Is there a centre of the universe?

by **Jonathan O'Callaghan**, 28 January 2013

Gemma Lavender gets to the bottom of this question for us.

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2 comments

Asked by Adam Lambert

If you were around in the 1500s, during the time of the Polish astronomer Nicolaus Copernicus, then the answer to this question would have been the Sun. Obviously, despite how we see the planets and stars moving across the night sky, our star is not at the centre of the Universe. So what is?

Today astronomers believe that there is no centre to the cosmos. You might think that there must be a central point – after all, the Big Bang must have started somewhere? While great explosions of say, a bomb, do start from one point, the Big Bang that is believed to have created our Universe nearly 14 billion years ago was a different matter entirely and appeared to happen everywhere all at once – time and space did not exist before the Big Bang and so there was no point from where it could have erupted from.

This does not mean that, if we were to see to the very edges of the Universe, that there would be more of it on one side of the Earth in comparison to the other. Imagine if you were small enough to stand on a balloon – small enough to see in a straight line across the balloon's surface. You're not able to see into or out of the balloon and, no matter which direction you look, the end of the balloon seems to be at roughly the same distance from you. If you start moving across the balloon's surface, it would appear that you were at the centre of it. The reality of the matter is, however, that your two-dimensional balloon does not have a centre.

Now, suppose your balloon is being inflated with air and covered with pen marks around you. As the balloon gets bigger and bigger, these pen marks get further and further away from you and each other – no matter

where you are it appears to you that you are at the centre of the expansion. Since space is curved, it is somewhat like the two-dimensional space on a balloon and just like there is no centre to its expansion there is no centre to the expansion of the Universe.

Answered by science journalist Gemma Lavender

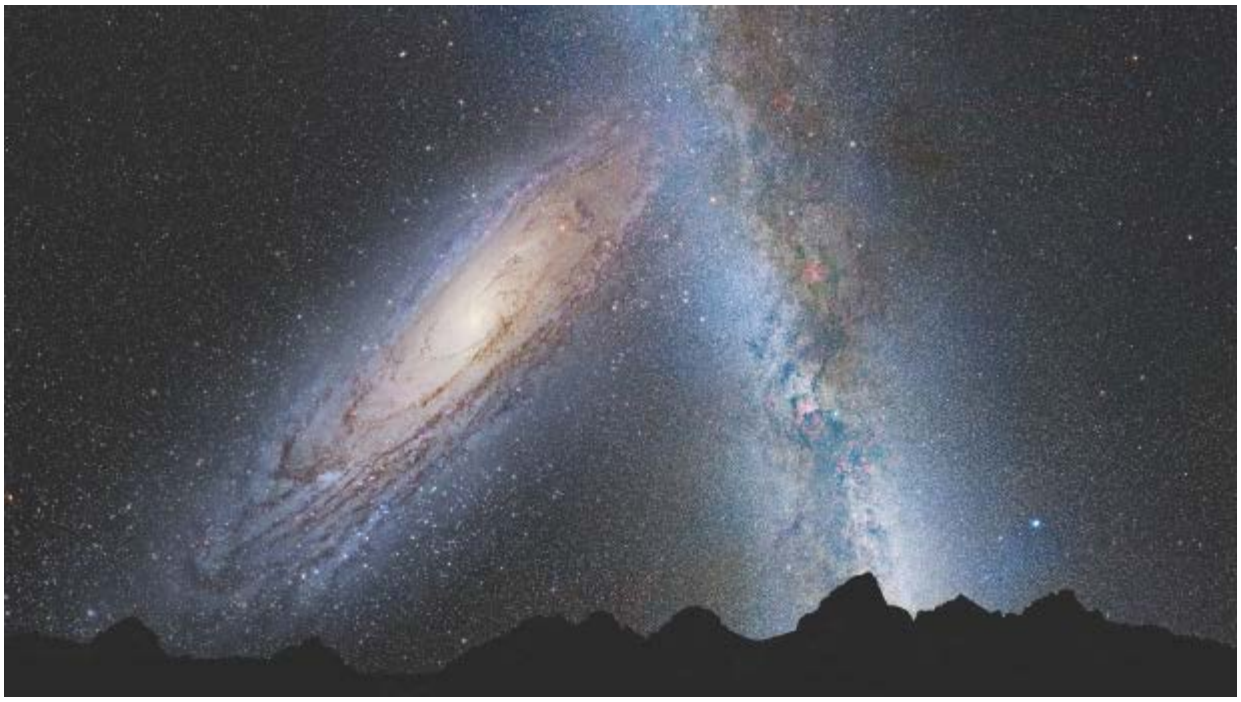
Tags: centre, Cosmos, direction, Earth, point, Sun, Universe

If the universe is expanding, why are we on a collision course with the Andromeda galaxy?

by **Jonathan O'Callaghan**, 26 January 2013

Gemma Lavender heads straight into this one to find us the answer.

comments



The expansion of the Universe, as measurements carried out by astronomer Edwin Hubble in the 1920s show, mean that galaxies are rushing away from us at a rate, recently measured by today's cosmologists, to be 74 kilometres per second per megaparsec (where one megaparsec equals around 3.26 million light years).

While it is easy to envision all galaxies moving away from each other, the evidence of smash-ups between these gigantic structures litter the Universe. This means that galaxies are both moving away and crashing into one another – this happens much more often than you think.

So often, in fact, that our galactic neighbour, Andromeda is moving towards the Milky Way Galaxy at around 250,000 miles per hour – a speed that would get you to the Moon in about an hour.

Why this is so is all thanks to the gravity of the dark matter surrounding the pair, knitting them together so tightly, that they resist the expansion of the Universe and are instead, drawn together with Andromeda falling towards us. As you may have read in our feature on the Andromeda Galaxy in issue 6 of All About Space, we are unlikely to see the spectacular collision as our Sun evolves and extinguishes life on our planet's surface.

However, when the inevitable does happen, and the two coalesce, they will create a single elliptical galaxy with the merger triggering a great burst of star formation and the supermassive black holes that sit at the hearts of both galaxies will combine. While stars in both the Milky Way and Andromeda are unlikely to collide due to their great distances, the gravitational disturbance could cause what is left of our Solar System to change its position – tossing it from its current position in the Orion spur and further from the Milky Way's core.

The galaxy merging does not end there either; Andromeda's companion, the Triangulum Galaxy – which is also attached by dark matter to the pair – will join the collision, taking another two billion years to merge with "Milkomeda" completely.