

# Dark Matter

## What is Dark Matter?

Dark Matter is material in the Universe which has mass, but which we can't see using conventional telescopes. This is either because it doesn't emit any light of its own, or it doesn't reflect light from a nearby star.

## Why should we study something we can't see?

Even though we can't see Dark Matter it is very important to astronomers because it has mass and therefore has a gravitational effect. A lot of Dark Matter distributed through the Universe means a lot of gravity. This strong gravitational pull could eventually stop the expansion of the Universe and make it collapse back on itself! Dark Matter could make up 96% of the material in the Universe so it is important that it is studied.

## What is Dark Matter made of?

Dark Matter could be made of many things from dead stars that don't shine anymore, planets going round distant stars, black holes, to tiny particles that barely interact with anything and are hard to detect. The latter are known as WIMPs – Weakly Interacting Massive Particles. Millions of these are thought to pass straight through your body every second. An example of a WIMP is something called a neutrino. This is a particle that is produced by radioactive rocks and in the core of the Sun.

## Where are scientists looking for Dark Matter?

Everywhere! Deep underground, in disused mines, the search for WIMPs is on. (It is thought that only WIMPs can get to these depths, meaning it is easy to identify them.) In the edges of our own galaxy and beyond, where astronomers are looking for objects the size of giant planets.

## How did we find out about Dark Matter?

Dark Matter was proposed when galaxies were observed to be acting in a strange way. It was known that galaxies rotate, but observations started to show that they were rotating too fast for the gravitational pull of the stars in the galaxy to hold it together. It was realised that there must be more gravity, or more material, present than that which could be seen. Hence, Dark Matter!

## What has all this got to do with Einstein?

Einstein's general theory of relativity is really his theory about gravity. It was his masterpiece and it predicts that massive objects distort space to produce a curved space-time. Very massive objects can distort space so much that light actually bends around them. This theory is being used in the search for the larger Dark Matter candidates, such as dead stars and black holes.

## Where can I find more information?

<http://www.bbc.co.uk/science/space/deepspace/darkmatter/index.shtml>