Giant galaxies akin to snowflakes in space

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(PhysOrg.com) -- Giant galaxies that contain billions of stars are born in much the same way as delicate snowflakes, new research from Swinburne University of Technology has shown.

In a paper accepted for publication in the Monthly Notices of the Royal Astronomical Society, Professor Duncan Forbes has provided the first direct evidence to support a theory of galaxy formation that he has likened to the birth of a snowflake.

Forbes, with the help of international collaborators, analysed data from three different telescopes in order to help confirm this galaxy formation theory proposed last year by German astronomer Ludwig Oser and his colleagues.

“What we’ve found is that galaxies form in two phases. Firstly, an inner region of stars is formed from collapsing gas. This region then acts as a core, or `seed’, around which the galaxy grows as the result of stars which are acquired from other smaller galaxies,” he said.

According to Professor Jean Brodie from the University of California, “our work provides some of the best evidence for this inside-out build up of giant galaxies.”

What intrigued the astronomers was the similarity between this inside-out process for giant galaxy formation and the way that snowflakes are formed.

“Snowflake formation requires a `seed’ to get it started. In the case of snowflakes, that `seed’ is a microscopic dust grain. Having a core from which to build upon is comparable to the formation of a giant galaxy,” Forbes said.

“Then, in much the same way as water vapour accumulates to grow the snowflake, small galaxies and their stars are accreted onto the galaxy core.”

The astronomers based their conclusions on observations of the massive elliptical galaxy NGC1407, one of the largest galaxies in the southern skies with over 10 billion stars.

They made their observations using two giant telescopes in Hawaii – the 8.2 metre Subaru and the 10 metre Keck, the largest optical telescope in the world. They also included data collected from the Hubble Space Telescope.

“Our data came from three of the world’s premier telescopes, and in each case it supported the ‘snowflake theory’ of galaxy formation,”

Forbes said. “This means we can be very confident in our findings.”

Provided by Swinburne University of Technology