

'Dinosaurs' in space found by PhD student (w/ Video)

October 7 2010



Using Australian telescopes, Swinburne University astronomy student Andy Green has found 'living dinosaurs' in space: galaxies in today's Universe that were thought to have existed only in the distant past.

The report of his finding - Green's first scientific paper - appears on the cover of the 7 October issue of *Nature*.

"We didn't think these [galaxies](#) existed. We've found they do, but they are extremely rare," said Professor Karl Glazebrook, Green's thesis supervisor and team leader.

The Swinburne researchers have likened the galaxies to the 'living dinosaurs' or Wollemi Pines of space - galaxies you just wouldn't expect

to find in today's world.

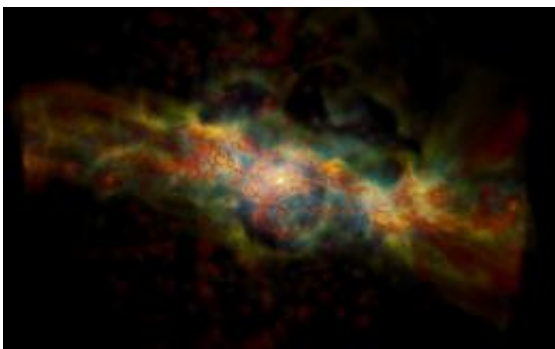
"Their existence has changed our ideas about how star formation is fuelled and understanding star formation is important. Just look at the Big Bang, which is how we all got here," Glazebrook said.

The galaxies in question look like disks, reminiscent of our own galaxy, but unlike the Milky Way they are physically turbulent and are forming many young stars.

"Such galaxies were thought to exist only in the distant past, ten billion years ago, when the [Universe](#) was less than half its present age," Glazebrook said.

"Stars form from gas, and astronomers had proposed that the extremely fast star formation in those ancient galaxies was fuelled by a special mechanism that could exist only in the early Universe - cold streams of gas continually falling in."

But finding the same kind of galaxy in today's Universe means that that mechanism can't be the only way such rapid star formation is fuelled. Instead it seems that when young stars form, they create turbulence in their surrounding gas. The more stars are forming in a galaxy, the more turbulence it has.



"Turbulence affects how fast stars form, so we're seeing stars regulating their own formation," Green said.

"It's a bit like a little girl deciding how many siblings she should have."
"We still don't know where the gas to make these stars comes from though," he said.

Understanding star formation is one of the most basic, unsolved problems of astronomy. Another significant aspect of the paper is that it was authored by a PhD student.

As Glazebrook pointed out, being first author of a Nature paper as a student is as rare as the galaxies they've discovered. This is an achievement not lost on the young scientist.

"*Nature* is one of the most prestigious journals in science. It was a pleasant surprise for our work to receive this kind of accolade," Green said.

The study was based on selected galaxies from the Sloan Digital Sky Survey, a kind of census of modern galaxies.

"We studied extreme galaxies to compare them with the ancient Universe," Green said.

He observed them using the Anglo-Australian [Telescope](#) (AAT) and the Australian National University's 2.3 metre telescope, both located at Siding Spring Observatory in New South Wales. Professor Matthew

Colless, Director of the Australian Astronomical Observatory, which operates the AAT, said that the study highlighted the value of the instruments found at Australia's telescopes.

"They are ideal for studying in detail the nearby counterparts of galaxies seen in the distant Universe by the eight and 10 metre telescopes," he said.

For the next stage of his research, Green plans to use one of these 10 metre telescopes - in fact the largest optical telescope in the world at the Keck Observatory - to take an even closer look at the rare galaxies he has discovered.

Green admitted: "Really, we need a bigger telescope, the Giant Magellan Telescope, to understand [star formation](#). But, until it's constructed, Keck is the best tool available."

Green's access to the Keck will be possible thanks to Swinburne's agreement with Caltech, which gives the Swinburne astronomers access to the Keck Observatory in Hawaii for up to 20 nights per year.

More information: Go to www.nature.com/nature/journal/.../ull/nature09452.html

Provided by Swinburne University of Technology

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