

Astronomers crack the Fried Egg Nebula

September 27 2011



This picture of the nebula around a rare yellow hypergiant star called IRAS 17163-3907 is the best ever taken of a star in this class and shows for the first time a huge dusty double shell surrounding the central hypergiant. The star and its shells resemble an egg white around a yolky centre, leading astronomers to nickname the object the Fried Egg Nebula. Credit: ESO/E. Lagadec

(PhysOrg.com) -- Using the European Southern Observatory's Very Large Telescope (VLT), teams from The University of Manchester, among others, took the new picture showing for the first time a huge dusty double shell surrounding the central hypergiant.

The star and its shells resemble an egg white around a yolky centre, leading the [astronomers](#) to nickname the object the Fried Egg [Nebula](#). The international team's results are published in the journal *Astronomy & Astrophysics*.

The monster star, known to astronomers as IRAS 17163-3907, has a diameter about a thousand times bigger than our Sun. At a distance of about 13 000 light-years from Earth, it is the closest yellow hypergiant found to date and new observations show it shines some 500 000 times more brightly than the Sun.

The observations of the star and the discovery of its surrounding shells were made using the VISIR infrared camera on the VLT. The pictures are the first of this object to clearly show the material around it and reveal two almost perfectly spherical shells.

If the Fried Egg Nebula were placed in the centre of the Solar System, the Earth would lie deep within the star itself and the planet Jupiter would be orbiting just above its surface.

The much larger surrounding nebula would engulf all the planets and dwarf planets and even some of the comets that orbit far beyond the orbit of Neptune. The outer shell has a radius of 10 000 times the distance from the Earth to the Sun.

"This object was known to glow brightly in the infrared but, surprisingly, nobody had identified it as a yellow hypergiant before," said Eric Lagadec ([European Southern Observatory](#)), who led the team that

produced the new discovery.

Yellow hypergiants are in an extremely volatile phase of their evolution, undergoing a series of explosive events — this star has ejected four times the mass of the Sun in just a few hundred years. The material flung out during these bursts has formed the extensive double shell of the nebula, which is made of dust rich in silicates and surrounded by gas.

Professor Albert Zijlstra, from The University of Manchester, said: "It is amazing that one of the brightest stars in the infrared sky had previously gone unnoticed. We are seeing a very rare event, when a star is beginning to blow off its outer layers, as a prelude to its final explosion as a supernova."

This activity also shows that the star is likely to soon die an explosive death — it will be one of the next supernova explosions in our galaxy. Supernovae provide much-needed chemicals to the surrounding interstellar environment and the resulting shock waves can kick start the formation of new stars.

The Very Large [Telescope](#) mid-IR instrument, VISIR, captured this delicious image of the Fried Egg Nebula through three mid-infrared filters that are here coloured blue, green and red.

More information: “A double detached shell around a post-Red Supergiant: IRAS 17163-3907, the Fried Egg nebula“ by E. Lagadec et al., *Astronomy & Astrophysics*.

Provided by University of Manchester

Citation: Astronomers crack the Fried Egg Nebula (2011, September 27) retrieved 19 April 2024

from <https://phys.org/news/2011-09-astronomers-fried-egg-nebula.html>

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