objects' mode. Please see the documentation for the [Fragmenter](#) for details.

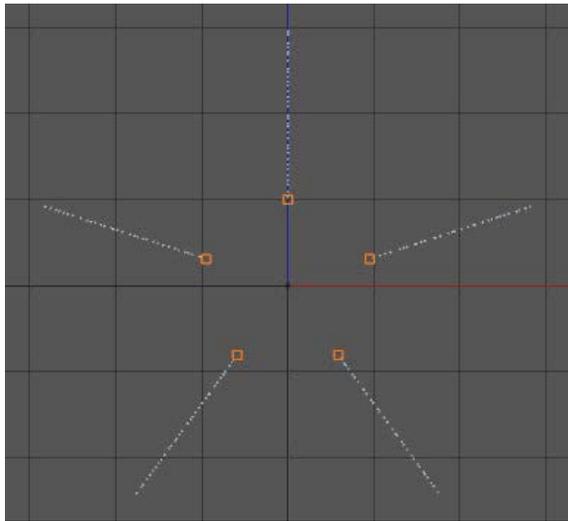
Initial Direction

This drop-down sets the initial direction of the particles. This can be:

- Random: each particle has a randomly-assigned direction
- X+/X-: particles move along the positive or negative X axis
- Y+/Y-: particles move along the positive or negative Y axis
- Z+/Z-: particles move along the positive or negative Z axis

Radial

This switch is only available in Circular mode. It causes the 'Initial Direction' setting to be ignored and the particles emitted in a radial fashion outward from the boxes like so:



Box Size

The size of the boxes in the editor. These are never rendered.

Static Mode

One of the most useful ways to use defined emission is for the emitter to emit one particle for each box on just one frame. By linking the emitter to a Generator or Sprite object, you then have a simple cloner, but with the advantage that the particles (and therefore the objects) can be controlled by the X-Particles particle engine.

Checking this box will set this up for you automatically. It will set the emission to occur on one frame, which you specify in the 'On Frame' field.

On Frame

The frame to emit on if 'Static Mode' is checked.

Initial State

With these settings you can play back the emitter to a point of your choice, then click the 'Set State' button. If you then rewind the animation, when you play back again the emitter starts from the point at which 'Set State' was clicked.

Use Initial State

Once the initial state has been set, you can turn it on or off with this switch. Turning it off does not clear the initial state from memory.

Scale

(Click the small black arrow to the left of the words 'Use Initial State' to access this setting).

This is used to scale the particle system if you are importing from, or exporting to, the Partio file format (that is, if you click 'Load State...' or 'Save State...'). To save the initial state to a partio format just set the file extension, e.g. .prt for PRT.

Compressed

If checked, the initial state data will be compressed in memory (useful if you have a very large number of particles).

Set State

Click this button to set the initial state at the frame of your choice.

Clear State

Clicking this button will delete the initial state data.

Load State

Click this button to load a saved initial state. You can load any X-Particles emitter cache file as the initial state or any file format supported by the cache reading (such as RealFlow BIN).

Save State

Save the initial state to disk. The saved file has the same format as a cache file.

Using the Initial State

If you set the initial state then rewind the document to the start, when you play the scene again the emitter will, on the first frame, emit the number of particles in the initial state, in the positions they were in when the state was set. From then on it will continue to emit particles as normal. If you would prefer that only the particles in the initial state are emitted and no more, set the emitter's 'Emission Mode' in the 'Emission' tab to 'Controlled Only'.

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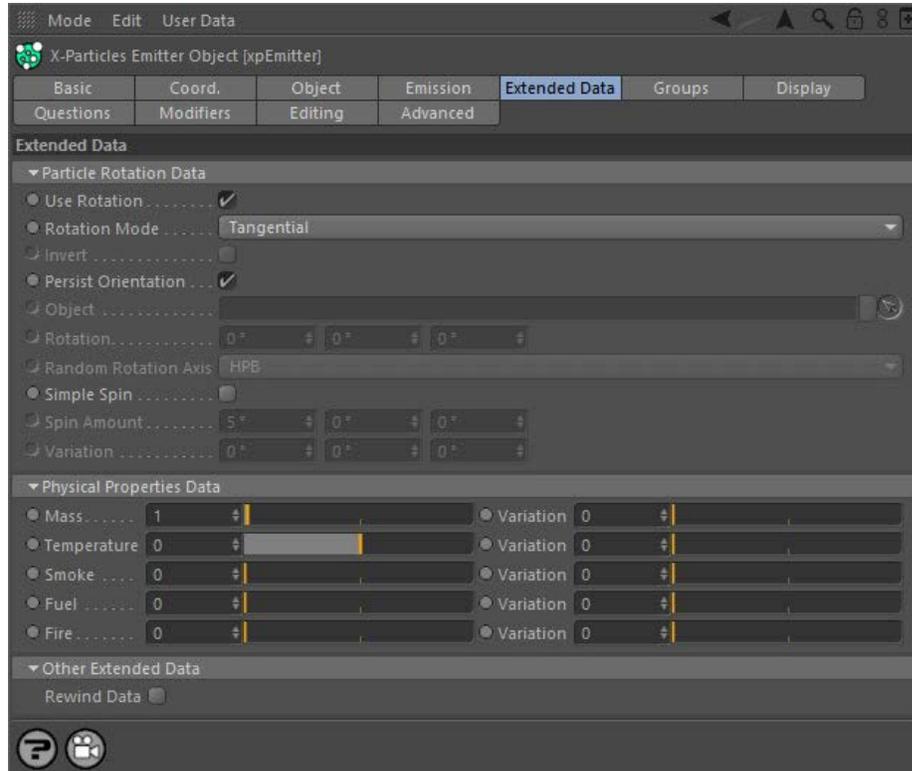
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Emitter: Extended Data Tab

This tab deals with additional data which can be used by the particles. An X-Particles emitter will always create certain basic data for all particles, such as speed, direction, color, etc. But in some cases additional data, sometimes quite a lot of it, may be required for certain functions. Always including this data, even when it will never be required, is very wasteful of RAM and may also slow down the particle engine, so this extra data is only stored when required.

In some cases the extra data will be added automatically, but in others you must specify that you require this data. For example, if you want to use particle rotations, you must check the switch 'Use Rotation' in the rotation data section in this tab.

Interface



Sections

[Particle Rotation](#)
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Particle Rotation

This group of settings determines particle rotation and spin. Therefore, if you want to rotate or spin your objects, you must turn on particle orientation in the emitter. By default, rotation is not enabled since it requires significant extra data to be allocated to the particle. If you don't need to rotate the particles or generated objects, leave 'Use Rotation' unchecked.

 If a Spin modifier is affecting the particles, the modifier will override the Set and Random modes for rotation and will also override the Simple Spin settings. This is to prevent conflicts between the emitter and the modifier when rotating particles.



Use Rotation

To use particle rotation, check this switch. This is essential if you want to rotate objects linked to the particles, but it uses additional memory so is not enabled by default.

Rotation Mode

This drop-down has six settings:

[None](#)

- [Limit](#)
- [Network](#)
- [Rotator](#)
- [Sound](#)
- [Speed](#)
- [Spin](#)
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The particles are not rotated but the necessary data structures are created so that you can use a Spin Modifier, for example, to spin the particles (and linked objects).

Tangential

The particles are rotated to align with their direction of travel. If the 'Persist Orientation' switch is checked, the particles will be reoriented each frame as their direction changes.

Set

A specific initial rotation can be given to the particles by changing the value in the 'Orientation' field. A Spin modifier, if present, will override this setting.

Random

The particles are given a random initial rotation. The axis on which the rotation is set can be changed in the 'Random Orientation' drop-down. A Spin modifier, if present, will override this setting.

Face Camera

The particles are rotated to align their Z-axis towards the current camera. If the 'Persist Orientation' switch is checked, the particles will be reoriented each frame as their location and direction (or that of the camera) changes.

Face Object

The particles are rotated to align their Z-axis towards the object given in the 'Object' field. If the 'Persist Orientation' switch is checked, the particles will be reoriented each frame as their location and direction (or that of the object) changes.

Persist Orientation

Only used in 'Tangential', 'Face Camera' or 'Face Object' modes. If it is unchecked, the particles are oriented correctly on birth but are not re-oriented as the scene plays. If it is checked, the orientation will be constantly maintained and updated.

Object

Drag the object the particles should face into this field. Only used in 'Face Object' mode.

Rotation

You can set the particles to a specific initial rotation in this field. Only used in 'Set' mode.

Random Rotation

If the 'Mode' is set to 'Random', the axis or axes to be randomly rotated can be set in this drop-down. There are seven options representing all possible axis combinations.

Simple Spin

If you need to make the particles spin, check this switch. You can then set the amount of spin and add some variation between particles if required.

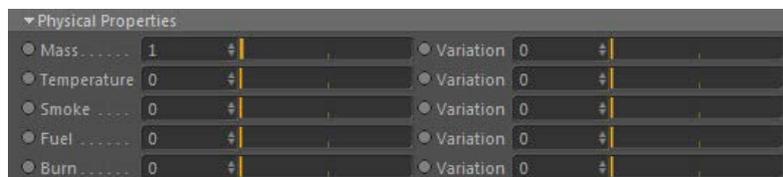
A Spin modifier, if present, will override this setting and will take over spinning the particles. In previous versions of X-Particles, a Spin modifier was required to make generated objects spin. For simply spinning an object, the modifier is no longer required and the object will take its spin from the particle spin. You can still use the Spin modifier if you need to do things such as increasing or decreasing spin during the animation.

Spin Amount and Variation

This is the amount of spin per particle if 'Simple Spin' is enabled. The 'Variation' setting will give a different spin rate to different particles.

Physical Properties

In this section you can set various 'physical' properties of the particles. These are used in the FLIP system for smoke, fire, etc. Particle mass is also used in other areas such as the [Drag modifier](#).



The following settings can be changed, with variation between particles if required:

- Mass
- Temperature
- Smoke
- Fuel
- Burn

Other Extended Data

Rewind Data

Check this box to enable data recoding for the Rewind modifier. See the [Rewind modifier](#) page for more details.

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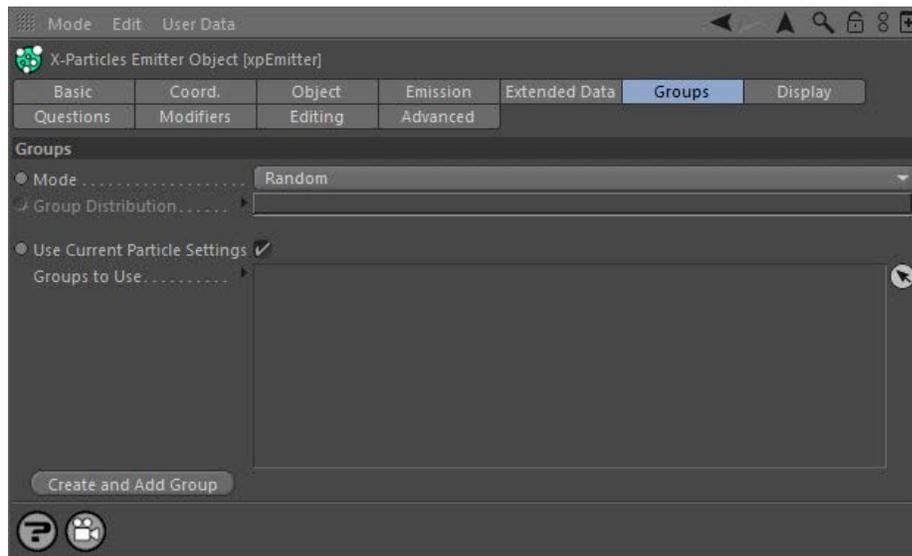
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Emitter: Groups Tab

This tab controls the use and creation of particle groups by this emitter.

Interface



It is possible to assign particles to different groups. This is useful because you can use a Question object to test whether a particle is in (or not in) a group, and trigger an Action for that group, or determine which particles are affected by a particular modifier.

Parameters

Mode

This drop-down list has four options:

Random

When particles are created they are assigned randomly to one of the groups in the 'Groups to Use' list.

Sequential

The first particle is assigned to the first group in the list, the second particle to the second group, and so on. When the end of the list is reached, it wraps around to the beginning of the list again.

Use Gradient

You can use a gradient to control the distribution of groups. Click the little black arrow next to the 'Mode' drop-down to reveal the gradient to use.

First Group Only

Causes the emitter to emit particles in the first group only, if there is one. The reason for this is so that you can create groups associated with this emitter and then switch between them. Otherwise the emitter would create particles belonging to all the groups.

Group Distribution

The gradient used to distribute particles between groups in 'Use Gradient' mode.

Using the Gradient distribution

The colours in the gradient are not relevant - what matters are the knots. You need one knot per group. The emitter will handle the situations of too many or too few knots gracefully though; if it can't determine what group to use it puts the particle in the default group.

Suppose you have two groups. If there are no knots in the gradient, all particles go into the default group. If there is one knot at (for example) 25%, then 25% of the particles will be in group 1 and all the rest in the default group. Adding a second knot at 100% will put all particles not in group 1 into group 2; moving that second knot to 75% would put 25% of particles in group 1, 50% in group 2, and the rest in the default group. It's easier to use than it is to explain!

Use Current Display Settings

If this switch is checked, any group created with the 'Create and Add Group' button will have the same settings as in this emitter - that is, same colour, speed, radius, etc. If it is unchecked the new group will use the default particle settings found in the [X-Particles Preferences](#).

Note: if the 'Random Color on Creation' switched is checked in the main X-Particles preferences, each group will have a random colour when created. This will override the colour specified in the emitter and in the main preferences. Turn that switch off if you don't like this behaviour.

Groups to Use

Drag the [Particle Group objects](#) you want to use into this list. If no groups are present in the list, all particles will be in the default group 0 (zero) and will have the settings found in the 'Particle Display' tab. If more than one group is in the list, new particles will be assigned randomly or sequentially to one of the groups, depending on the 'Mode' setting. They will then take their appearance from the group they are in.

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Create and Add Group

Clicking this button will automatically create a new Group object and insert it into this list. This is exactly the same - but more convenient - as going to the X-Particles menu and clicking on the xpGroup object in the 'Other objects' sub-menu.

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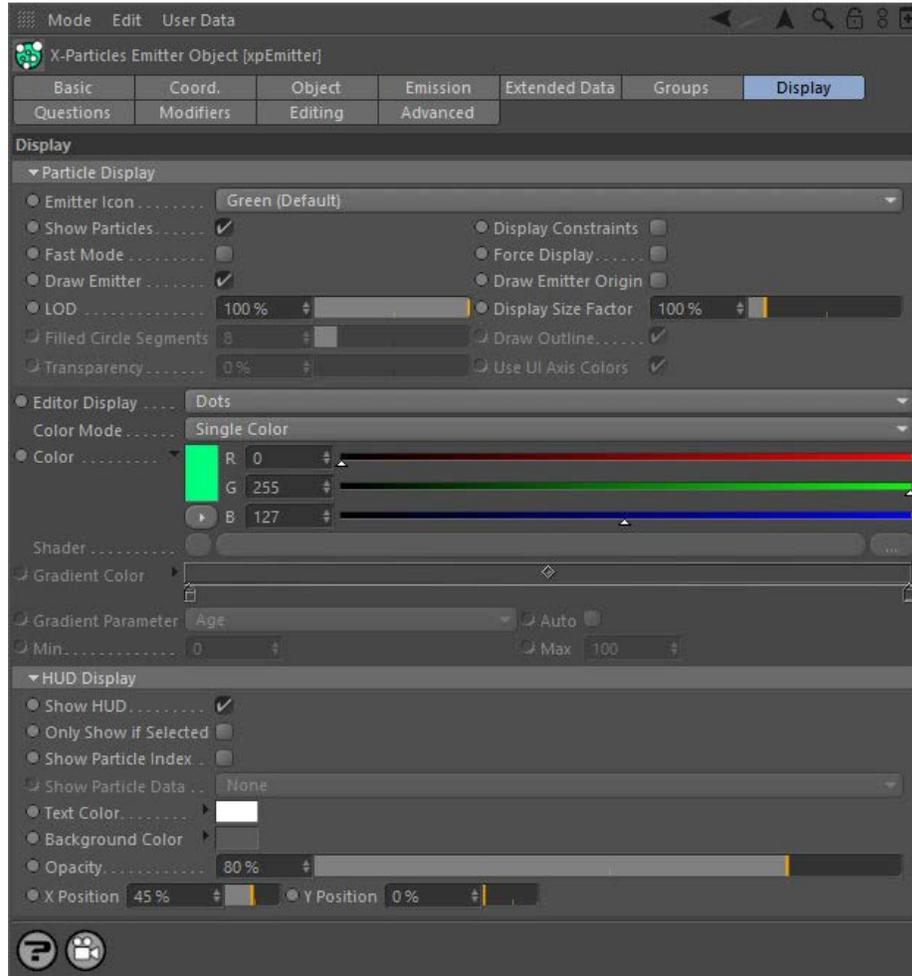
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Emitter: Display Tab

This tab controls the appearance of particles in the editor.

Interface:



Parameters

Emitter Icon

This drop-down menu offers several colours for the emitter's icon. This can be useful when you have multiple emitters in the Object Manager and you need to be able to distinguish between them.

Show Particles

If this is unchecked, no particles will be shown. They will still be generated though, so that you can turn them on at any point and have them show on screen.

Display Constraints

If constraints are enabled in the [xpConstraints object](#), if this switch is checked the connections between particles will be displayed as thin yellow lines.

Fast Mode

This is a special setting for use with very high particle counts. It provides the fastest way of drawing particles in the Cinema 4D editor. When this mode is selected, the particles are drawn as dots and only as a single colour. The gradient is not available.

Force Display

Each particle "knows" its own type - Dot, Sphere, Tick, etc. Normally the particle will be drawn in the editor using its own type. However, if 'Force Display' is checked, all particles will be drawn using the type in the Display tab.

Draw Emitter

Unchecking this switch will mean that the emitter shape will no longer be drawn in the editor. It does not affect anything else and is not used if 'Emitter Shape' is set to 'Object'.

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If checked, a small cross will be drawn at the center of the emitter, plus a line pointing along the emitter's Z-axis (this line is not drawn if the shape is set to 'Sphere').

The origin is not shown if the emitter shape is set to 'Object' or 'Defined Emission'.

LOD

LOD is Level of Detail. If you are generating millions of particles, the screen redraw may become very slow, even in fast mode. This is not the fault of X-Particles, it is due to Cinema 4D's screen handling. You can speed up the editor redraw by reducing the LOD to less than 100%. This will cause fewer particles than actually exist to be drawn in the editor, thereby speeding it up.

This does NOT affect the total particles rendered at render time!

Display Size Factor



Changing this value will alter the size of the displayed particles in the viewport. Increasing it can be useful to visualise very small particles more easily. Note that this does NOT affect the particle radius or scale, it is simply an editor display feature. Note that this feature does not work with the Dots, Squares, or Lines display types.

Filled Circle Segments



If you select the 'Circle (Filled)' display type, you can use this setting to specify the number of segments in the filled circle. A smaller number will result in a faster editor display. This is only a viewport setting and does not affect the rendered result.

Draw Outline



Only used with the 'Circle (Filled)' display type. It causes a slightly darker outline to be drawn around the circle.

Transparency

Only used if you select 'Sphere' or 'Circle (Filled)' as the particle type.

Use UI Axis Colors

Only used if you select 'Axes' as the particle type. If checked, each axis will be drawn in the same colour used in the world or object axes - normally red, green, and blue for X, Y, and Z. If unchecked, each axis is drawn in the colour specified by the 'Color Mode' setting.

Display Settings

Important: the controls in this section are unavailable if there are one or more particle groups in the 'Groups to Use' list in the Groups tab. This is because the display parameters are controlled by the group, not the emitter.

Editor Display

This is the shape of the particle in the viewport. You can choose between:

- Dots
- Ticks
- Axes
- Squares
- Box
- Box (Filled)
- Spheres
- Lines
- Circle
- Circle (Filled)
- Pyramid
- Arrow
- Arrow (Filled)
- Plane
- Plane (Filled)
- None

'Lines' will show the particles in the same way as the standard Cinema 4D emitter, that is, they are drawn as short lines whose length is dependent on the particle speed. 'Axes' are drawn as three short lines representing the particle's rotation axes (X, Y, and Z). If you choose Spheres or Circle (Filled), you can also set the degree of transparency of the sphere or circle.

You should be aware that Spheres are the slowest to draw and Dots are the fastest - important when visualising large numbers of particles!

Choosing 'None' will cause no particles to be drawn (they are still emitted but you can't see them).

Effect of Particle Radius and Particle Scale

Not all display types will change if you change the particle's radius or scale. This table shows whether the display will change in each case:

Display Type	Affected by Radius	Affected by Scale
Dots	No	No
Ticks	No	No
Axes	Yes	No
Squares	No	No
Box	Yes	Yes
Box (Filled)	Yes	Yes
Spheres	Yes	No
Lines	No	No
Circle	Yes	No
Circle (Filled)	Yes	No

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Pyramid	Yes	Yes
Arrow	Yes	No
Arrow (Filled)	Yes	No
Plane	Yes	Yes
Plane (Filled)	Yes	Yes

Color Mode

Note: the particle colour is not only seen in the editor but has an effect on several options at render time - such as the Skinner Shader, the X-Particles Material, the Sprite Shader and other objects: all of these make use of the particle colour.

This drop-down has five options:

Single Color

The particles all have the same colour, from the 'Color' setting.

Random Color

Particles are assigned a randomly-chosen colour.

Gradient (Random)

A random colour is chosen for each particle from the 'Gradient Color' gradient.

Gradient (Parameter)

The particle colour is chosen from the 'Gradient Color' gradient but the colour chosen is determined by the 'Gradient Parameter' drop-down.

Use Shader

In this mode particles are coloured by a shader placed into the 'Shader' link.

Color

The color of the particle in the viewport. This is used in the editor and in the X-Particles material if that is set to use the particle colour. The default is a light green.

Shader

The shader to use in 'Use Shader' mode.

Gradient Color

This is used in 'Gradient (Random)' and 'Gradient (Parameter)' modes. By default this is a blue to white gradient.

Gradient Parameter

In 'Gradient (Parameter)' mode the colour the particles are given is taken from the 'Gradient Color' but the precise colour is determined by the chosen setting in this drop-down. The parameters available are:

- Age
- Speed
- Radius
- Mass
- Density
- Temperature
- Smoke
- Fire
- Fuel

For example if the parameter is 'Age', new particles are given the colour from the extreme left of the gradient, particles at the end of their lifespan are drawn in the colour from the extreme right of the gradient.

Auto

When this switch is checked, the colour gradient is automatically mapped to the range of values in that property. For example, if 'Speed' is chosen in 'Gradient Parameter', the slowest particles are given the colour at the left edge of the gradient, while the fastest ones are given the colour at the right edge. If this switch is unchecked you can choose the range to map to the gradients using the 'Min' and 'Max' settings.

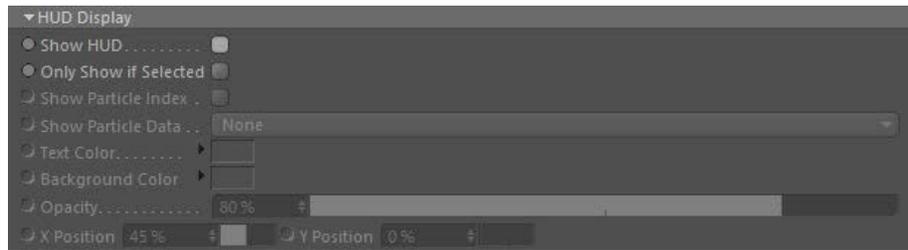
Min, Max

The minimum and maximum values to use when the 'Auto' switch is unchecked.

Note: this does not work with the 'Age' parameter. Age is always determined automatically.

HUD Display

Checking 'Show HUD' will show a very simple head-up display giving the emitter name, the number of live particles, and the number of remaining particles which are still available but haven't been generated yet. These two numbers will be updated each frame as particles are born and die.



Show HUD

If checked, shows the HUD in the editor.

Only Show if Selected

If checked, the HUD will only be shown if 'Show HUD' is checked AND the emitter is selected in the object manager.

Show Particle Index

If checked, each particle will have a small label showing its index number. You can use this in Questions which test for the particle index.

Show Particle Data



This drop-down menu lets you choose an item of particle data to be displayed alongside its index. 'Show Particle Index' must be checked for this option to become available. The possible data items that can be displayed are:

- Age (Frames)
- Age (Seconds)
- Radius
- Speed
- Mass
- Temperature

Text Color, Background Color, and Opacity

These settings allow you to change the colours used in the HUD and its opacity.

X Position, Y Position

These settings give the location of the HUD on the screen, expressed as percentages of the screen width and height. You can change these to alter the HUD location. (Unlike the Cinema 4D HUD, you can't drag the HUD around the screen.)

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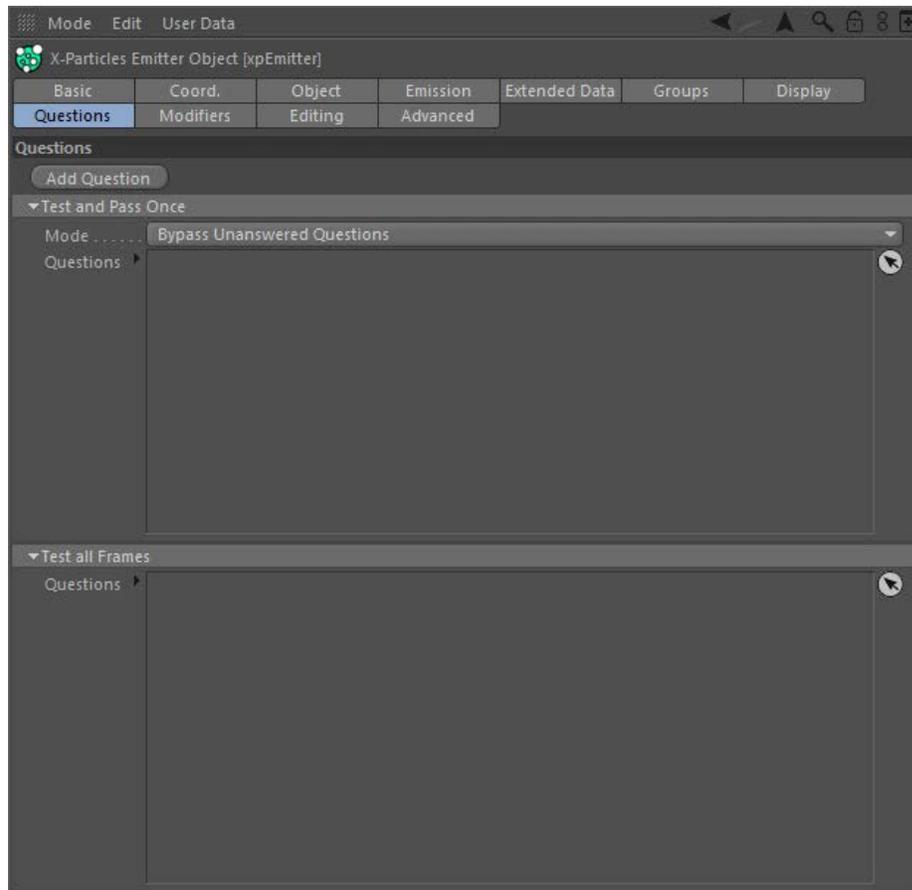
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Emitter: Questions Tab

Interface:



Settings

This tab contains the list of Question objects which particles generated by this emitter will be tested against.

Add Question

Clicking this button will create a Question object and will automatically add it to the emitter's Questions list (note: the Question is added to the 'Test and pass once' list. If you need the Question to be in the 'Test all frames' list, you will have to copy it into that list and delete it from the first list). This is a convenience function to allow you to add a question object to the scene and assign it to this emitter without having to drag it into the questions list manually.

Question lists

There are two lists of questions. Drag a Question object into one of these lists, or click the 'Add Question' button..

The first list - 'Test and Pass Once' contains those questions which are tested for each particle until it passes the question. From that point on, the question will not be tested again for that particular particle. This is very useful for building up sequences in which certain actions only take place once previous ones have been carried out. How this works is governed by the 'Mode' setting and is explained fully in the [Question object](#) page.

The second list - 'Test all frames' contains questions which will be tested against each particle every frame. Even if the question is passed for a particle in one frame, it will continue to be tested each frame. This is particularly useful when you want an action to be carried out every time a certain criterion is met.

Note that any question can be dropped into either or both lists.

Mode

This drop-down menu only applies to questions in the 'Test and pass once' list. It has two entries:

- Bypass unanswered questions [default setting]
- Strict sequential order

Please refer to the [Question object](#) where these options are explained.

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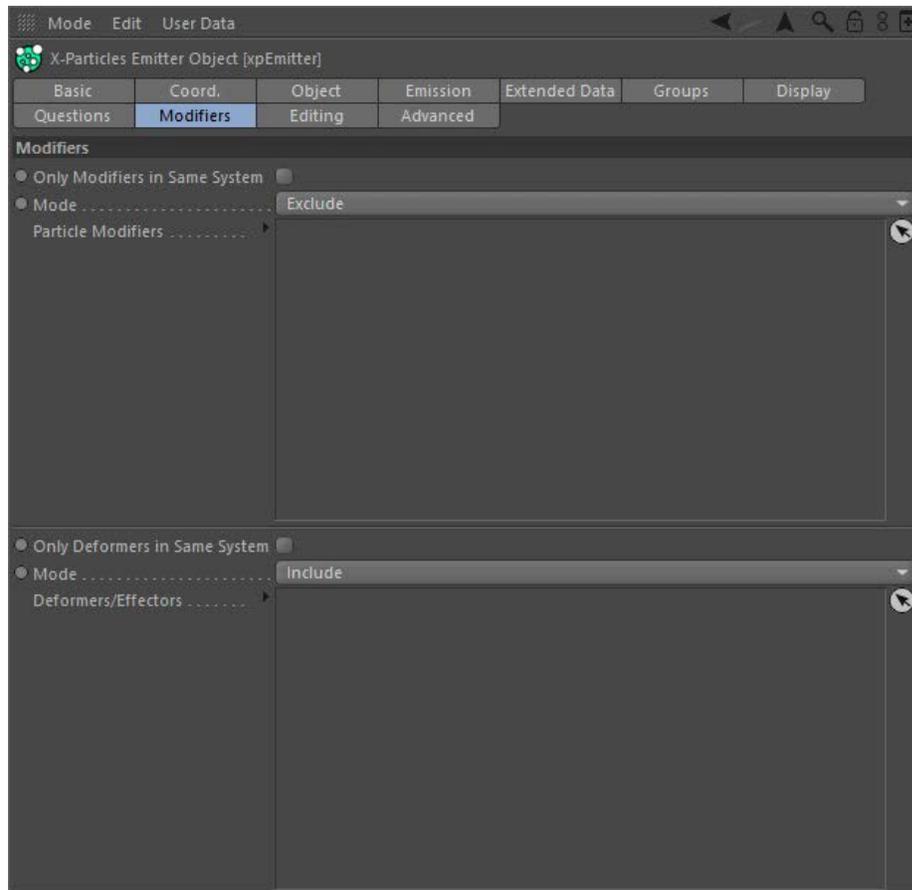
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Emitter: Modifiers Tab

Interface:



Particle Modifiers

Include/Exclude list

This tab contains an include/exclude list of particle modifiers acting on this emitter. The list works in exactly the same way as in the standard Cinema 4D emitter. In summary:

- If the mode drop-down is set to 'Exclude' (the default setting) all the particle modifiers in the scene will act on this emitter EXCEPT those which are dragged into this list.
- If the mode is set to 'Include' the ONLY modifiers in the scene which will act on this emitter are those which are dragged into this list.

Only Modifiers in Same System

If this switch is checked, the emitter will only be affected by modifiers which are child objects of the same System object as the emitter.

Consider a scene in which you have two emitters and multiple modifiers. You want emitter 1 to be influenced by some modifiers but not others, and emitter 2 to be influenced by a different set of modifiers. You could do this by dragging the modifiers for emitter 1 into the list and setting it to include, and doing the same for emitter 2, but it's inconvenient and in a complex setup still leaves you wondering which modifiers affect which emitters.

The alternative is to create two System objects with one emitter under each System object. Then create the modifiers which affect emitter 1 as child objects of the same System object and check the 'Only modifiers in same System' switch. Do the same for emitter 2's modifiers. Now emitter 1 and emitter 2 are only affected by the modifiers in the same System object as themselves. All other modifiers - in other System objects, or not in a System object at all - are ignored.

Note that this will only work if the emitter is in the object hierarchy under a System object. If the emitter is in the root of the object manager, or in some other object chain, this setting will have no effect.

Deformers/Effectors

Drop the deformers or effectors you wish to affect the particles into this list. The 'Mode' and 'Only Deformers in Same System' switches are identical in function to the Particle Modifiers section.

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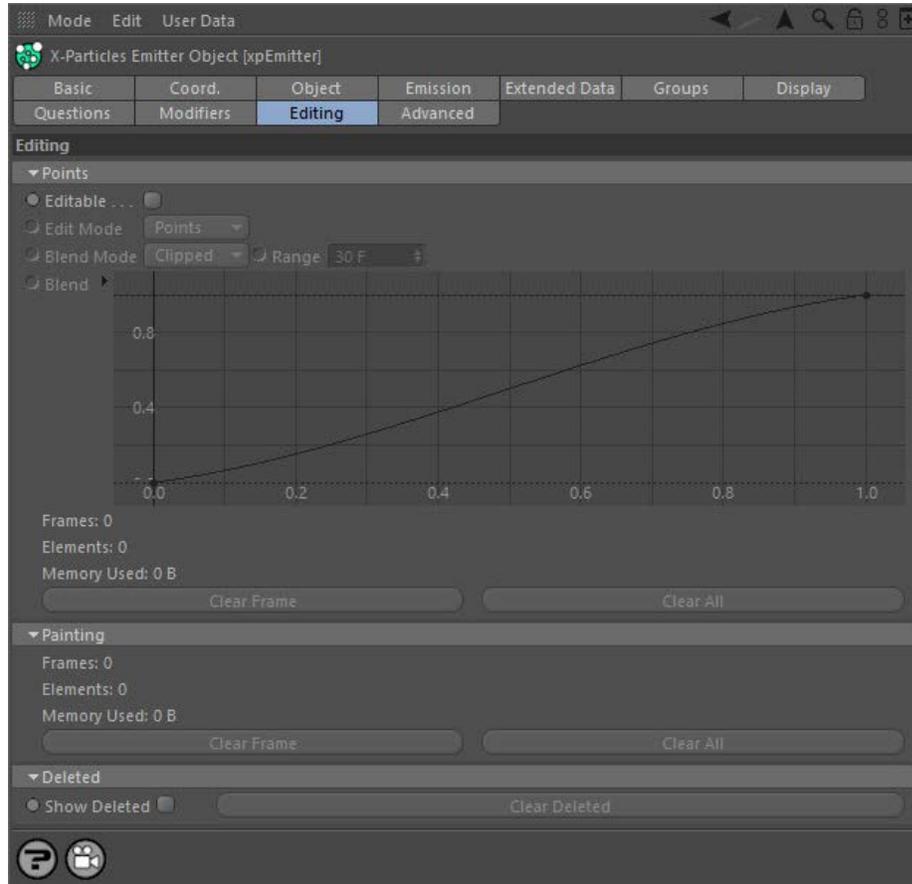
Emitter: Editing Tab

Interface

This tab allows you to select particles then use any point-editing tool, such as move or delete. With this you can, for example, remove stray particles that you don't want.

Here is a brief summary of how to edit particles:

1. Play your animation to the frame where you want to start editing, (best is at the end). Note that a keyframe marker will appear in the powerslider to show you where the edit was made. You can edit particles on multiple frames.
2. Enable 'Editable' and go into points mode. The particles now become points; you can select, delete, move, reposition etc. them using the live selection, move tool, brush tool, magnet, etc.
3. Now play your animation and the particles will reposition themselves to the edited position. They will start to do this a number of frames before the frame in which you made the edit. That number is given in the 'Range' parameter.
4. Note that if you delete any particles they will be gone from the start of the animation.
5. It is also possible to use Cinema's Set Selection commands on edited particles.
6. Setting 'Range' to a longer duration will make the particles start repositioning earlier.
7. The Blend spline works like a ease in and out based on the Range value. This prevents an abrupt transition to the edited state.



Settings

Editable

Check this switch to make particles editable.

Edit Mode

This drop-down has two settings:

Points

Particles are edited as points for the current frame.

Path

Edits the particles' path to the current frame as spline points.

Blend mode

It is possible to edit particles on more than one frame. This drop-down determines how the emitter will blend between edited data on different frames. It has two settings:

Clipped

The emitter will blend between edited frames.

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Mixed

The emitter will mix the blend Ranges of multiple frames.

Range

The number of frames before a frame containing edited data when the transition to the edited state begins.

Blend

This spline determines how the particles will move to their edited state. It can be used to give smooth transitions or more abrupt ones.

Clear Frame

If you move to an edited frame, then click this button, the edited data on this frame only will be removed. How do you know where you made the edit? A keyframe marker will appear in the powerslider when you edit particles on that frame.

Clear All

Removes editing data on all frames.

Painting

This section is used to display information for particles which have been painted using the Particle Paint tool.

Frames

The number of frames containing painted particles.

Elements

The number of particles painted on the current frame. This will be updated as you move through the timeline.

Memory Used

The amount of memory used for painted particles on the current frame.

Clear Frame

Delete painted particles from this frame (you will need to rewind the scene and play forward to see the result).

Clear All

Delete all painted particles from this emitter (you will need to rewind the scene and play forward to see the result)..

Deleted

Show Deleted

If particles were deleted, checking this switch will make them visible and highlight which were marked as deleted. This can be combined with the [Particle Paint](#) tool to undelete particles you have removed.

Clear Deleted

If particles have been deleted by editing, clicking this button will clear the deletion - that is, when you play the animation again, the deleted particles are restored.

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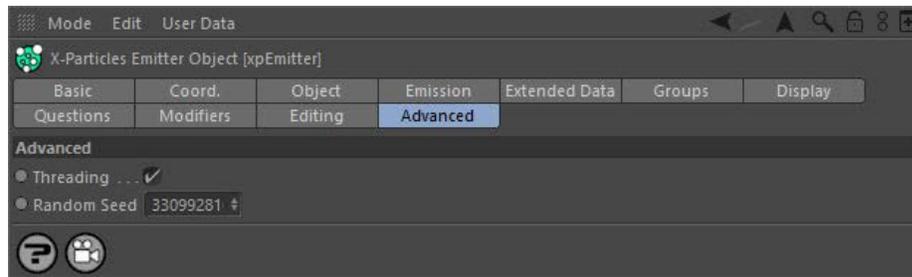
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Emitter: Advanced Tab

Interface



Threading

By default the Emitter is multithreaded. Occasionally this may lead to problems. Normally you should leave this checked, but if unexplained errors occur, you can try disabling threading.

Random Seed

This the seed for the random number generator used by the emitter. You can change this if you have more than one emitter in the scene or your emitters will all generate the same pattern of particles. (This may or may not be an issue for you.) This seed also affects many modifiers which use random numbers, so if you don't like the effects a modifier produces you can try altering this value.

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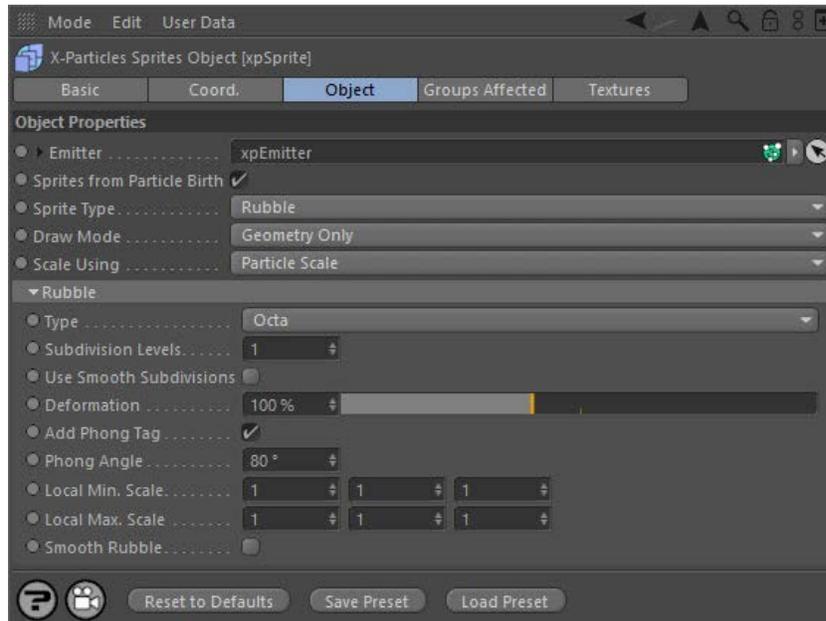
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Sprite object - Rubble generation

The Sprite object can generate simple primitive objects to give the illusion of rubble or gravel.

If you select 'Rubble' in the 'Sprite type' drop-down menu, the interface changes and you see the available parameters for the rubble:



For the 'Groups Affected' tab and the buttons at the bottom of the interface, please see the '[Common interface elements](#)' page.

Type

This drop-down lets you select the shape of the rubble object. The rubble is created from a Platonic primitive and the options in this drop-down are identical to the 'Type' drop-down in the Platonic object. There is one addition - 'Random' which selects randomly from the available types.

Hint: 'Dodeca' produces a good result without being too polygon-heavy.

Subdivision levels

The sprite object can subdivide the basic object to give more polygons. This is important when deforming the object (see 'Deformation' below). The default value is 1, but higher values may give better results; however, as more polygons are generated the editor playback may be slower. A value of 2 is a good compromise. A value of zero means no subdivision will occur.

Use Smooth Subdivisions

If this switch is checked, the subdividing process will use smooth subdivisions. This gives a smoother object but it becomes more spherical in shape, which may not be desirable.

Deformation

This slider will deform the object randomly along polygon normals. The greater the value, the more the deformation.

Add Phong Tag

If this switch is checked a phong tag is added to the object; the angle can be adjusted in the 'Phong Angle' setting. Adding a phong tag will give a smoother object, which may or may not be what you want.

Phong Angle

The phong angle to use if a phong tag is added.

Local Min. Scale, Local Max. Scale

These settings allow you to set the minimum and maximum scale of each object. They are applied in addition to any scale set by the sprite object. So for example, if the particle scale is 2 and the local scale in the rubble setting is also 2, the final scale value is 4. In general it is recommended that you keep the particle scale to 1 and use the local scale settings to determine the size of the rubble. The actual scale used is a random value between the minimum and maximum settings.

Smooth Rubble

If this switch is checked the object is further subdivided one more time using smooth subdivision.

Why have two subdivisions? These settings are independent of one another, but the initial subdivision is carried out before the object is deformed, and the 'Smooth Rubble' subdivision takes place after deformation. As a result they produce distinctly different effects. You can use them together in any combination.

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About this manual

This is the reference manual for X-Particles 3.5. It is an offline manual in HTML format, and can be accessed from any object in X-Particles object by clicking the help button  at the bottom of the attributes manager or dialog box. You can also access the manual from the main X-Particles menu.

Themes

Please note: this is an experimental feature for the manual and may not work on all browsers.

The manual comes with three different themes. To switch between them, click the appropriate button below. Please note that this will store a cookie named 'xpmanstyle' on your computer.

The default theme with a white background.

A soft, pastel theme easy on the eye.

A dark, vibrant theme for those preferring dark backgrounds.

Theme switching should work fine on Firefox without any further action.

For Internet Explorer you may have to tell the browser to allow active content for this site. IE may tell you that it has prevented the 'site' from running scripts or ActiveX content. There is no ActiveX content used by this manual, just some simple Javascript to allow CSS file switching.

Finally, this will not work at all on Chrome, which does not allow file URLs (file:///...) to set cookies. In a future version of X-Particles the manual will be fully online and theme switching should then work on all platforms.

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