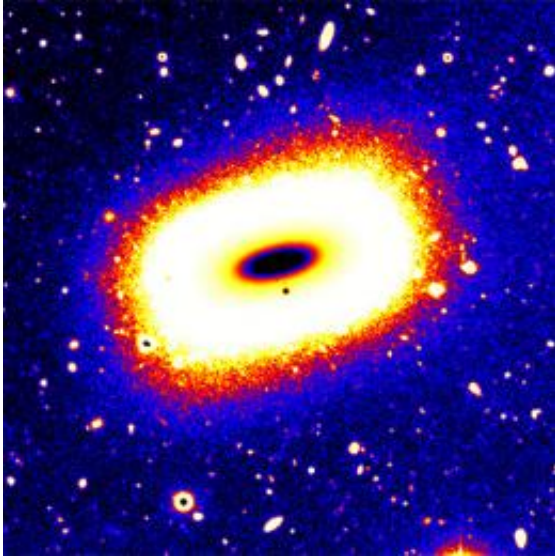


Astronomers discover 'emerald-cut' galaxy

March 19 2012



False-color image of LEDA 074886 taken with Subaru Telescope's Suprime-Cam. The central contrast has been adjusted to reveal the inner disk/bar-like component. Dr. Lee Spitler (Swinburne University of Technology, Australia) took this image.

(PhysOrg.com) -- An international team of astronomers has discovered a rare square galaxy with a striking resemblance to an emerald cut diamond.

The [astronomers](#) – from Australia, Germany, Switzerland and Finland – discovered the rectangular-shaped galaxy within a group of 250 [galaxies](#) some 70 million light years away.

“In the Universe around us, most galaxies exist in one of three forms: spheroidal, disc-like, or lumpy and irregular in appearance,” said Associate Professor Alister Graham from Swinburne University of Technology

He said the rare rectangular-shaped galaxy was a very unusual object. “It's one of those things that just makes you smile because it shouldn't exist, or rather you don't expect it to exist.

“It’s a little like the precarious Leaning Tower of Pisa or the discovery of some exotic new species which at first glance appears to defy the laws of nature.”

The unusually shaped galaxy was detected in a wide field-of-view image taken with the Japanese Subaru Telescope for an unrelated program by Swinburne astrophysicist Dr Lee Spitler.

The astronomers suspect it is unlikely that this galaxy is shaped like a cube. Instead, they believe that it may resemble an inflated disc seen side on, like a short cylinder.

Support for this scenario comes from observations with the giant Keck Telescope in Hawaii, which revealed a rapidly spinning, thin disc with a side-on orientation lurking at the centre of the galaxy. The outermost measured edge of this galactic disc is rotating at a speed in excess of 100,000 kilometres per hour.

“One possibility is that the galaxy may have formed out of the collision of two spiral galaxies,” said Swinburne’s Professor Duncan Forbes, co-author of the research.

“While the pre-existing stars from the initial galaxies were strewn to large orbits creating the emerald cut shape, the gas sank to the mid-plane

where it condensed to form new stars and the disc that we have observed.”

Despite its apparent uniqueness, partly due to its chance orientation, the astronomers have managed to glean useful information for modelling other galaxies.

While the outer boxy shape is somewhat reminiscent of galaxy merger simulations which don’t involve the production of new stars, the disc-like structure is comparable with merger simulations involving star formation.

“This highlights the importance of combining lessons learned from both types of past simulation for better understanding galaxy evolution in the future,” said Associate Professor Graham.

“One of the reasons this emerald cut galaxy was hard to find is due to its dwarf-like status: it has 50 times less stars than our own Milky Way galaxy, plus its distance from us is equivalent to that spanned by 700 Milky Way galaxies placed end-to-end.

“Curiously, if the orientation was just right, when our own disc-shaped galaxy collides with the disc-shaped Andromeda galaxy about three billion years from now we may find ourselves the inhabitants of a square looking galaxy.”

The results will be published in *The Astrophysical Journal*.

More information: Pre-publication: arxiv.org/pdf/1203.3608v1.pdf

The paper presenting the results of this research, "Leda 074886: A Remarkable Rectangular-Looking Galaxy", will appear in the *Astrophysical Journal*. It is tentatively scheduled for the May 1, 2012,

Issue 750-1.

Provided by Swinburne University of Technology

Citation: Astronomers discover 'emerald-cut' galaxy (2012, March 19) retrieved 9 April 2024
from <https://phys.org/news/2012-03-astronomers-emerald-cut-galaxy.html>

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