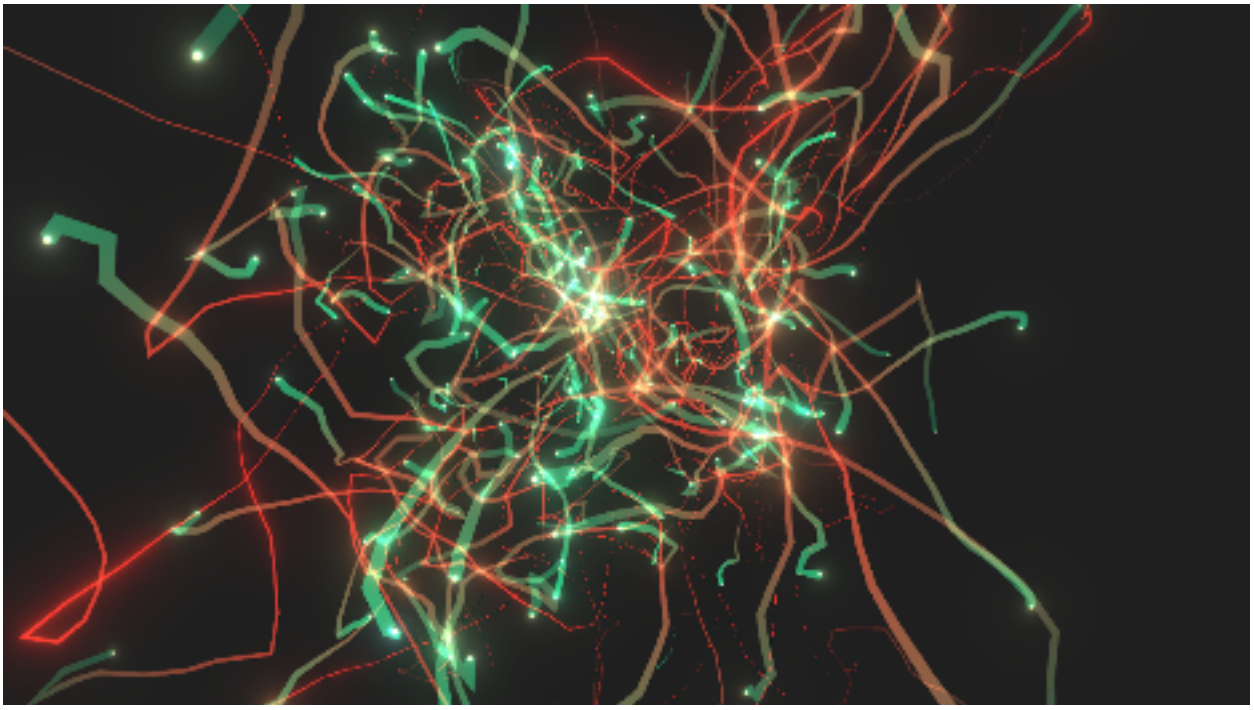
Magnetic Particles - Documentation



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Magnetic Particles - Overview

‘Magnetic Particles’ is a tool for Unity that augments the performance of the inbuilt particle system through the use of transforms. These transforms allow users to attract and repulse particles from a target particle system, determine the type of magnetic effect (position, direction, bounded pos or dir, pos noise or dir noise), as well as determine the magnet scale and distance of magnetic effect.

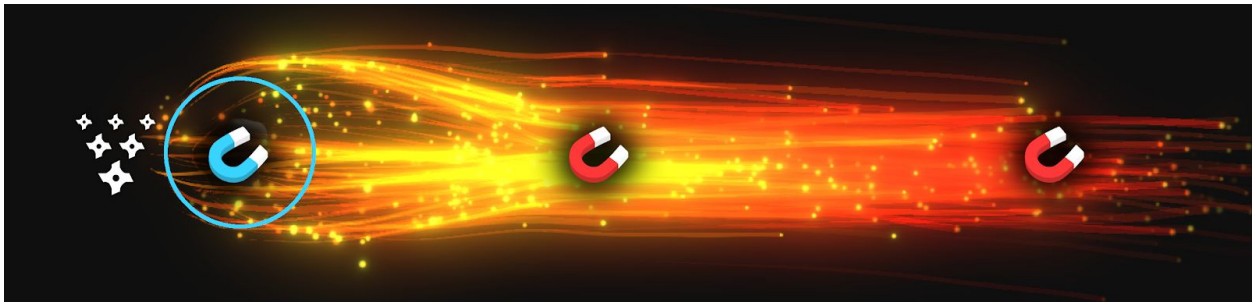
Users are able to determine how many magnetic transforms a given particle system is affected by, potentially combining multiple magnet behaviors to create unique particle effect combinations that are otherwise not possible using the inbuilt particle system.

Potential Use Cases

Due to the versatility in combining multiple magnet transforms, magnet effects and even multiple particle systems there are many potential use cases for this tool . Below are just three examples. Included in the project you will find 7 example magnet/ particle systems to reference when setting up your own.

Example 1 - Asteroid/ comet

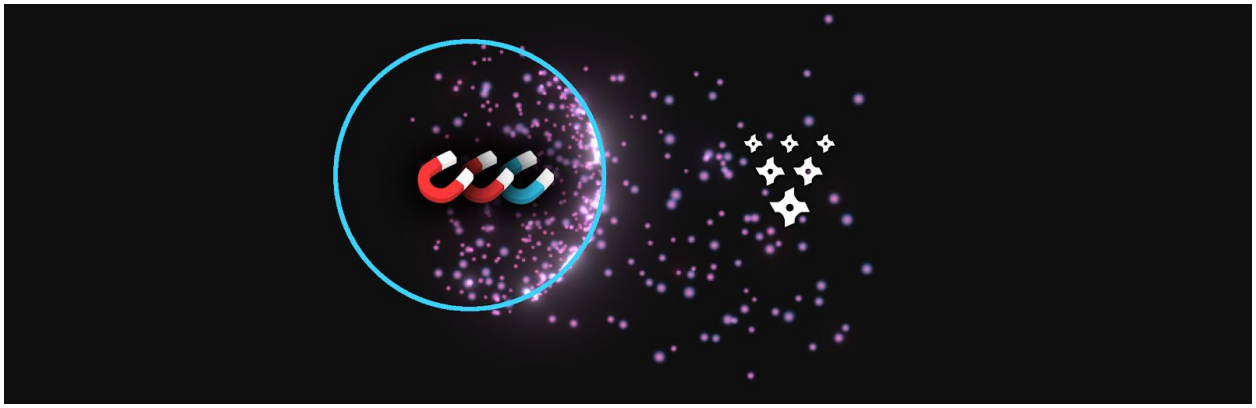
In the image below and included in the web demo (which can be found linked on the Magnetic Particles asset store page) users will be able to find a demonstration system that results in the effect of an asteroid trail. This system is achieved by using a single particle emitter (represented by the Shuriken Particle System icon), a repulsing magnet (represented in blue) with a range roughly of the blue circle surrounding it, and two attracting magnets at different points in the asteroid ‘trail’.



By repositioning the magnet transforms, directions, scales or modifiers you will be able to quickly generate new behaviors and visual effects.

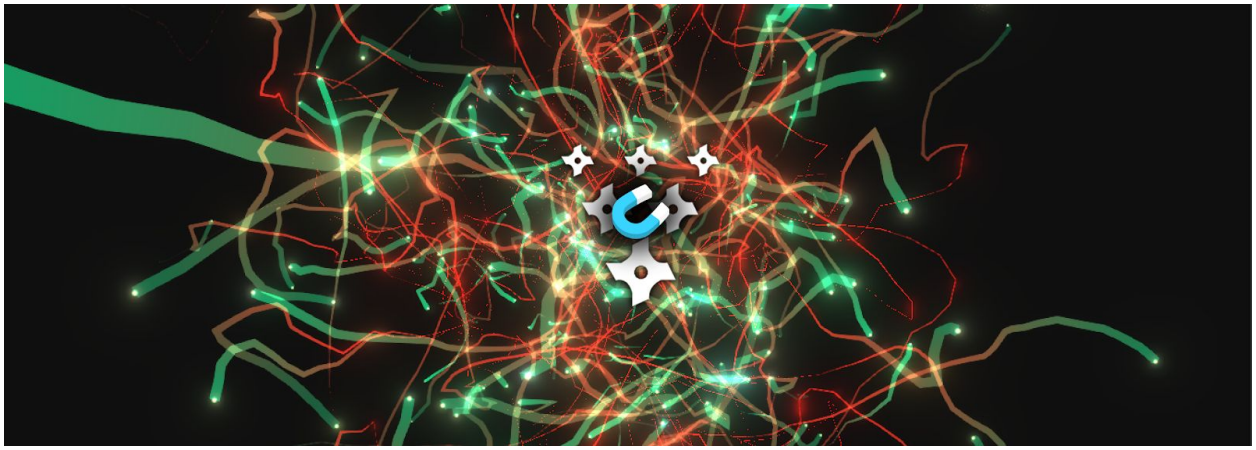
Example 2 - Shield bubble

In the image below the same reference transform is used 3 times with varying magnetic effects applied to it, resulting in a unique ‘bubble shield’ type visual. The blue icon represents a repelling magnet modifier with quite a large scale. This repelling magnet is fighting against the two attracting magnets, causing a kind of equilibrium at the boundary of the repelling magnets sphere of influence.



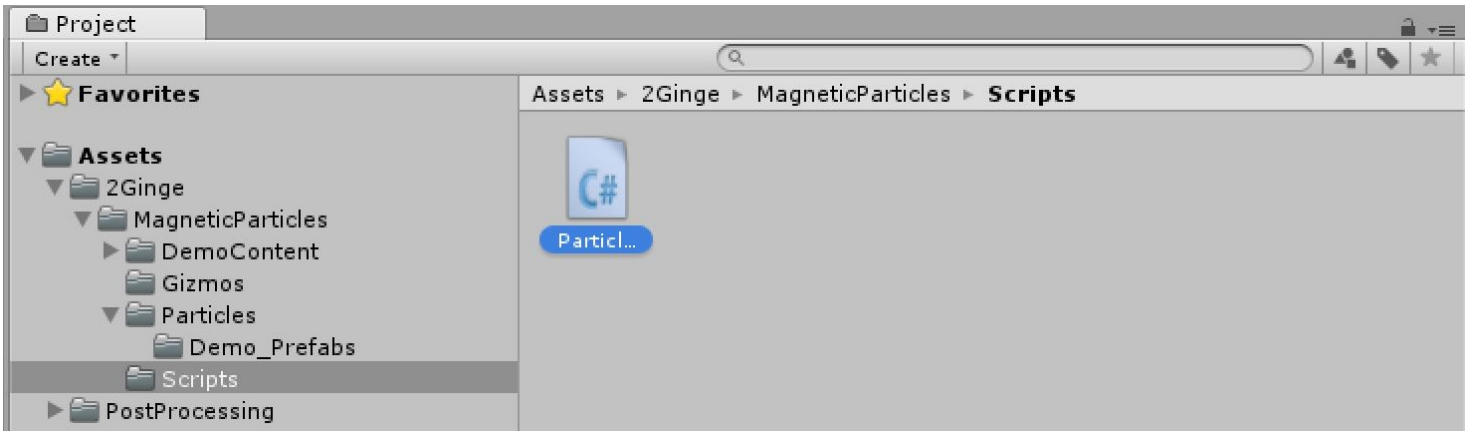
Example 3 - Random Noise Visualisation

In the image below one magnet transform is used with a repulse effect and a directional noise modifier, resulting in sporadic particle movement over the particle lifetime. Using the trail renderer and colour over lifetime settings included in the Shuriken Particle System results in an interesting musical visualiser style system.



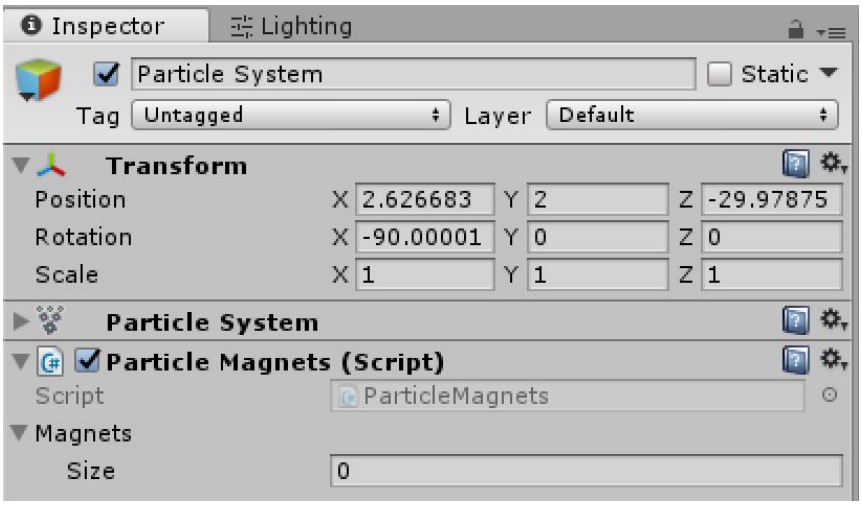
How to use Magnetic Particles - first time users

Getting started with Magnetic Particles is easy. If you have used the Shuriken particle system before, you're 80% of the way there. All you need to convert a standard unity particle effect into one with magnetic properties is to attach the 'ParticleMagnets' script found in the downloaded packs 'Scripts' folder to the particle system in the inspector. You can do this by either dragging the script from the project window directly onto the particle system in the hierarchy window, or by clicking the 'Add Component' button at the bottom of the inspector window with the intended particle system selected.

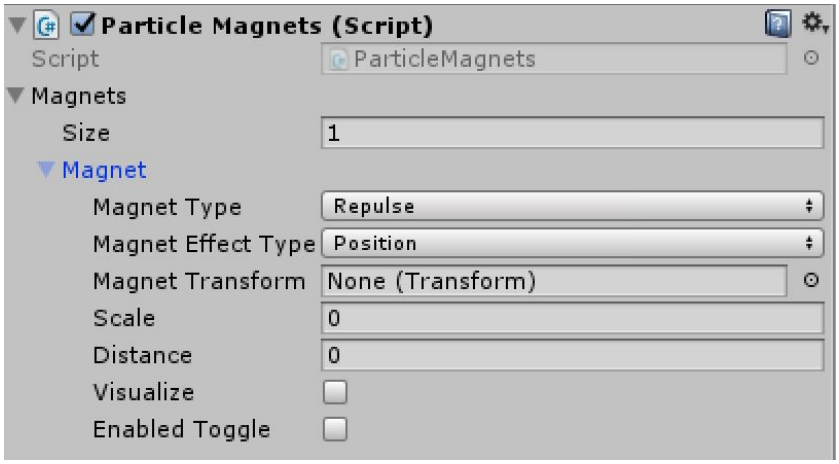


The image above demonstrates the location of the 'ParticleMagnets' script in the project.

Once the script is attached, select the particle system and observe the empty script ready to be hooked up. From here you will need to enter the number of magnets you would like the system to be influenced by in the 'Size' field.

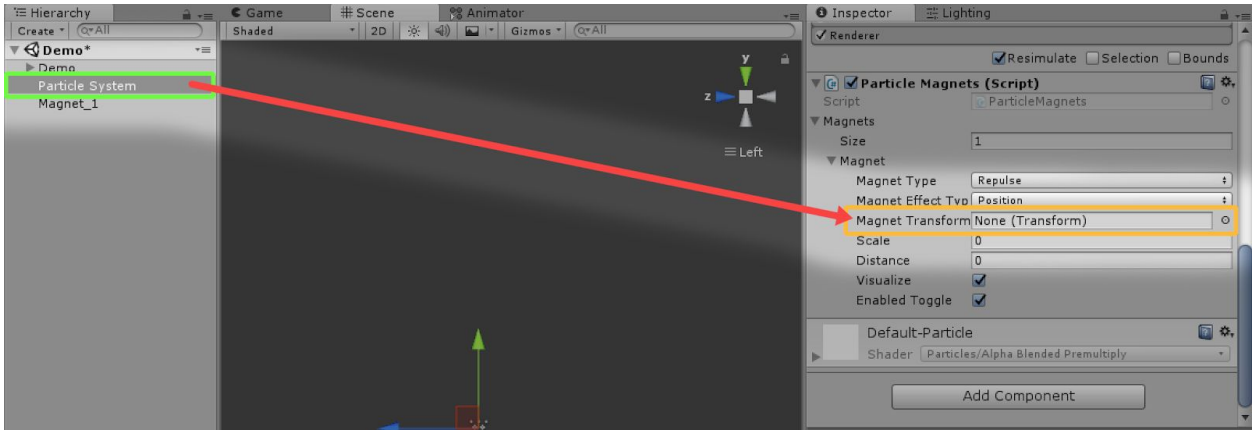


Once you have entered a number into the ‘Size’ field, that number will be reflected by the amount of magnet entries below. In this magnet drop down menu you will select the transform used to give the magnet a position and determine whether the magnet attracts or repels the particles, what type of magnetic effect it will cause, what intensity of magnetism it has, how far the magnet reaches, whether the debug visualiser is on/off and an enable toggle to allow for debugging of the magnet system.



The script is now ready to receive user defined information for one magnet.

To make a start, create an empty game object and place it at the location in the scene where you would like the particles to be attracted to or repelled away from. Best practice is to name it as ‘magnet’ and assign it a number if there will be more than one magnet in the system. Once you have done so, with the particle system object selected, drag and drop the transform of that magnet into the ‘MagnetTransform’ variable as can be seen in the image below.



After the magnet transform has been established, you can now choose whether the magnet will attract or repulse particles from the parent particle system. If you have gizmo's visible, the transform will display a blue magnet icon when 'repulse' is selected, or a red icon when 'attract' is selected.

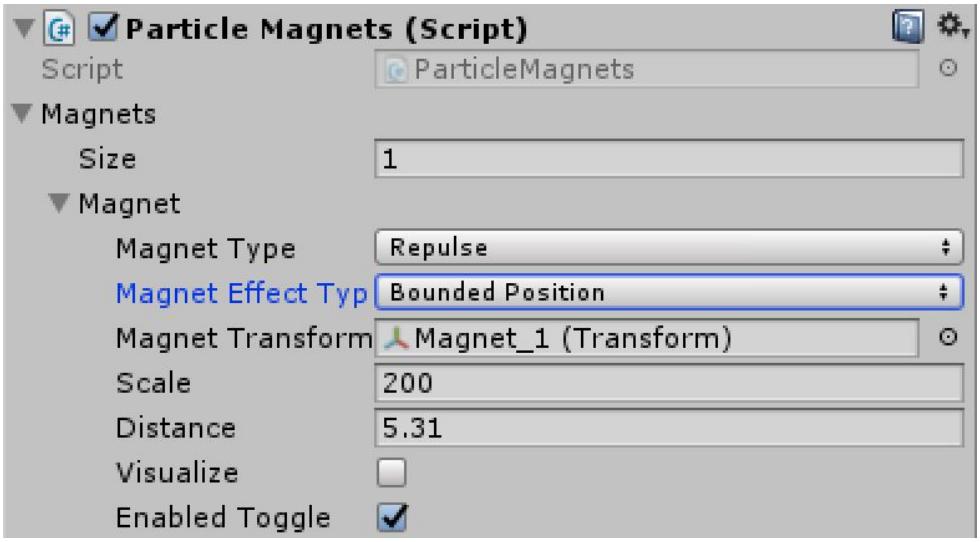
The 'Magnet Effect Type' drop down menu allows you to select an additional modifier/ behavior for the magnet transform to inherit. Please use the script overview section below to help you choose which effect type is best for your purposes. Naturally, combining multiple magnets with varying magnet effect types, scales and distances will allow for a wide range of possibilities. The best way to learn how you can use these variables to your advantage is by experimentation. You can also find our demonstration videos in the 2Ginge Asset Pack and Tool Tutorial Playlist on YouTube for a more in depth look at this tool and others.

Finally you will see 'visualize' and 'enabled toggle' checkboxes. The visualize option simply allows you to debug the distance of the magnet distance visually by drawing a spherical mesh to fill the circumference of the distance range. The 'Enabled Toggle' will allow you to turn on and off a particular magnet within a system to determine how it is contributing to the particle behavior.

Script Overview

While much of what follows below has been covered in other sections, for quick reference you will find outlined the purpose of each

ParticleMagnets.cs



The image above shows the particle magnets script with one element present.

Size
The number of magnets in the ‘magnets’ array. Up to 64 magnets can be allowed for using the system.

Magnet ‘x’
The position of the magnet in the magnet array.

Magnet Type

Attract
Quite simply, an attract magnet will pull particles from the attached system towards the supplied transform location. This property will be modified by the effect type, distance and scale modifiers.

Repulse
The repulse magnet type will repel particles from the attached system away from the supplied transform location. This effect too will be modified by the effect type, distance and scale modifiers.

Magnet Effect Type

Position
The magnetic effect will be applied by either attracting or repelling particles to the transform position by applying an operation to the particle position. Note that the distance and scale modifiers will determine exactly how much or how little this is true and some particles may escape the full influence of the magnet due to these values.

Direction
The magnetic effect will be applied to the emitted particles by either attracting or repelling them in the direction of the magnet transform from their position by affecting each particles velocity. As with the above, note that the distance and scale modifiers will determine exactly how much or how little this is true and some particles may escape the full influence of the magnet due to these values

Bounded Position
When using the bounded position effect type particles will be drawn to or repelled away from the magnet transform within the bounds of the area supplied as defined by the ‘distance’ variable. Particles outside this area will not be affected by the magnet. To see this area represented visually for debug purposes please see the ‘visualize’ section below.

Bounded Direction
The bounded direction effect type will influence the particle's velocity within the defined distance. Particles outside this range will not have the influence of the magnet applied to them.

Positional Noise
Positional noise applies randomization to the particle position.

Directional Noise
Directional noise applies randomization to the particle velocity.

Magnet Transform
The magnet transform is used to assign a location to the magnetic effect within the scene. This can be an empty game object, or any other kind of game object with a valid transform.

Scale
The ‘Scale’ variable

Distance
The ‘Distance’ variable will determine the scale of the magnets effective area. Setting the distance to 0 will cause the magnet to uniformly attract or repel particles emitted from the target

system. When using bounded effect types, setting the distance higher will define bounds within which the magnet causes particles to behave in accordance to the ‘effect type’ and ‘scale’ variable settings. Any particles outside of those bounds will not be affected by the magnet. With the effect types that do not use defined bounds, the distance modifier will scale the effect of the scale number over distance. Closer to 1 = stronger magnetic influence when magnets are closer to the particle, further = greater the fall off the magnetic influence will be as distance from the magnet transform increases.

Visualize
A checkbox that allows you to visualize the distance as a spherical mesh. This is handy when debugging systems that are working in conjunction with meshes in scene, or where a system has more than one magnet the magnets don’t overlap, or overlap in the way you intend.

Known Limitations

- When using the particle system in conjunction with the ‘Magnetic Particles’ script, you cannot use the light component that can be turned on for each particle in the system

FAQ

Is there a limit to the number of magnetic elements I can use?
The maximum number of magnet elements that can be added to the magnetic particles script is 64. Though we do recommend you keep the number lower than 15 as there are likely few use cases that would need to exceed this number and influence performance negatively.

Additional Help/ Contact

Feel free to contact us with any issues you may be having through any of the channels below. We are always happy to support our customers and will address bug fixes as soon as possible. Please do not hesitate to contact us with feature requests either! We'd love to continue to make our tools and assets better wherever possible.

We would be very grateful if you could take a moment to leave us a review on the Unity Asset Store if you have found the tool useful for your project. You can do this here.

Email: contact@2ginge.com
Website: www.2ginge.com
Twitter: @TwoGinge | @PezzSp | @JairMcBain

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