

## Calculating and displaying the distance between two particles using Xpresso

In this Cinema 4d 11.5 tutorial (level = moderate), I will show you how to get / calculate the distance between two particles. This can be used to determine collisions between particles.

As an extra, I will also show you how to display the calculated the distance between two particles. See also the Cinema 4D manual.

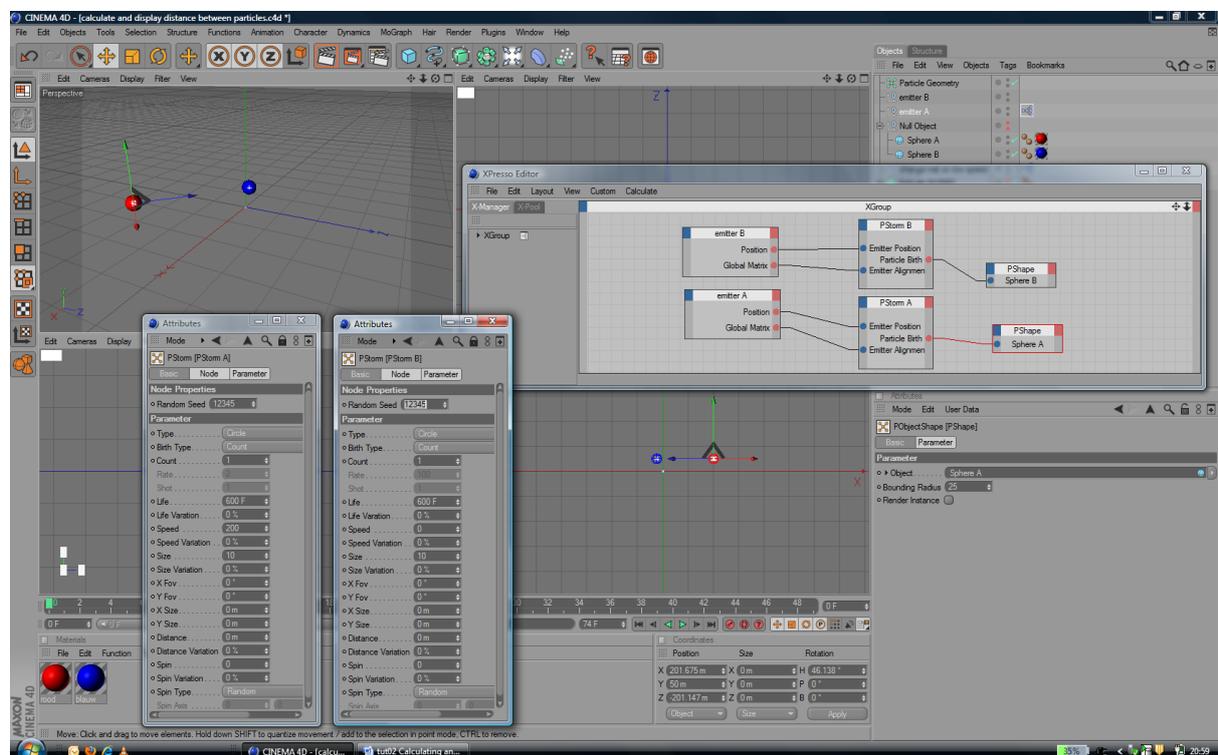
Start with creating two emitters opposite to each other. One with speed 200 and one with speed 0. Create the emitters using the PStorm node and connect Emitter Position and Emitter Alignment to the Position and Global Matrix of the Null Object. This way the emitter's position and direction is controlled using the Null Object.

Connect the Pstorm output to a PShape (PObjectShape) and drag the object you want to assign to the particles onto the PShape node. Do not forget to include a Particle Geometry Object. Only after adding this object, the particle objects will be displayed!

Point the emitter A (Z axe) in the direction of the emitter B.

Set the Birth Type for both emitters to Count and Count to 1. This way the emitters will only 'shoot' one particle.

To move the particles in a straight line, set X Fov, Y Fov, X Size and Y size to 0.



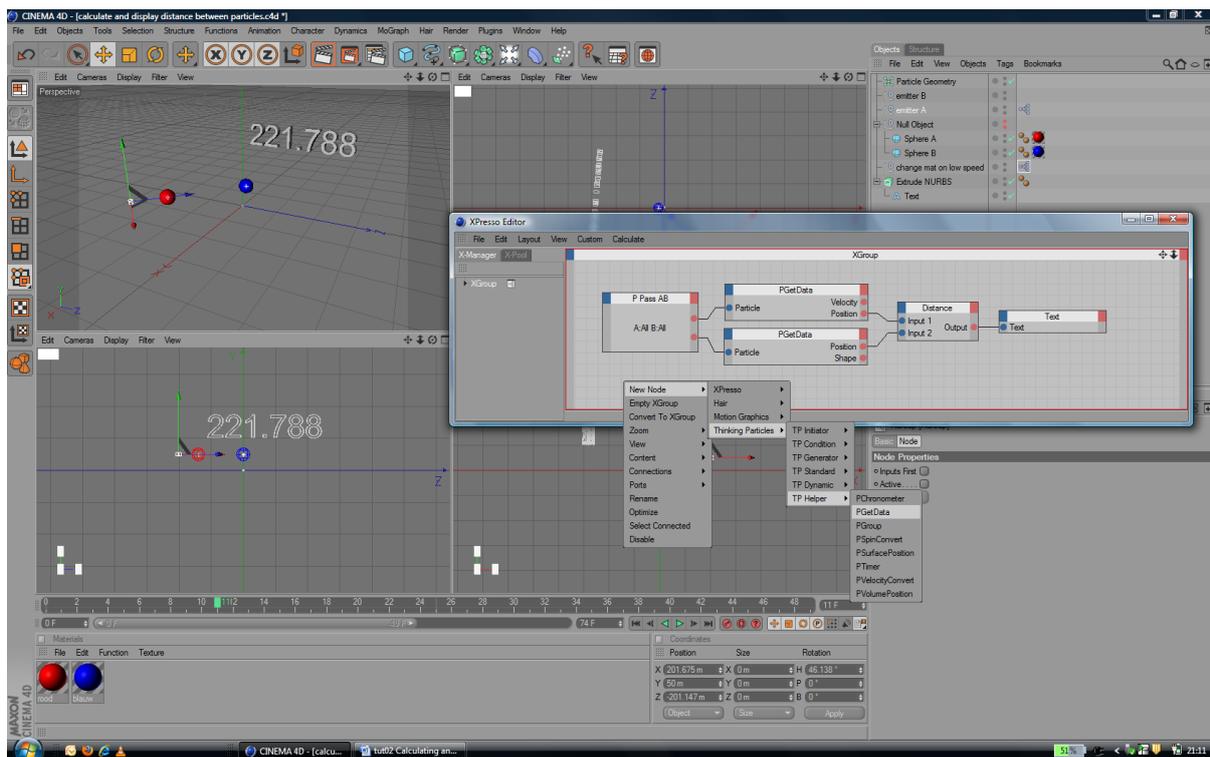
After clicking Play Forward, you will see the red sphere moving in the direction of the blue sphere. So far, so good.

Now to get the distance between two particles, in fact to get the distance between two positions, all we need is the Xpresso Distance node. Xpresso > Calculate > Distance.

To get the positions of the particles we use PGetData. Thinking Particles > TP Helper > PGetData. We feed these PGetData nodes with P Pass AB.

**Note:** See below for an detailed explanation of PPass and PPassAB taken from [www.bonkers.de](http://www.bonkers.de).

To display the distance value in CINEMA 4D's viewport, create an Object node for a Text spline. Connect the Distance node's output to the Object node's Text input. To make the text visible when rendered, make the spline a child of a Loft NURBS or Extrude NURBS.



Enjoy.

### Using PPass and PPassAB appropriately – Copied from [www.bonkers.de](http://www.bonkers.de)

PPass and PPassAB are used to access particles during their lifetime. They are basically iterators that will deliver all particles of the set group one after the other, or in case of PPassAB all pairs of particles created by two groups.

PPassAB must be used if you want to make particles interact with one another. Two PPass nodes won't work for this, since they are independent iterators.

This short piece of pseudo code should give you an idea on how PPass and PPassAB differ.

#### PPass works like this:

```
for n = 1 to particle count
    do something with n
next n
```

#### PPassAB works like this:

```
for n= 1 to group A particle count
    for i= 1 to group B particle count
        do something with n and i
    next i
next n
```

A mixture of two PPass nodes has no relation. They are completely separate so you will never be able to iterate through every A/B particle pair.