Our Galaxy may be bigger than we thought

August 10 2005

Our Galaxy could be a lot bigger than we thought. That's the conclusion of team of astronomers that's found whole new 'suburbs' of stars in another galaxy.

Like archaeologists unearthing a lost city, the Australian and US astronomers used the 8-m Gemini South telescope in Chile to reveal the faint ancient outer parts of the galaxy NGC 300, showing that that galaxy is at least twice as big as previously thought.

The finding implies that our own Galaxy too is probably much bigger than textbooks say.

And ideas on how galaxies form will have to be rethought, to explain how NGC 300 could have stars so far out from its centre.

The research is published today [10 August 2005] in the Astrophysical Journal.

NGC300 is a spiral galaxy 6.1 million light-years away. It looks rather like our own Galaxy, with most of its stars lying in a thin disk like a pancake.

Using the Gemini Multi-Object Spectrograph instrument on the Gemini South telescope in Chile, the observers were able to see stars in the disk up to 47,000 light-years [14.4 kpc] from the galaxy's centre—double the previously known radius of the disk.

These were extremely sensitive measurements, going more than ten times fainter than any previous images of this galaxy.

A few billion years ago the outskirts of NGC 300 were brightly lit suburbs that would have shown up as clearly as its inner metropolis. But the suburbs have dimmed with time, and are now inhabited only by faint, old stars—stars that need large telescopes such as Gemini South to detect them.

The finding has profound implications for our own Galaxy. Most current estimates put its size at 100,000 light-years across, about the same as the new estimate for NGC 300. “However, our galaxy is much more massive and brighter than NGC 300. So on this basis, our Galaxy is also probably much larger than we previously thought—perhaps as much as 200,000 light-years across,” said the paper’s lead author, Professor Joss Bland-Hawthorn of the Anglo-Australian Observatory.

The observers found no evidence that the outer part of NGC 300 was falling abruptly in brightness, or truncating, as happens in many galaxies.

“We now realize that there are distinctly different types of galaxy disks,” said team member Professor Ken Freeman of the Research School of Astronomy and Astrophysics at the Australian National University. “Probably most truncate—the density of stars in the disk drops off sharply. But NGC 300 just seems to go on forever. The density of stars in the disk falls off very smoothly and gradually.”

The observers traced NGC 300’s disk out to the point where the surface density of stars was equivalent to a one-thousandth of a Sun per square light-year.

“This is the most extended and diffuse population of stars ever seen,” said Bland-Hawthorn.

Source: Australian National University