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WEEKLY 1 March 2025

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Space

Gigantic star may be about to explode

Chris Simms

ONE of the largest stars in the known universe is undergoing a strangely rapid transformation and may soon explode as a supernova.

WOH G64 sits some 160,000 light years from Earth in the Large Magellanic Cloud, a small satellite galaxy of the Milky Way. It is one of the biggest red supergiants, the largest stars we know of. These are massive, cool stars that have run out of hydrogen fuel in their core and instead burn an envelope of hydrogen gas that surrounds them.

The star was thought to be about 1500 times the size of the sun, but is pretty unstable, losing mass faster than any other known red supergiant. Now, using data from the Very Large Telescope

"This transition seems to have happened over a few years – an astronomical blink of an eye"

and Magellan Telescopes in Chile, Alceste Bonanos at the National Observatory of Athens, Greece, and her colleagues have spotted a more dramatic shift.

By analysing the star's light, they found that it had gone from being about 3000°C with a strong signature of titanium oxide and a reddish colour, which is typical of a red supergiant, to heating up to about 4500°C and having a strong signature of elements such as iron and nickel and a bluer colour (Research Square, doi.org/n7nt).

The star had changed so much, says Bonanos, that "one of our co-authors said, 'Wait, did I observe the wrong star?'" But it was the right one, she says. "That was the first clue that something was going on."

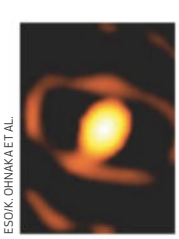
Exactly when this transition occurred is unclear, given a lack of continuous observations, but it seems to have happened over just a few years – a blink of an eye in astronomical terms.

The researchers suspect that a few things are going on. First, that WOH G64 turned from a red supergiant into a quieter yellow hypergiant. Such a transformation has previously been hypothesised, but we have never seen it happen.

Second, the researchers think that the outer layers of the star have been stripped away. This may have happened, they say, because its stellar wind has ramped up, releasing huge amounts of gas and hinting it might soon explode as a supernova. Alternatively, the stripping may have been caused by interactions with another star, suggesting that WOH G64 is actually part of a binary system.

"We knew something was brewing and that what WOH G64 had been doing was unsustainable. It has been losing mass at such a rate," says Jacco van Loon at Keele University, UK, whose team revealed an image of the star last year. "But we didn't know it was going to happen in our lifetime."

But Roberta Humphreys at the University of Minnesota thinks something different has been happening. She suspects WOH G64 might have been a yellow hypergiant all along, but went



ESO/K. OHNAKA ET AL.

WOH G64 is a star in the Large Magellanic Cloud, a galaxy 160,000 light years from us

through a period of intense activity during which it looked like a red supergiant and it has now reverted. Such behaviour has been seen in other stars, she says.

Bonanos and her team will observe the star over the next year to see what happens next. ▮

Marine biology

Cuttlefish disguise themselves as coral when hunting prey

Sofia Quaglia

UNIVERSITY OF BRISTOL

This cuttlefish mimics coral by splaying its arms and changing its colour

DAZZLING camouflage helps cuttlefish transform themselves into non-threatening objects while stalking their prey.

"These are masters, the hypnotists of the underwater world," says Matteo Santon at the University of Bristol, UK.

Cuttlefish can change their colour and texture in less than a second thanks to millions of pigment sacs in their skin called chromatophores. They can also create and control precise patterns on their bodies, such as moving stripes. When Santon travelled to Indonesia to study these kinds of abilities in broadclub cuttlefish (*Sepia latimanus*), he realised each individual could pull off different forms of camouflage, something he says is "very unusual".

He and his colleagues filmed 98 cuttlefish pursuing prey 234 times. On some hunts, the animals turned pale grey, extended an arm on each side and flashed a dark stripe repeatedly down their body. Some also splayed all eight arms out in front of their body and turned a mottled yellow and orange to resemble a branched coral. Others mimicked a leaf by turning shades of olive green, sticking out their arms in three directions and slowly floating up and down (*Ecology*, doi.org/n7ns).

Each technique probably has a different purpose, says Santon. His preliminary research suggests sliding stripes mask the cuttlefish's approach or create enough visual noise to bamboozle prey. The leaf and coral camouflages may be attempts to look like non-threatening objects.

These displays could allow cuttlefish to approach prey faster and avoid being spotted by their own predators, says Trevor Wardill at the University of Minnesota.

But it is unclear how cuttlefish decide which display to use and when. Their choices may depend on the environment or the type of prey they are hunting, or they might just use a random rotation of camouflage types.

Wardill's octopus research shows that their strategy for hunting varies according to prey. He says it is "quite possible" that cuttlefish are also choosing their camouflage technique based on the meal they are pursuing. ▮