

# DOTS

V2.0

particle engine for DigitalFusion and MayaFusion

# manual

# FUSIONTEERS

## Introduction

DOT-s is a particle engine for DigitalFusion and MayaFusion. It enables you to add customized particles to your project. You can control them through various modifiers, forces as well as set different behaviours and the flows can be rendered on a network.

We hope that you will find it useful and have fun playing with it.

You can get support at [dot@fusioners.net](mailto:dot@fusioners.net) - We will try and help you as quick as possible.

## Installation

To install DOT-s, unzip the downloaded file to your root Fusion program directory. Check "Use folder names" in WinZip to maintain subdirectories.

If you want to do it manually, place the file "DOT-s2.dfp" into your Fusion/plugins directory.

## Registration

Load any of the sample flows or add DOT-s [tools/fusioners/DOT-s2.0] to your flow. DOT-s will show a requester with the serial number of your system. Write it down and send it to:

[dot@fusioners.net](mailto:dot@fusioners.net)

You will get a valid serial number as soon as possible.

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NOTE: The demo version can't be serialized. Some routines are left out.

## Setup page

On this page you can set all the basic parameters for your particles.

**Reset position:** resets all particles on the view.

**FastForward:** will fast forward the particle's position (animated modifiers will not be considered).

**Roll Frames:** sets the amount of frames for FastForward.

These three inputs are working in interactive mode only. Rendering will not be affected. you are recommended to hit reset on the first frame of your animation before rendering.

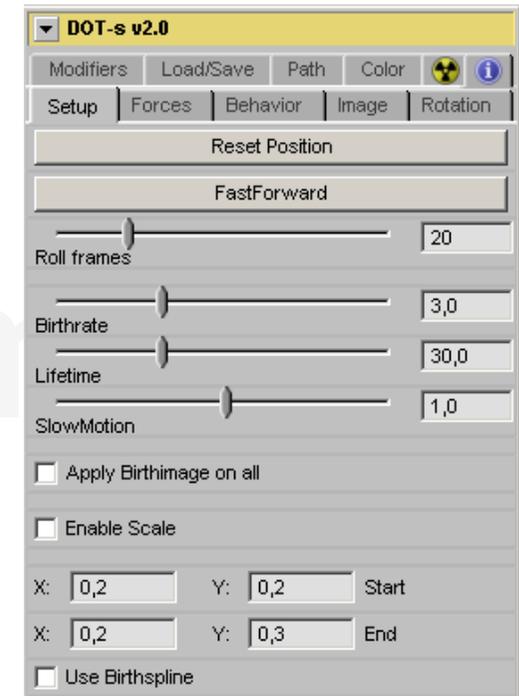
**Birthrate:** defines how many particles are born per frame.

**Lifetime:** determines the lifetime of the particles in frames.

**SlowMotion:** lets you set the overall speed of your particle system. You can slow it down even to a complete stop or speed it up.

It is designed to work with MotionBlur. To get an accurate motion blur on your particles set this value to  $1/(2 * MoBlurQuality) + 1$ . That means, if you have a MotionBlur Quality of 4 set it to:  $1/(2 * 4) + 1 = 1/9 = 0.111111$ . You can simply type "1/9" directly in this field.

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## Setup page

*Apply Birthimage on all:* the current image on the particle input is used for all particles alive.

*Enable scale:* this is used for rescaling the particle image.

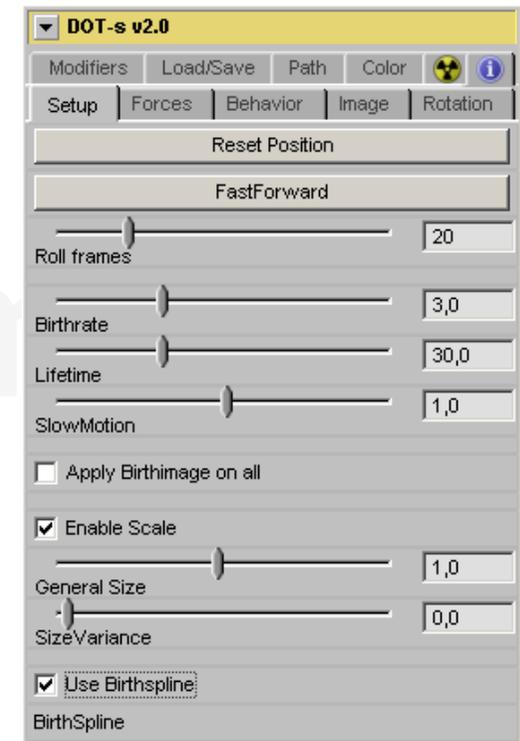
*General Size:* sets the overall size of the particle image.

*ScaleVariance:* defines the size variation of the particles. A value of 1 will result in very different sized particles, lower values will make them more uniform sized.

*Birthline Start and End:* defines the line on which the particles are born. You can add a path to each coordinate or connect it to a tracker. Connect one to the other, using the RMB menu, to get a point source for the particles.

*Use Birthspline:* Check this feature to create a path on which the particles are born. Of course you can connect this spline to any available path in your flow and even animate it. Default is not animated.

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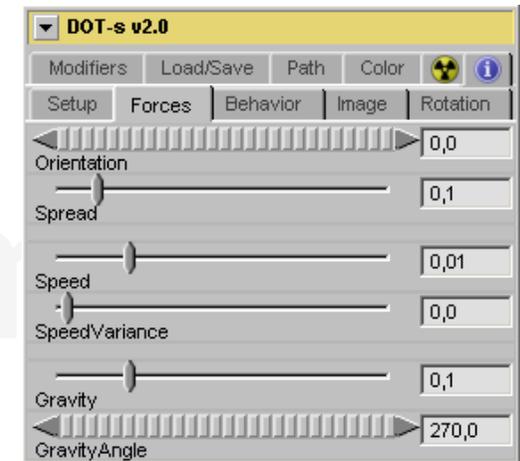


## Forces

- Orientation:** sets the initial direction of the particles.
- Spread:** determines the spread of the particles. A value of 1 means that the particles fly out in every direction.
- Speed:** sets the initial velocity.
- SpeedVariance:** adds or subtracts randomness to the velocity. 0 means every particle has the same speed, while 1 means that every particle has a totally different speed.
- Gravity:** sets the strength of gravity.
- GravityAngle:** sets the direction of gravity.

Please note that the default values have changed to lower values. Also the slider ranges for force and gravity have tighter ranges now to control slow particles better.

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## Behaviour

*Fade In/Out:* turns fade on and off.

*Fade Spline:* please see Grow In/Out

*Grow In/Out:* turns growing on and off.

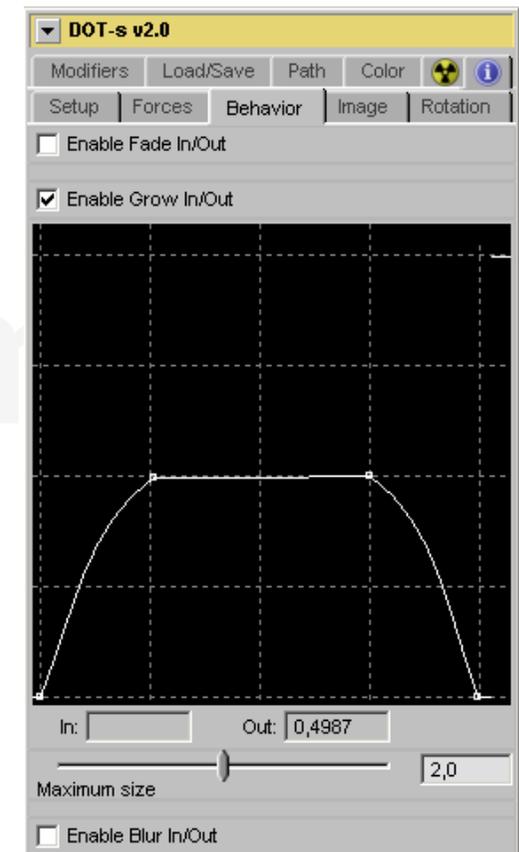
*Grow Spline:* This is a graph that sets the size of the particles over their lifetime. The x-axis (from left to right) is the lifetime. The y-axis (from bottom to top) is the size. In this case the particles will grow to their full size, keep their size and size down again at the end of their life.



*Maximum Size:* Sets the maximum size of the particles, when a control point is at the maximum y-value.

*Blur In/Out:* turns blurring on and off. The Blur spline works exactly the same as the Grow In/Out spline.

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## Image

**Merge:** determines how the particles are merged.

**Blur Quality:** sets the quality level of the Gaussian blur used.

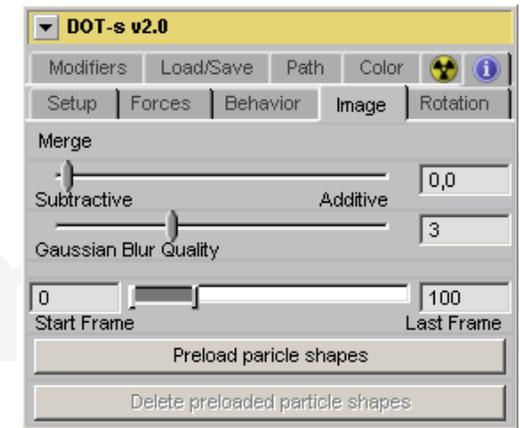
**Preload particle:** Together with the Start Frame/End Frame slider this button lets you preload any image sequence on DOT-s' input. Use the slider to set your desired range and press the button to execute this function.

When you have a preloaded sequence in DOT-s, the sequence is played back on each particle. If you have a good sequence with a lot of complex motion and detail you will only need to have a few particles born to get great results. Thus speeding up rendering.

Once the particle sequence is loaded, it is stored in the flow file. This is why the files can be rather big, but you can render your project over your network. Do not forget to save the motion data in the Load/Save tab before submitting a job to your network.

You still need a valid image on the particle input of DOT-s. A simple background tool with a size of 2x2 pixels will do fine.

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## Rotation

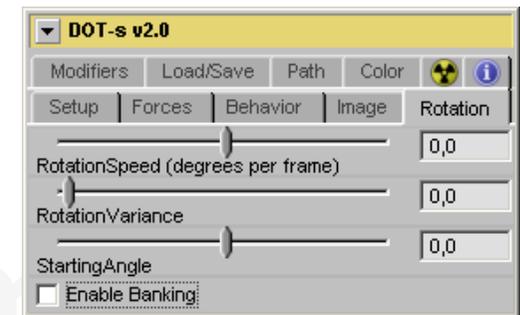
**RotationSpeed:** defines the angle in degrees for the rotation. A value of 5 means that each particle is rotated 5° per frame.

**RotationVariance:** adds randomness to the rotation value. A value of 1 means that each particle is rotated in a totally different direction.

**StartingAngle:** defines the initial angle at the birth.

**Enable Banking:** By clicking this option all particles will be rotated according to their flight-direction. With this function it is possible e.g. to use arrows that point exactly in the right direction when they follow a path or just fly around respecting different forces. RotationSpeed and Variance will be hidden as the rotation is calculated automatically. StartingAngle is still available to reorient your particle.

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## Modifiers

*Enable Attractor:* turns the attractor on and off.

*Attractor X, Y:* lets you place the attractor in your image. You can also add a path or connect it to a tracker.

*Strength:* a value of 0 will not affect the particles at all. Positive values will attract the particles to the attractor coordinates (blackhole effect). Negative values will deflect them.

*Enable Bounceline:* turns the bounceline on and off.

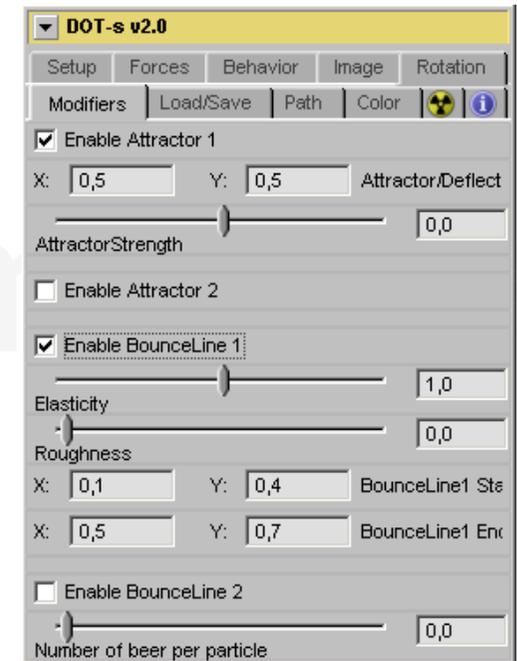
*Elasticity:* defines how much energy is added to the particles when they hit the bounceline. A value of 1 will not have any effect on the speed of the particles. Lower values will make them slower and values greater than 1 will speed up the particles when they hit the bounceline.

The Bouncelines will be replaced by Bouncesplines in the next version of DOT-s 2.

*Roughness:* simulates a rough surface. Higher values will result in more chaotic direction after the particles hit the bounceline.

*Beers per particle* adds alcohol to the system. That means that an overall directional chaos is added. A value of 1 will result in unpredictable directional motion of each particle -- aka Brownian motion.

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## Load/Save

This tab allows you to record and save all the relevant data of your particle system to render it over a network.

**Save MotionData under:** lets you browse your drives and set a filename.

**Start/End frame range:** defines the time range of the system, which will be recorded.

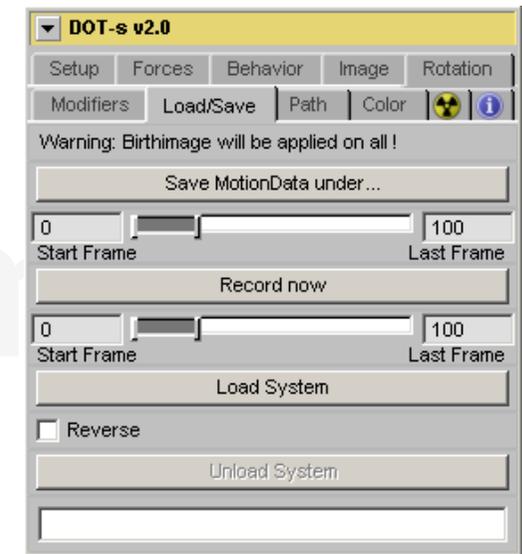
**Record now:** will force DF to render the desired range.

You are highly recommended to set all the tools (except Creators and Loaders) upstream of DOT-s to “pass through” (Ctrl-P). DOT-s only needs to have a valid background and particle image on its inputs to render the data.

**Load System:** lets you browse to the pre-recorded MotionData file. Make sure to use a path all your rendernodes have access to.

Once a system is loaded, all the relevant inputs are hidden. You can only adjust the Behaviours and the merge method.

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With loaded system data, DOT-s can render MotionBlur correctly. You don't have to adjust the SlowMotion slider in the Setup tab, therefore you can not access it.

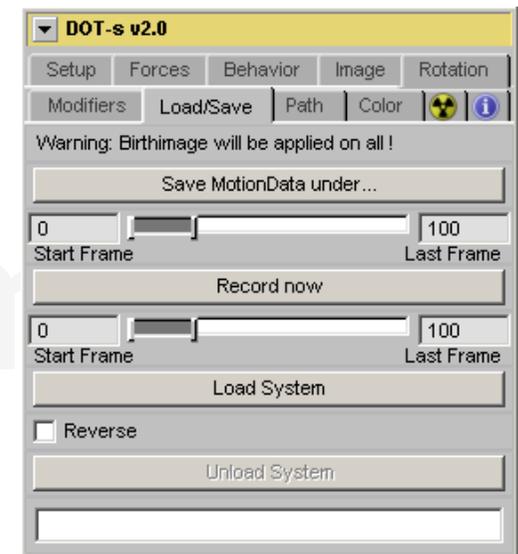
**Start/End range:** lets you set the in and out point of the particle system. If the range is wider than the recorded range, DOT-s will interpolate between the coordinates. Thus the system will be slower. If the range is smaller than the recorded range, accordingly DOT-s will speed up the system. That means that DOT-s will always do a stretch/shrink to fit between the in and out point.

**Reverse:** lets you reverse the loaded motion data. The particles will move reverse if this box is checked.

**Unload system:** unloads the system and lets you adjust all the parameters again.

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# Path

**Enable Pathbinding:** Turns pathbinding on and off. Please note that the Modifiers do not influence the particles anymore when pathbinding is turned on.

**Polyline Path:** Here you can animate the path as you are used to in DigitalFusion. Default is not animated.

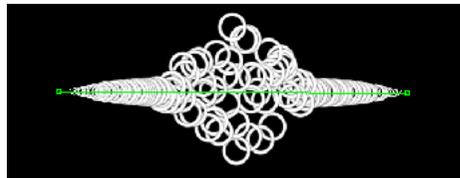
**Speed Variance:** Particles on the path will follow the coordinates of the path quite uniformly. Use this slider to get rid of this uniformity.

**Strict mode:** When unchecked all particles follow the path relative to the birth position. Checking Strict Mode will force the particles to follow the exact screen coordinates of the drawn path.

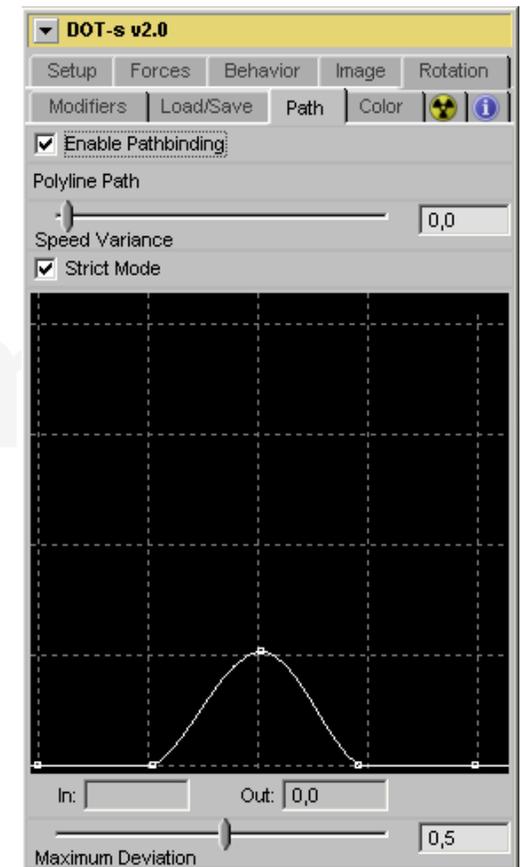
**Binding Spline:** This is a graph that sets the binding strength over a particle's lifetime. Again x-axis (from left to right) displays the lifetime, while the y-axis sets the deviation.

**Maximum Deviation:** Sets the maximum value.

In this case the particles will follow the path exactly first, then fly off the path a bit and return to it finally.



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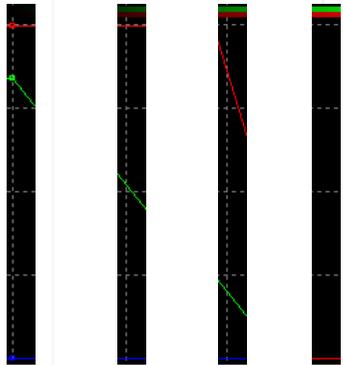


# Color

Similar to all the new “lifetime” graphs this graph will give you the control over the particles color over their age. Again the x-axis is the lifetime and the y-axis is the color value.

Please read the following explanation carefully. Once you understand how it works, you will be able to colortint your particles really fast.

We decided to use this graph-method so we virtually do not have any limitation of the amount of colors used in a particles lifetime.



As said before, the lifetime is the x-axis from left to right. The y-axis here now displays the RGB values. In this case at the birthtime (first slice) of the particles the R-spline is at max, the G-spline is slightly lower and finally the B-spline is at 0. This results in a yellow color. In the third slice you see that the R-spline still is pretty high, while the G-spline is almost at 0. This results in a red colored particle. In the last slice you see that all three splines are at 0. This will color the particles black.



If you need very accurate colorsettings, please remember that you can zoom in and out of any of these graphs using the num “+” and “-” or CTRL-mousewheel. CTRL-middle mousebutton will let you pan in the graph.

The second graph is for tinting strength. It follows the exact same rules as all other graphs. If the spline is at the max y-value the particles are all 100% tinted with the desired color at that point of the particles’ lifetime.

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## General Notes:

### Lifetime Graphs

We included quite a few ready-to-use LUT files that you can load into the graphs. To do so right-click the graph and choose “Load LUT...”.

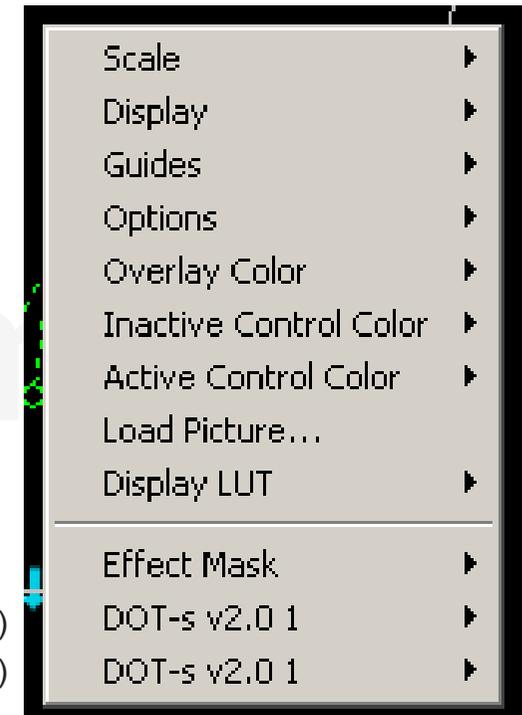
If you have unzipped with the “use directories” option you will find those files in your DF root in a subdirectory called “DOT-s Settings”.

The files are named accordingly to their function. More of these files are available at [www.fusioneers.net](http://www.fusioneers.net) in the download section.

We are aware that the coloring section of DOT-s 2.0 can lead to misunderstandings and may be hard to get used to. However, once you played with it a little and understand that if you are looking on the graph in vertical slices and see those as single RGB sliders side by side it really isn't that hard to follow what's going on. Feel free to ask your questions anytime at [dot@fusioneers.net](mailto:dot@fusioneers.net). We will try and help as quick as we can.

The DF SDK does not allow naming of polylines in the onscreen context menu. Therefore both birth spline and path are named the same as the tool itself. When you rightclick e.g. in View1 you will get a menu similar to this one on the right. The *first* one is the *birth spline*, the *second* one is the *path polyline*. We are sorry if that causes any trouble.

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- 1.)
- 2.)

- 1.) DOT-s v2.0 1 is the birth spline
- 2.) DOT-s v2.0 1 is the path polyline

## Known issues:

If bouncelines are crossed, particles may “fall” through in the crossing section.

If the particles remain long enough on a bounceline (low elasticity value) they will also “fall” through.

DOT-s has been tested and was used in productions. We find it very stable and bugfree. If you find any bugs please report them to: [dot@fusioners.net](mailto:dot@fusioners.net) to get them solved.

Please include the configuration details of your system such as: Operating system, RAM, Fusion version, etc. that might be relevant.

## Address:

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