9.6.4 Physics - Particles - Particle Visualization

Particle Visualization....1
Viewport Display....1
Color....2
Render Settings....2
None....2
Halo....2
Line....3
Path....3
Timing Options....4
Object....4
Group....4
Billboard....5

Particle Visualization

With the items in the *Display* and *Render* panel you can set the way the particles will be rendered or depicted in the view ports in various ways. Some option are valid only for the 3D window, the particles then are rendered always as *Halos*. Some of the options will be rendered as shown in the 3D window.

Viewport Display

The Display Panel controls how particles are displayed in the 3d viewport. This does not necessarily determine how they will appear when rendered.

None
The particles are not shown in the 3D window and are not rendered. The emitter may be rendered though.

Point
Particles are displayed as square points. Their size is independent of the distance from the camera.

Circle
Particles are displayed as circles that face the view. Their size is independent of the distance from the camera.

Cross
Particles are displayed as 6-point crosses that align to the rotation of the particles. Their size is independent of the distance from the camera.

Axis
Particles are displayed as 3-point axes. This useful if you want to see the orientation and rotation of particles in the view port. Increase the *Draw Size* until you can clearly distinguish the axis.

Particles visualized like Point, Circle, Cross and Axis don’t have any special options, but can be very useful when you have multiple particle systems at play, if you don’t want to confuse particles of one system from another (e.g. in simulations using *Boids* physics).

Display
Specifies the percentage of all particles to show in the viewport (all particles are still rendered).

Draw Size
Specifies how large (in pixels) the particles are drawn in the viewport (0 = default).

Size

Draw the size of the particles with a circle.

Velocity

Draw the velocity of the particles with a line that points in the direction of motion, and length relative to speed.

Number

Draw the id-numbers of the particles in the order of emission.

Color

The Color Menu allows you to draw particles according to certain particle properties.

None

Particles are black.

Material

Particles are colored according to the material they are given.

Velocity

Color particles according to their speed. The color is a ramp from blue to green to red, Blue being the slowest, and Red being velocities approaching the value of *Max* or above. Increasing *Max* allows for a wider range of particle velocities.

Acceleration

Color particles according to their acceleration.

Render Settings

The Render Panel controls how particles appear when they are rendered.

Material Index

Set which of the object’s material is used to shade the particles.

Parent

Use a different object’s coordinates to determine the birth of particles.

Emitter

When disabled, the emitter is no longer rendered. Activate the button *Emitter* to also render the mesh.

Parents

Render also parent particles if child particles are used. Children have a lot of different deformation options, so the straight parents would stand between their curly children. So by default *Parents* are not rendered if you activate *Children*.. See *Children*

Unborn

Render particles before they are born.

Died

Render particles after they have died. This is very useful if particles die in a collision (*Die on hit*), so you can cover objects with particles.

None

When set to *None* particles are not rendered. This is useful if you are using the particles to duplicate objects.

Halo

Halo particles are rendered as *Halo Type Materials*.

Trail Count

Set the number of trail particles. When greater than 1, additional options appear.

Length in Frames

Path timing is in absolute frames.

Length
End time of drawn path.

Random
Give path lengths a random variation.

Line

The Line visualization mode creates (more or less thin) polygon lines with the strand renderer in the direction of particles velocities. The thickness of the line is set with the parameter *Start* of the *Strands* shader (*Material* sub-context, *Links and Pipeline* panel).

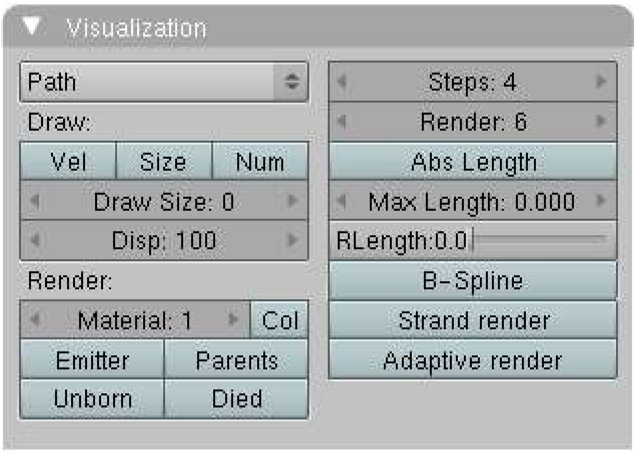
Back
Set the length of the particle’s tail.

Front
Set the length of the particle’s head.

Speed
Multiply the line length by particles’ speed. The faster, the longer the line.

Trail Count
See description in Halo.

Path



Visualization

Path

Draw:

Draw Size: 0

Disp: 100

Render:

Material: 1

Steps: 4

Render: 6

Max Length: 0.000

RLength:0.0

The Visualization panel for Path visualization.

The *Path* visualization needs a *Hair* particle system or *Keyed* particles.

Strand render
[Keypointstrands] Use the strand primitive for rendering. Very fast and effective renderer.

Adaptive render
Tries to remove unnecessary geometry from the paths before rendering particle strands in order to make the render faster and easier on memory.

Angle
How many degrees path has to curve to produce another render segment (straight parts of paths need fewer segments).

Pixel
How many pixels path has to cover to produce another render segment (very short hair or long hair viewed from far away need fewer parts). (only for Adaptive render).

B-Spline
Interpolate hair using B-Splines. This may be an option for you if you want to use low *Render* values.

You loose a bit of control but gain smoother paths.

Steps

Set the number of subdivisions of the rendered paths (the value is a power of 2). You should set this value carefully, because if you increase the render value by two you need four times more memory to render. Also the rendering is faster if you use low render values (sometimes drastically). But how low you can go with this value depends on the waviness of the hair.(the value is a power of 2). This means 0 steps give 1 subdivision, 1 give 2 subdivisions, 2–>4, 3–>8, 4–>16, ... *n* `-->2` *n*.

Timing Options

Absolute Path Time

Path timing is in absolute frames.

Start

Start time of the drawn path.

End

End time of the drawn path.

Random

Give the path length a random variation.

Please see also the manual page about *Strands* for an in depth description.

Object

In the Object visualization mode the specified object (*Dupli Object:* field) is duplicated in place of each particle. The duplicated object has to be at the center of the coordinate system, or it will get an offset to the particle.

Global

Use object’s global coordinates for duplication.

Size

Size of the objects

Random Size

Give the objects a random size variation.

Group

In the Group visualization mode, the objects that belong to the group (*GR:* field) are duplicated sequentially in the place of the particles.

WholeGroup

Use the whole group at once, instead of one of its elements, the group being displayed in place of each particle.

Use Count

Use objects multiple times in the same groups. Specify the order and number of times to repeat each object with the list box that appears. You can duplicate an object in the list with the `Plus` button, or remove a duplicate with the `Minus` button.

Use Global

Use object’s global coordinates for duplication.

Pick Random

The objects in the group are selected in a random order, and only one object is displayed in place of a particle. Please note that this mechanism fully replaces old Blender particles system using parentage and DupliVerts to replace particles with actual geometry. This method is fully deprecated and doesn’t work anymore.

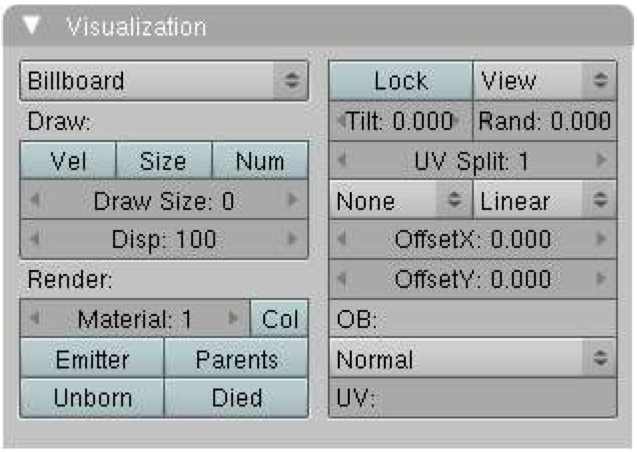
Size

Size of the objects

Random Size

Give the objects a random size variation.

Billboard



Billboard visualization for particles.

Billboards are aligned square planes. They are aligned to the camera by default, but you can choose another object that they should be aligned to.

If you move a billboard around it’s target, it always faces the center of it’s target. The size of a billboard is set with the parameter *Size* of the particle (in Blender Units). You can use them e.g. for Sprites, or to replace *Halo* visualization. Everything that can be done with a halo can also be done with a billboard. But billboards are real objects, they are seen by raytracing, they appear behind transparent objects, they may have an arbitrary form and receive light and shadows. They are a bit more difficult to set up and take more render time and resources.

Texturing billboards (including animated textures with alpha) is done by using uv coordinates that are generated automatically for them so they can take an arbitrary shape. This works well for animations, because the alignment of the billboards can be dynamic. The textures can be animated in several ways:

- Depending on the particle lifetime (relative time).
- Depending on the particle starting time.
- Depending on the frame (absolute time).

You can use different sections of an image texture:

- Depending on the lifetime of the billboard.
- Depending on the emission time.
- Depending on align or tilt.

Since you use normal materials for the billboard you have all freedoms in mixing textures to your liking. The material itself is animated in absolute time.

The main thing to understand is that if the object doesn’t have any *UV Layers*, you need to create at least one in the objects *Editing* context, for any of these to work. Moreover, the texture has to be set to UV coordinates in the *Map Input* panel. If you want to see examples for some of the animation possibilities, see the Billboard

Animation Tutorial.

An interesting alternative to billboards are in certain cases strands, because you can animate the shape of the strands. Because this visualization type has so much options it is explained in greater detail below.

You can limit the movement with these options. How the axis is prealigned at emission time.

View
No prealignement, normal orientation to the target.

X / Y / Z
Along the global X/Y/Z-axis respectively.

Velocity
Along the speed vector of the particle.

Lock
Locks the align axis, keeps this orientation, the billboard aligns only along one axis to it’s target

Billboard Object
The target object that the billboards are facing. By default, the active camera is used.

Tilt Angle
Rotation angle of the billboards planes. A tilt of 1 rotates by 180 degrees (turns the billboard upside down).

Random
Random variation of tilt.

Offset X
Offset the billboard horizontally in relation to the particle center, this does not move the texture.

Offset Y
Offset the billboard vertically in relation to the particle center.

UV Channels
Billboards are just square polygons. To texture them in different ways we have to have a way to set what textures we want for the billboards and how we want them to be mapped to the squares. These can then be set in the texture mapping buttons to set wanted textures for different coordinates. You may use three different UV layers and get three different sets of UV coordinates, which can then be applied to different (or the same) textures.

Billboard Normal UV
Coordinates are the same for every billboard, and just place the image straight on the square.

Billboard Time-Index (X-Y)
Coordinates actually define single points in the texture plane with the x-axis as time and y-axis as the particle index. For example using a horizontal blend texture mapped to color from white to black will give us particles that start off as white and gradually change to black during their lifetime. On the other hand a vertical blend texture mapped to color from white to black will make the first particle to be white and the last particle to be black with the particles in between a shade of gray.

The animation of the UV textures is a bit tricky. The UV texture is split into rows and columns (N times N). The texture should be square. You have to use *UV Split* in the UV channel and fill in the name of the UV layer. This generated UV coordinates for this layer.

Split UV’s
The amount of rows/columns in the texture to be used. Coordinates are a single part of the *UV Split* grid, which is a n?n grid over the whole texture. What the part is used for each particle and at what time is determined by the *Offset* and *Animate* controls. These can be used to make each billboard unique or to use an “animated” texture for them by having each frame of the animation in a grid in a big image.

Billboard Split UV
Set the name of the *UV layer* to use with billboards (you can use a different one for each *UV Channel*). By default, it is the active UV layer (check the *Mesh* panel in the *Editing* context.

Animate

Dropdown menu, indicating how the split UVs could be animated (changing from particle to particle with time):

None
No animation occurs on the particle itself, the billboard uses one section of the texture in it's lifetime.

Age
The sections of the texture are gone through sequentially in particles' lifetimes.

Angle
Change the section based on the angle of rotation around the *Align to* axis, if *View* is used the change is based on the amount of tilt.

Frame
The section is changes according to the frame.

Offset

Specifies how to choose the first part (of all the parts in the n×n grid in the texture defined by the *UV Split* number) for all particles.

None
All particles start from the first part.

Linear
First particle will start from the first part and the last particle will start from the last part, the particles in between will get a part assigned linearly from the first to the last part.

Random
Give a random starting part for every particle.

Trail Count
See the description in Halo.