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SPACE

Betelgeuse's brightness dimmed, and we finally understand why

Astronomers have discovered the cause of the 'Great Dimming of Betelgeuse': a cloud of dust partially concealing it from us.

As one of the largest stars visible to the naked eye, the red supergiant star Betelgeuse is a familiar sight to professional and amateur astronomers alike. That's perhaps why it was so surprising when the star's brightness started to drop in October 2019.

By February 2020, the star, which marks the right shoulder in the constellation of Orion, had hit a record low of only 40 per cent of its usual brightness.

This dramatic drop sparked speculation that Betelgeuse was about to go supernova – that is, reach the end of its life as a red supergiant, collapse, and then bounce into a fiery explosion so bright we'd even be able to see it in the daytime. It wasn't immediately clear to astronomers whether or not this was the case, since a supernova hasn't been observed in our Galaxy since astronomer Johannes Kepler saw one in 1604.

But it never happened, and by April 2020, Betelgeuse was back to its normal brightness. Now, images of the star, taken with the European Southern Observatory's Very Large Telescope, along with data from the GRAVITY instrument, have revealed what happened to it.

"We have directly witnessed the formation of so-called stardust," said Dr Miguel Montargès, from the Observatoire de Paris, France, and KU Leuven, Belgium. "For once, we were seeing the appearance of a star changing in real time on a scale of weeks."

The surface of Betelgeuse is always changing. Giant bubbles of gas grow, shrink and move around within the star, and occasionally it burps one out. Before the Great Dimming began, Betelgeuse released one of these bubbles. Then a patch of the star's surface cooled down, and this temperature drop allowed the gas to cool enough to condense into solid dust.

This cloud of dust partially concealed Betelgeuse from the Earth, particularly in the southern region.

"The dust expelled from cool evolved stars, such as the ejection we've just witnessed, could go on to become the building blocks of terrestrial planets and life," said Emily Cannon, a PhD student at KU Leuven. "Looking up at the stars at night, these tiny, twinkling dots of light seem perpetual. The dimming of Betelgeuse breaks this illusion."

In the image on the far left, taken in January 2019, you can see Betelgeuse at its normal brightness. The other images, from December 2019, January 2020 and March 2020, show the star dimming

NEUROBIOLOGY

Birds' brain activity translated into song

The findings could allow scientists to design high-quality vocal prosthetics for people who can no longer speak

Here's something worth tweeting about: researchers have managed to synthesise birds' brain activity into song.

The scientists, who come from the University of California, San Diego, say that this research could help create a means of communication for people who are no longer able to speak.

Current state-of-the-art communication prosthetics are implantable devices that allow the user to generate text at a speed of about 20 words per minute.

"Now imagine a vocal prosthesis that enables you to communicate naturally with speech, saying out loud what you're thinking nearly as you're thinking it," said senior author Timothy Gentner, a professor of psychology and neurobiology at UC San Diego. "That is our ultimate goal, and it is the next frontier in functional recovery."

While human speech and birdsong might not seem immediately comparable to each other, the researchers say that there are a lot of similarities, as both types of vocalisation are learned and complex behaviours.

GETTY IMAGES, ESO/M MONTARGES ET AL ILLUSTRATION: KYLE SMART