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News Release

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Our galaxy is Way lighter than previous estimates, study shows

The Milky Way is lighter than astronomers previously thought, according to new research.

For the first time, scientists have been able to precisely measure the mass of the galaxy that contains our solar system.

Researchers have found that the Milky Way is approximately half the weight of a neighbouring galaxy – known as Andromeda – which has a similar structure to our own. The Milky Way and Andromeda are the two largest in a region of galaxies which astronomers call the Local Group.

Scientists say that Andromeda's extra weight must be present in the form of dark matter, a little-understood invisible substance which makes up most of the outer regions of galaxies. They estimate that Andromeda contains twice as much dark matter as the Milky Way, causing it to be twice as heavy.

Researchers say their work should help them learn more about how the outer regions of galaxies are structured.

Although both galaxies appear to be of similar dimensions, until now scientists had been unable to prove which is larger.

Previous studies were only able to measure the mass enclosed within both galaxies' inner regions. In this new study, researchers were also able to work out the mass of invisible matter found in the outer regions of both galaxies, and reveal their total weights. They say 90 per cent of both galaxies' matter is invisible.

A team of scientists led by the University of Edinburgh used recently published data on the known distances between galaxies in the Local Group – as well as their velocities – to calculate the total masses of Andromeda and the Milky Way.

The study, published in the journal *Monthly Notices of the Royal Astronomical Society*, was carried out in collaboration with the University of British Colombia, Carnegie Mellon University and NRC Herzberg Institute of Astrophysics.

The work was supported by the UK's Science and Technology Facilities Council.

Findings from the study are supported by research led by Jonathan Diaz at the University of Cambridge, which used different data and methods and produced very similar results.

Dr Jorge Peñarrubia, of the University of Edinburgh's School of Physics and Astronomy, who led the study, said: "We always suspected that Andromeda is more massive than the Milky Way, but weighting both galaxies simultaneously proved to be extremely challenging. Our study combined recent measurements of the relative motion between our galaxy and Andromeda with the largest catalogue of nearby galaxies ever compiled to make this possible."

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