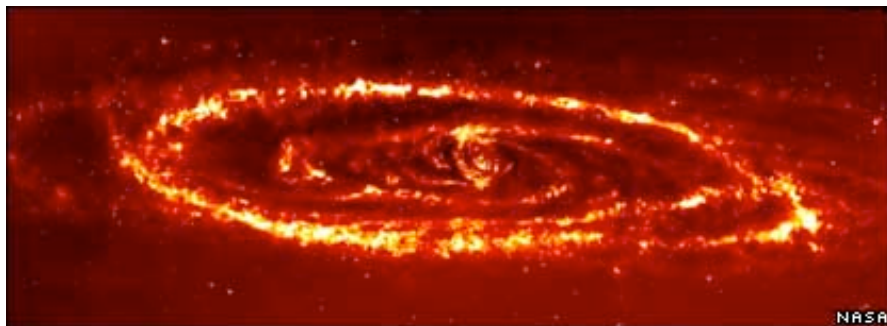


Vast halo extends galaxy's size

By Paul Rincon

Science reporter, BBC News, Seattle



Astronomers have found an enormous halo of stars around the Andromeda galaxy.

The discovery suggests the nearby spiral galaxy, also known as M31, is as much as five times bigger than astronomers had previously thought.

In fact, Andromeda's "suburbs" are so vast that they nearly overlap with those of our own Milky Way galaxy.

University of California researchers presented their findings at a meeting of the American Astronomical Society (AAS) taking place in Seattle, US.

Andromeda is a spiral galaxy similar to the Milky Way. About 2.5 million light-years away from Earth, it is the largest galaxy in the "local group", which also includes the Milky Way and about 30 smaller galaxies.

Perfect distance

Spiral galaxies consist of a bright central bulge with a dense concentration of stars, surrounded by a flat rotating disc of stars.

Extending out from the disc is a spherical halo of sparsely distributed stars.

Theories of galaxy formation predict that the halo of a large galaxy is the first component to form. The disc and central bulge develop some time later.

Studying the Milky Way's halo is difficult because Earth is buried within the galaxy; astronomers do not have an external vantage point from which to view the whole galaxy.

The halos of distant galaxies are nearly impossible to resolve, because astronomers cannot see individual stars.

Andromeda is at the perfect distance: it is just far enough for astronomers to see the whole galaxy, and just close enough for them to observe individual stars.

Smooth and even

A team from the University of California at Santa Cruz (UCSC) detected a sparse population of red giant stars - bright, bloated stars in a late stage of stellar evolution.

These appeared to be smoothly distributed around Andromeda out to a distance of 500,000 light-years from the galaxy's centre.

"I am absolutely astounded by how big this halo is," said UCSC Professor Puragra Guhathakurta, one of the researchers in the study.

"As we looked farther and farther out, we kept finding stars that look like halo stars."

The astronomer said he thought that previous groups had mistakenly identified the outer parts of Andromeda's central bulge as its halo.

Heavy metals

Stars in the Milky Way's halo are very old, but earlier studies had found those in Andromeda's were of intermediate age.

In addition, the Milky Way's halo stars contained fewer heavy metals compared with those in the inner parts of the galaxy - they were "chemically anaemic". This finding was consistent with theories of galaxy formation.



However, previous work had found that stars in Andromeda's halo were a factor of 10 richer in heavy metals than those in the Milky Way.

Dr Jason Kalirai, another member of the UCSC team, said the project had partly been started to resolve some of these disparities.

He explained that his team had extended their search for stars in Andromeda further out from the



galaxy centre than previous studies had done.

This was made possible by developing a technique that allowed true Andromeda stars to be isolated from other objects along the same line of sight.

They found a clear break in the surface brightness of stars from the inner parts of Andromeda and fainter ones from outer parts of the galaxy.

This clean break is seen in the Milky Way, but had previously not been reported in Andromeda.

If theories of galaxy formation and analogies drawn with the Milky Way were correct, the stars in this outer region should be depleted in heavy metals compared with those in the inner parts of Andromeda.

This is in fact what the team found.

Paul Hodge, an astronomer who has written a book on Andromeda, said it had not been possible to resolve differences in the outer part of the galaxy until the advent of powerful observatories such as the Hubble Space Telescope.

"For the first time, Andromeda has a very extensive outer envelope, and we're now learning that it's not just extensive, it's complicated," said the University of Washington researcher.

Paul.Rincon-INTERNET@bbc.co.uk

[Send this to a friend](#)

RELATED TO THIS STORY:

[Astronomers complete mighty map](#) (05 Oct 06 | Science/Nature)

[Galactic pancake mystery solved](#) (07 Apr 05 | Science/Nature)

[Galaxy has mystery star clusters](#) (05 Apr 05 | Science/Nature)

['Alien' stars invade Milky Way](#) (26 Sep 03 | Science/Nature)

[Galactic cannibalism in action](#) (04 Jul 01 | Sci/Tech)

RELATED INTERNET LINKS:

[AAS](#)

[UCSC](#)

[Hubble space telescope](#)

The BBC is not responsible for the content of external internet sites

[News Front Page](#) | [Video Headlines](#) | [World](#) | [UK](#) | [England](#) | [Northern Ireland](#) | [Scotland](#) | [Wales](#) | [Business](#) | [Politics](#) | [Health](#) | [Education](#) | [Science/Nature](#) | [Technology](#) | [Entertainment](#) | [Magazine](#) | [Have Your Say](#) |

[^ Back to top](#) | [BBC Sport Home](#) | [BBC Homepage](#) | [Feedback](#) | [©](#)