

25.10.1 Editors - Properties Editor - Physics - Force Fields Panel

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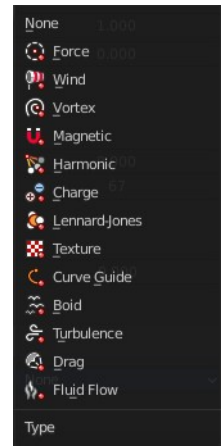
Force Fields panel

Force Fields offer a way to add extra movement to dynamic systems like Particles, Soft Bodies, Rigid Bodies and Cloth objects.

Note that when you work with particles, softbody or cloth system and change one of the force fields parameters, then you need to recalculate the particles, softbody or cloth systems.

Type

There are several force field types available.

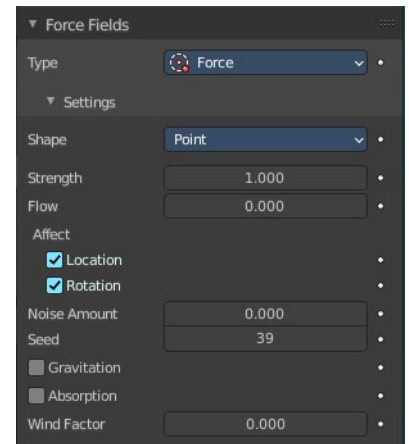


Type Force

A Force type force field gives a constant force towards (positive strength) or away from (negative strength) the object's center.

For Boids a field with positive strength can be used as a Goal. A field with negative strength can be used as Predator. Whether Boids seek or fly goals/predators depends on the Physics settings of the Boids.

Settings subpanel



Shape

The direction that is used to calculate the effector force.

Strength

The strength of the force.

Flow / Inflow

Convert effector force into air force velocity / Inwards component of the force.

Affect

Location

Affect the location of the particles.

Rotation

Affect the rotation of the particles.

Noise Amount

Amount of noise for the force effect.

Seed

The random seed for the noise amount.

Gravitation

Multiply force by 1 divided through the distance in square.

Absorption

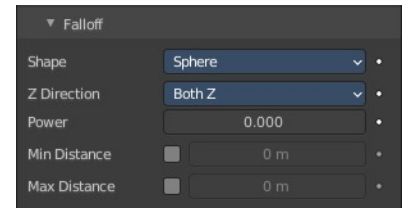
Force gets absorbed by collision objects.



Wind Factor

How much the force is reduced when acting parallel to a surface. Like a cloth.

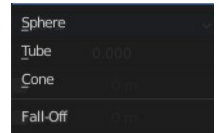
Falloff Subpanel



Shape

Sphere

Falloff is uniform in all directions, as in a sphere.



Tube

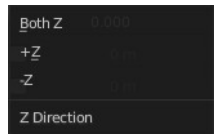
Fall off results in a tube shaped force field. The Field's Radial falloff can be adjusted, as well as the Minimum and Maximum distances of the field.

Cone

Fall off results in a cone shaped force field. Additional options are the same as those of Tube options.

Z Direction

Fall-off can be set to apply only in the direction of the positive Z Axis, negative Z Axis, or both.



Power (Power)

How the power of the force field changes with the distance from the force field. If r is the distance from the center of the object, the force changes with $1/r^{\text{Power}}$. A Fall-off of 2 changes the force field with $1/r^2$, which is the falloff of gravitational pull.

Min Distance

The distance from the object center, up to where the force field is effective with full strength. If you have a Fall-off of 0 this parameter does nothing, because the field is effective with full strength up to Max Dist (or the infinity). Shown by an additional circle around the object.

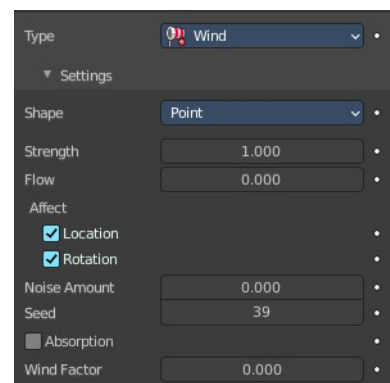
Max Distance

Makes the force field only take effect within a specified maximum radius (shown by an additional circle around the object).

Type Wind

Constant force along the Z axis.

Settings Subpanel



Shape

The direction that is used to calculate the effector force.

Strength

The strength of the force.

Flow / Inflow

Convert effector force into air force velocity / Inwards component of the force.

Affect

Location

Affect the location of the particles.

Rotation

Affect the rotation of the particles.

Noise Amount

Amount of noise for the force effect.

Seed

The random seed for the noise amount.

Absorption

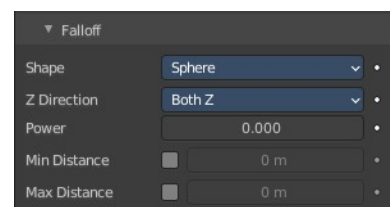
Force gets absorbed by collision objects.

Wind Factor

How much the force is reduced when acting parallel to a surface. Like a cloth.



Falloff Subpanel



Shape

Sphere

Falloff is uniform in all directions, as in a sphere.



Tube

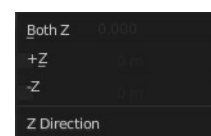
Fall off results in a tube shaped force field. The Field's Radial falloff can be adjusted, as well as the Minimum and Maximum distances of the field.

Cone

Fall off results in a cone shaped force field. Additional options are the same as those of Tube options.

Z Direction

Fall-off can be set to apply only in the direction of the positive Z Axis, negative Z Axis, or both.



Power (Power)

How the power of the force field changes with the distance from the force field. If r is the distance from the center of the object, the force changes with $1/r^{\text{Power}}$. A Fall-off of 2 changes the force field with $1/r^2$, which is the falloff of gravitational pull.

Min Distance

The distance from the object center, up to where the force field is effective with full strength. If you have a Fall-off of 0 this parameter does nothing, because the field is effective with full strength up to Max Dist (or the infinity). Shown by an additional circle around the object.

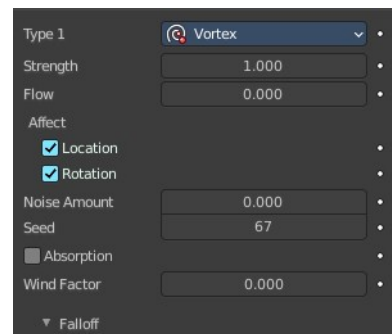
Max Distance

Makes the force field only take effect within a specified maximum radius (shown by an additional circle around the object).

Type Vortex

Spiraling force that twists the force object's local Z axis. Use case could be a tornado for example.

Settings Subpanel



Shape

The direction that is used to calculate the effector force.



Strength

The strength of the force.

Flow / Inflow

Convert effector force into air force velocity / Inwards component of the force.

Affect

Location

Affect the location of the particles.

Rotation

Affect the rotation of the particles.

Noise Amount

Amount of noise for the force effect.

Seed

The random seed for the noise amount.

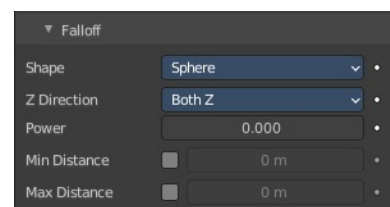
Absorption

Force gets absorbed by collision objects.

Wind Factor

How much the force is reduced when acting parallel to a surface. Like a cloth.

Falloff Subpanel



Shape

Sphere

Falloff is uniform in all directions, as in a sphere.



Tube

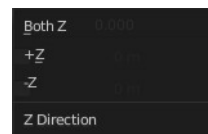
Fall off results in a tube shaped force field. The Field's Radial falloff can be adjusted, as well as the Minimum and Maximum distances of the field.

Cone

Fall off results in a cone shaped force field. Additional options are the same as those of Tube options.

Z Direction

Fall-off can be set to apply only in the direction of the positive Z Axis, negative Z Axis, or both.



Power (Power)

How the power of the force field changes with the distance from the force field. If r is the distance from the center of the object, the force changes with $1/r^{\text{Power}}$. A Fall-off of 2 changes the force field with $1/r^2$, which is the falloff of gravitational pull.

Min Distance

The distance from the object center, up to where the force field is effective with full strength. If you have a Fall-off of 0 this parameter does nothing, because the field is effective with full strength up to Max Dist (or the infinity). Shown by an additional circle around the object.

Max Distance

Makes the force field only take effect within a specified maximum radius (shown by an additional circle around the object).

Type Magnetic

A magnetic force field simulates the force of magnetism on magnetized objects.

Settings Subpanel

Shape

The direction that is used to calculate the effector force.

Strength

The strength of the force.

Flow

Convert effector force into air force velocity.

Affect

Location

Affect the location of the particles.

Rotation

Affect the rotation of the particles.

Noise Amount

Amount of noise for the force effect.

Seed

The random seed for the noise amount.

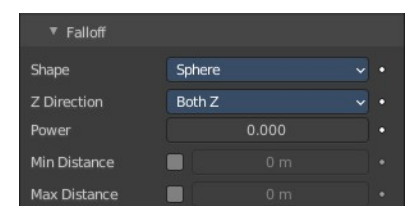
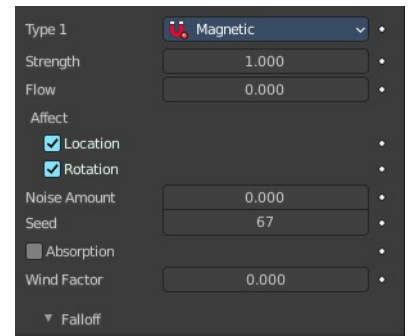
Absorption

Force gets absorbed by collision objects.

Wind Factor

How much the force is reduced when acting parallel to a surface. Like a cloth.

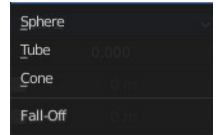
Falloff Subpanel



Shape

Sphere

Falloff is uniform in all directions, as in a sphere.



Tube

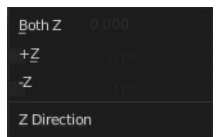
Fall off results in a tube shaped force field. The Field's Radial falloff can be adjusted, as well as the Minimum and Maximum distances of the field.

Cone

Fall off results in a cone shaped force field. Additional options are the same as those of Tube options.

Z Direction

Fall-off can be set to apply only in the direction of the positive Z Axis, negative Z Axis, or both.



Power (Power)

How the power of the force field changes with the distance from the force field. If r is the distance from the center of the object, the force changes with $1/r^{\text{Power}}$. A Fall-off of 2 changes the force field with $1/r^2$, which is the falloff of gravitational pull.

Min Distance

The distance from the object center, up to where the force field is effective with full strength. If you have a Fall-off of 0 this parameter does nothing, because the field is effective with full strength up to Max Dist (or the infinity). Shown by an additional circle around the object.

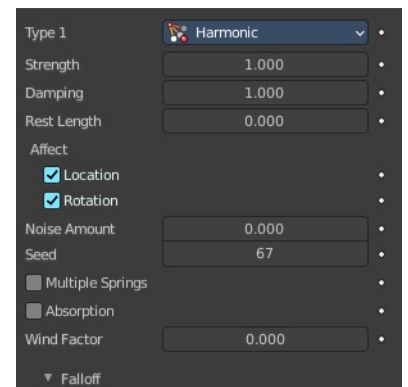
Max Distance

Makes the force field only take effect within a specified maximum radius (shown by an additional circle around the object).

Type Harmonic

The source of this force field is the zero point of a harmonic oscillator. If you set the *Damping* parameter to 1, the movement is stopped in the moment the object is reached.

Settings Subpanel



Shape

The direction that is used to calculate the effector force.



Strength

The strength of the force.

Damping

Damping of the harmonic force.

Rest Length

The rest length of the harmonic force.

Affect

Location

Affect the location of the particles.

Rotation

Affect the rotation of the particles.

Noise Amount

Amount of noise for the force effect.

Seed

The random seed for the noise amount.

Multiple Springs

Every point is effected by multiple springs.

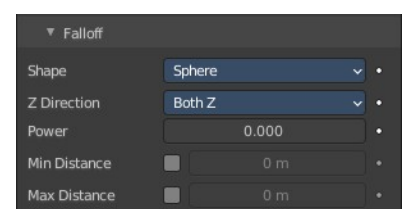
Absorption

Force gets absorbed by collision objects.

Wind Factor

How much the force is reduced when acting parallel to a surface. Like a cloth.

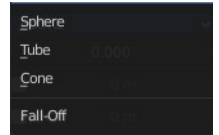
Falloff Subpanel



Shape

Sphere

Falloff is uniform in all directions, as in a sphere.



Tube

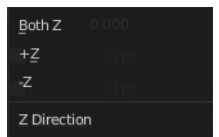
Fall off results in a tube shaped force field. The Field's Radial falloff can be adjusted, as well as the Minimum and Maximum distances of the field.

Cone

Fall off results in a cone shaped force field. Additional options are the same as those of Tube options.

Z Direction

Fall-off can be set to apply only in the direction of the positive Z Axis, negative Z Axis, or both.



Power (Power)

How the power of the force field changes with the distance from the force field. If r is the distance from the center of the object, the force changes with $1/r^{\text{Power}}$. A Fall-off of 2 changes the force field with $1/r^2$, which is the falloff of gravitational pull.

Min Distance

The distance from the object center, up to where the force field is effective with full strength. If you have a Fall-off of 0 this parameter does nothing, because the field is effective with full strength up to Max Dist (or the infinity). Shown by an additional circle around the object.

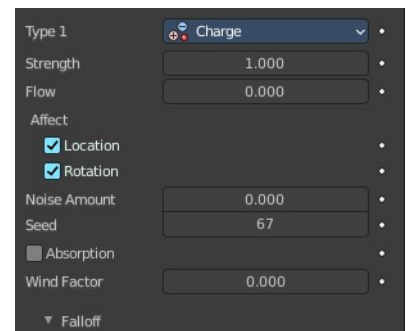
Max Distance

Makes the force field only take effect within a specified maximum radius (shown by an additional circle around the object).

Type Charge

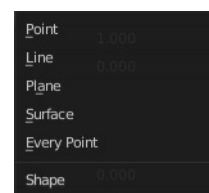
Special force field based on the charge of particles. Charge force fields just affects other charge force fields.

Settings Subpanel



Shape

The direction that is used to calculate the effector force.



Strength

The strength of the force.

Flow

Convert effector force into air force velocity.

Affect

Location

Affect the location of the particles.

Rotation

Affect the rotation of the particles.

Noise Amount

Amount of noise for the force effect.

Seed

The random seed for the noise amount.

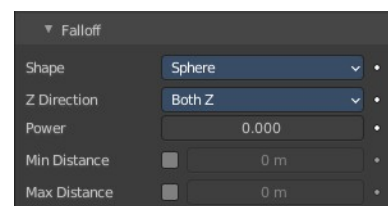
Absorption

Force gets absorbed by collision objects.

Wind Factor

How much the force is reduced when acting parallel to a surface. Like a cloth.

Falloff Subpanel



Shape

Sphere

Falloff is uniform in all directions, as in a sphere.



Tube

Fall off results in a tube shaped force field. The Field's Radial falloff can be adjusted, as well as the Minimum and Maximum distances of the field.

Cone

Fall off results in a cone shaped force field. Additional options are the same as those of Tube options.

Z Direction

Fall-off can be set to apply only in the direction of the positive Z Axis, negative Z Axis, or both.



Power (Power)

How the power of the force field changes with the distance from the force field. If r is the distance from the center of the object, the force changes with $1/r^{\text{Power}}$. A Fall-off of 2 changes the force field with $1/r^2$, which is the falloff of gravitational pull.

Min Distance

The distance from the object center, up to where the force field is effective with full strength. If you have a Fall-off of 0 this parameter does nothing, because the field is effective with full strength up to Max Dist (or the infinity). Shown by an additional circle around the object.

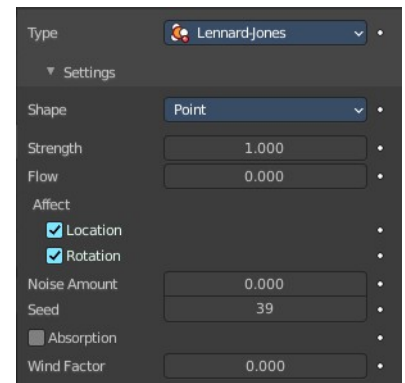
Max Distance

Makes the force field only take effect within a specified maximum radius (shown by an additional circle around the object).

Type Lennard Jones

Force field based on the Lennard-Jones potential. The Lennard-Jones potential describes the interactions of two neutral particles using a relatively simple mathematical model. At a distance smaller than the combined sizes the field is very repulsive and after that distance it's attractive.

Particles can have for example both a charge and a Lennard-Jones potential.



Settings Subpanel

Shape

The direction that is used to calculate the effector force.

Strength

The strength of the force.



Flow

Convert effector force into air force velocity.

Affect

Location

Affect the location of the particles.

Rotation

Affect the rotation of the particles.

Noise Amount

Amount of noise for the force effect.

Seed

The random seed for the noise amount.

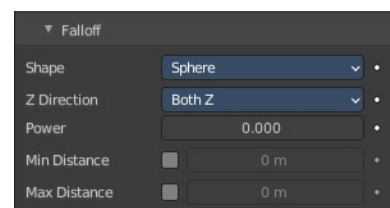
Absorption

Force gets absorbed by collision objects.

Wind Factor

How much the force is reduced when acting parallel to a surface. Like a cloth.

Falloff Subpanel



Shape

Sphere

Falloff is uniform in all directions, as in a sphere.



Tube

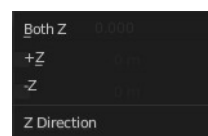
Fall off results in a tube shaped force field. The Field's Radial falloff can be adjusted, as well as the Minimum and Maximum distances of the field.

Cone

Fall off results in a cone shaped force field. Additional options are the same as those of Tube options.

Z Direction

Fall-off can be set to apply only in the direction of the positive Z Axis, negative Z Axis, or both.



Power (Power)

How the power of the force field changes with the distance from the force field. If r is the distance from the

center of the object, the force changes with $1/r^{\text{Power}}$. A Fall-off of 2 changes the force field with $1/r^2$, which is the falloff of gravitational pull.

Min Distance

The distance from the object center, up to where the force field is effective with full strength. If you have a Fall-off of 0 this parameter does nothing, because the field is effective with full strength up to Max Dist (or the infinity). Shown by an additional circle around the object.

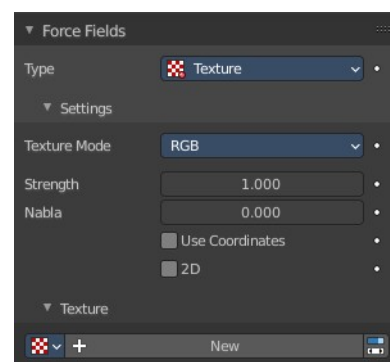
Max Distance

Makes the force field only take effect within a specified maximum radius (shown by an additional circle around the object).

Type Texture

Adds a force field based on a texture. The force in the 3 directions is color coded.

Red is coding for the x-axis, green for the y-axis and blue for the z-axis. A value of 0.5 means no force, a value larger than 0.5 acceleration in negative axis direction (like -Z), a value smaller than 0.5 acceleration in positive axis direction (like +Z).



Settings Subpanel

Texture mode

This sets the way a force vector is derived from the texture.

RGB

Uses the color components directly as the force vector components in the color encoded directions. You need an RGB texture for this, e.g. an image or a color band. So a Blend texture without a color band would not suffice.

Gradient

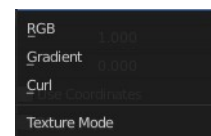
Calculates the force vector as the 3d-gradient of the intensity (greyscale) of the texture. The gradient vector always points to the direction of increasing brightness.

Curl

Calculates the force vector from the curl of the 3d-rgb texture (rotation of rgb vectors). This also works only with a color texture. It can be used for example to create a nice looking turbulence force with a color clouds texture with Perlin noise.

Strength

The strength of the force.



Nabla

It is the offset used to calculate the partial derivatives needed for Gradient and Curl texture modes.

Use Coordinates

Uses the emitter object coordinates as the texture space the particles use.

2D

Apply force only in 2D.

Texture Sub Subpanel

Texture Property

Texture Browser

A list of the available textures in the scene.

Name

The name of the currently active texture. You can rename the texture here by clicking at the edit box.

Fake User

Keep this texture in the scene even if it has no user.

New Texture

Add a new texture.

Remove

Remove the texture.

Show Texture in Texture Tab

Jumps to the texture tab where you can edit your texture.



Falloff Subpanel

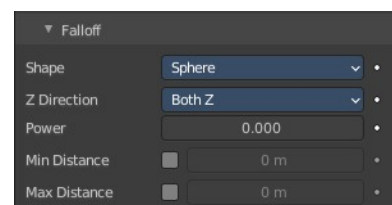
Shape

Sphere

Falloff is uniform in all directions, as in a sphere.

Tube

Fall off results in a tube shaped force field. The Field's Radial falloff can be adjusted, as well as the Minimum and Maximum distances of the field.

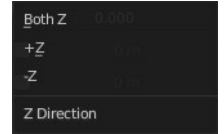


Cone

Fall off results in a cone shaped force field. Additional options are the same as those of Tube options.

Z Direction

Fall-off can be set to apply only in the direction of the positive Z Axis, negative Z Axis, or both.



Power (Power)

How the power of the force field changes with the distance from the force field. If r is the distance from the center of the object, the force changes with $1/r^{\text{Power}}$. A Fall-off of 2 changes the force field with $1/r^2$, which is the falloff of gravitational pull.

Min Distance

The distance from the object center, up to where the force field is effective with full strength. If you have a Fall-off of 0 this parameter does nothing, because the field is effective with full strength up to Max Dist (or the infinity). Shown by an additional circle around the object.

Max Distance

Makes the force field only take effect within a specified maximum radius (shown by an additional circle around the object).

Type Curve Guide

Creates a force along a curve object.

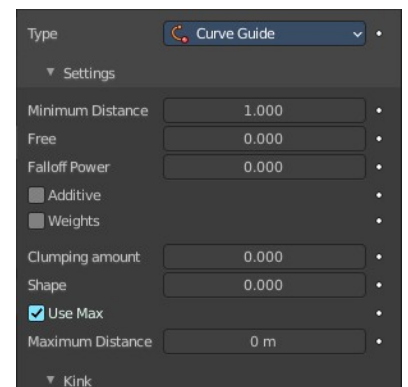
A typical scenario would be to move a red blood cell inside a vein, or to animate the particle flow in a motor. You can use Curve Guide s also to shape certain hair strands.

Note! You can also use the Particle Mode to define a path.

The option Curve Follow does not work for particles. Instead you have to set Angular Velocity in the Physics panel of the Particle sub-context to Spin and leave the rotation constant. For example don't turn on Dynamic.

Curve Guide s affect all particles on the same layer, independently from their distance to the curve. If you have several guides in a layer, their fields add up to each other (the way you may have learned it in your physics course). But you can limit their influence radius by changing there Minimum Distance (see below).

Note! The Curve Guide does not effect Softbodies.



Settings subpanel

Minimum Distance

The distance from the curve, up to where the force field is effective with full strength. If you have a Fall-off of 0 this parameter does nothing, because the field is effective with full strength up to MaxDist (or the infinity). MinDist is shown with a circle at the endpoints of the curve in the 3D window.

Free

Fraction of particle life time, that is not used for the curve.

Falloff Power

How quickly strength falls off with distance from the force field. A Fall-off of 1 means a linear progression.

Additive

If you use Additive, the speed of the particles is also evaluated depending on the Fall-off.

Weights

Use Curve weights to influence the particle influence along the curve.

Clumping Amount

The particles come together at the end of the curve (1) or they drift apart (-1).

Shape

Defines the form in which the particles come together. +0.99: the particles meet at the end of the curve. 0: linear progression along the curve. -0.99: the particles meet at the beginning of the curve.

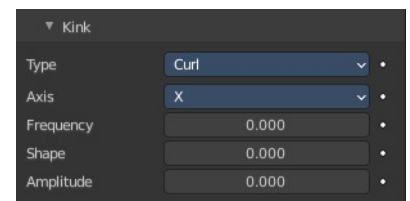
Use Max

The maximum influence radius. Shown by an additional circle around the curve object.

The other settings govern the form of the force field along the curve.

Kink sub subpanel

Kink changes the shape that the particles can take. It adds an offset.



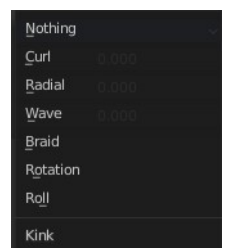
Type

Curl

The radius of the influence depends on the distance of the curve to the emitter.

Radial

A three dimensional, standing wave.



Wave

A two dimensional, standing wave.

Braid

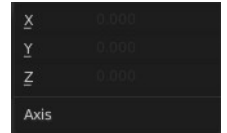
Braid.

Roll

A one dimensional, standing wave.

Axis

Which axis to use for the offset.



Frequency

The frequency of the offset.

Shape

Adjust the offset to the beginning/end.

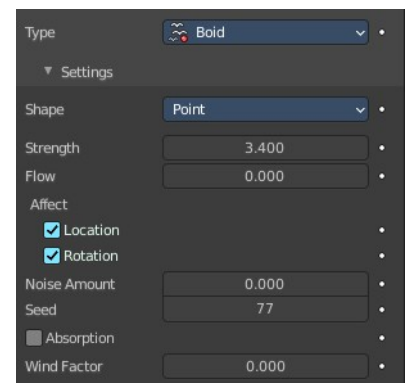
Amplitude

The Amplitude of the offset.

Type Boid

Creates a force that acts as a boid's predator or target. Boids simulates the flocking behavior of birds.

Settings Subpanel



Shape

The direction that is used to calculate the effector force.

Strength

The strength of the force.



Flow

Convert effector force into air force velocity.

Affect

Location

Affect the location of the particles.

Rotation

Affect the rotation of the particles.

Noise Amount

Amount of noise for the force effect.

Seed

The random seed for the noise amount.

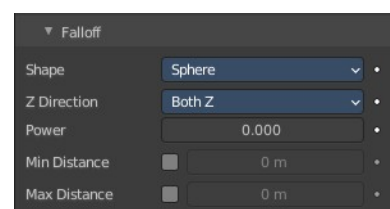
Absorption

Force gets absorbed by collision objects.

Wind Factor

How much the force is reduced when acting parallel to a surface. Like a cloth.

Falloff Subpanel



Shape

Sphere

Falloff is uniform in all directions, as in a sphere.



Tube

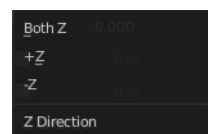
Fall off results in a tube shaped force field. The Field's Radial falloff can be adjusted, as well as the Minimum and Maximum distances of the field.

Cone

Fall off results in a cone shaped force field. Additional options are the same as those of Tube options.

Z Direction

Fall-off can be set to apply only in the direction of the positive Z Axis, negative Z Axis, or both.



Power (Power)

How the power of the force field changes with the distance from the force field. If r is the distance from the center of the object, the force changes with $1/r^{\text{Power}}$. A Fall-off of 2 changes the force field with $1/r^2$, which is the falloff of gravitational pull.

Min Distance

The distance from the object center, up to where the force field is effective with full strength. If you have a Fall-off of 0 this parameter does nothing, because the field is effective with full strength up to Max Dist (or the infinity). Shown by an additional circle around the object.

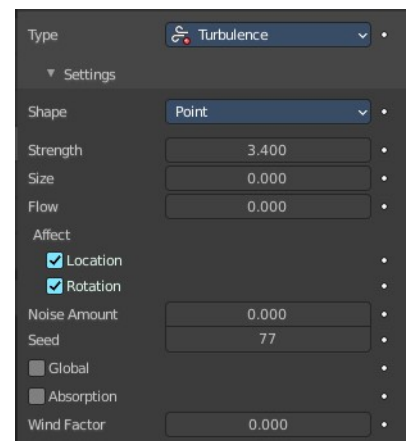
Max Distance

Makes the force field only take effect within a specified maximum radius (shown by an additional circle around the object).

Type Turbulence

Create turbulence with a noise field. This creates a random and chaotic 3D noise effect.

Settings Subpanel



Shape

The direction that is used to calculate the effector force.

Strength

The strength of the force.

Size

The size of the turbulence.

Flow

Convert effector force into air force velocity.



Affect

Location

Affect the location of the particles.

Rotation

Affect the rotation of the particles.

Noise Amount

Amount of noise for the force effect.

Seed

The random seed for the noise amount.

Global

Use global coordinates for the turbulence.

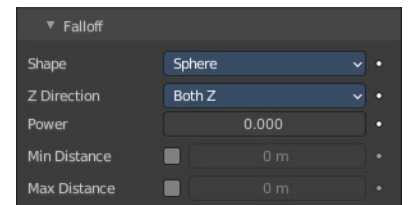
Absorption

Force gets absorbed by collision objects.

Wind Factor

How much the force is reduced when acting parallel to a surface. Like a cloth.

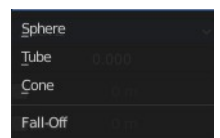
Falloff Subpanel



Shape

Sphere

Falloff is uniform in all directions, as in a sphere.



Tube

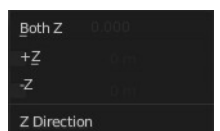
Fall off results in a tube shaped force field. The Field's Radial falloff can be adjusted, as well as the Minimum and Maximum distances of the field.

Cone

Fall off results in a cone shaped force field. Additional options are the same as those of Tube options.

Z Direction

Fall-off can be set to apply only in the direction of the positive Z Axis, negative Z Axis, or both.



Power (*Power*)

How the power of the force field changes with the distance from the force field. If r is the distance from the center of the object, the force changes with $1/r^{\text{Power}}$. A Fall-off of 2 changes the force field with $1/r^2$, which is the falloff of gravitational pull.

Min Distance

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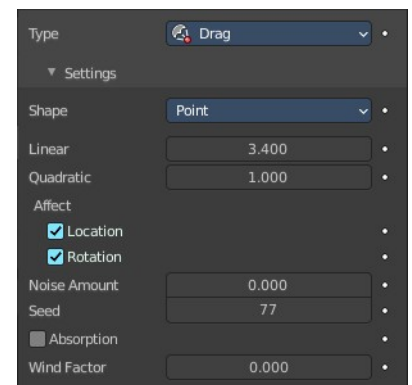
Max Distance

Makes the force field only take effect within a specified maximum radius (shown by an additional circle around the object).

Type Drag

Create a force that dampens motion. The particles motion is slowing down.

Settings Subpanel



Shape

The direction that is used to calculate the effector force.

Linear

Drag component proportional to velocity.

Quadratic

Drag component proportional to square velocity.

Affect

Location

Affect the location of the particles.

Rotation

Affect the rotation of the particles.



Noise Amount

Amount of noise for the force effect.

Seed

The random seed for the noise amount.

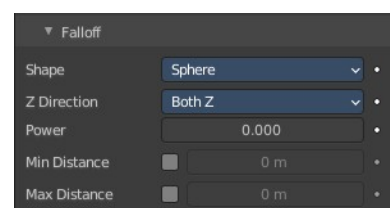
Absorption

Force gets absorbed by collision objects.

Wind Factor

How much the force is reduced when acting parallel to a surface. Like a cloth.

Falloff Subpanel



Shape

Sphere

Falloff is uniform in all directions, as in a sphere.



Tube

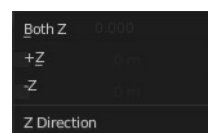
Fall off results in a tube shaped force field. The Field's Radial falloff can be adjusted, as well as the Minimum and Maximum distances of the field.

Cone

Fall off results in a cone shaped force field. Additional options are the same as those of Tube options.

Z Direction

Fall-off can be set to apply only in the direction of the positive Z Axis, negative Z Axis, or both.



Power (Power)

How the power of the force field changes with the distance from the force field. If r is the distance from the center of the object, the force changes with $1/r^{\text{Power}}$. A Fall-off of 2 changes the force field with $1/r^2$, which is the falloff of gravitational pull.

Min Distance

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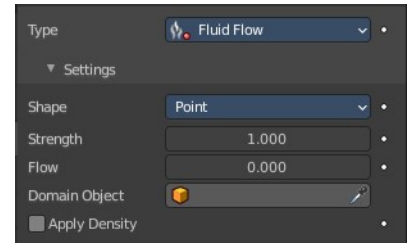
Max Distance

Makes the force field only take effect within a specified maximum radius (shown by an additional circle around the object).

Type Fluid Flow

Create a force field based on fluid simulation velocities.

Settings Subpanel



Shape

The direction that is used to calculate the effector force.

Strength

The strength of the force.

Flow

Convert effector force into air force velocity.

Domain Object

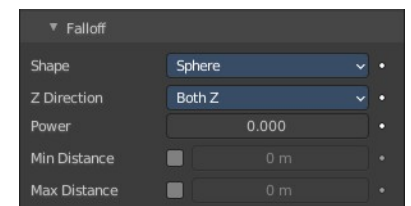
Select Domain object of the smoke simulation.

Apply Density

Adjust force strength based on smoke density.



Falloff Subpanel



Shape

Sphere

Falloff is uniform in all directions, as in a sphere.

Tube

Fall off results in a tube shaped force field. The Field's Radial falloff can be adjusted, as well as the Minimum and Maximum distances of the field.

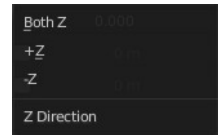


Cone

Fall off results in a cone shaped force field. Additional options are the same as those of Tube options.

Z Direction

Fall-off can be set to apply only in the direction of the positive Z Axis, negative Z Axis, or both.



Power (Power)

How the power of the force field changes with the distance from the force field. If r is the distance from the center of the object, the force changes with $1/r^{\text{Power}}$. A Fall-off of 2 changes the force field with $1/r^2$, which is the falloff of gravitational pull.

Min Distance

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Max Distance

Makes the force field only take effect within a specified maximum radius (shown by an additional circle around the object).