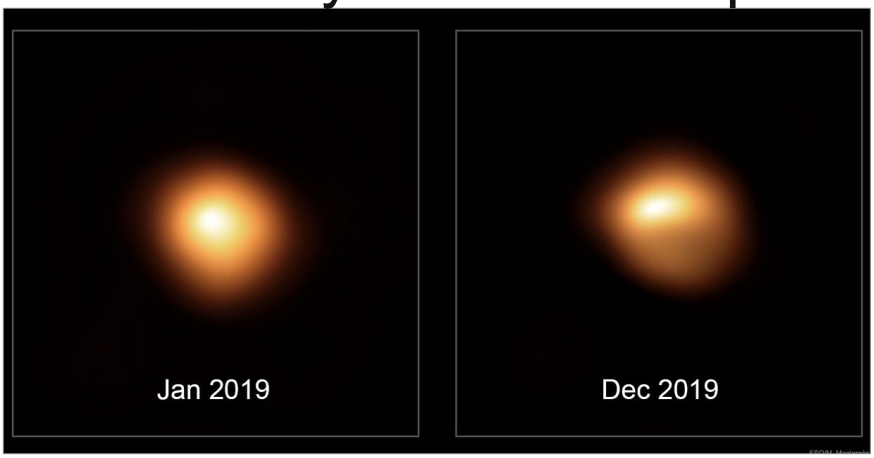
INSTITUTE OF ASTRONOMY
PUBLIC OPEN EVENING

— 19 February 2020 —

Surface of Betelgeuse observed by ESO telescope



Betelgeuse, as imaged by the SPHERE instrument on the VLT.

Using the Very Large Telescope (VLT), astronomers have captured an image of the surface of Betelgeuse, showing that the dying giant star is changing shape as well as getting dimmer.

Betelgeuse is a massive red star approaching the end of its life, and is expected to go supernova at some point within the next few hundred thousand years. The star has hit headlines around the world over the past few months, as it has been getting noticeably dimmer (at 36% of its normal brightness at the time of writing, it is no longer the brightest star in the constellation Orion!). As astronomers do not yet fully understand the behaviour of stars approaching the end of their lives, telescopes have been eagerly trained on Betelgeuse so scientists can learn more.

Now, a team of astronomers led by Miguel Montargès (at KU Leuven in Belgium), has used the SPHERE instrument on the VLT to image the surface of the dying star, showing that Betelgeuse is changing shape as well as dimming.

So what is causing the star to change so significantly? The two scenarios we are working on are a cooling of the surface due to exceptional stellar activity or dust ejection towards us," said Montargès in a press release. "Of course, our knowledge of red supergiants remains incomplete, and this is still a work in progress, so a surprise can still happen."

It's important to note that while this behaviour is exciting, Betelgeuse is known to be a variable star, so this dimming doesn't mean we should expect a supernova any time soon! Instead, it gives us a chance to learn more about dying stars.

TONIGHT'S SPEAKER

Anastasia Fialkov

The Unseen Universe

Our weekly welcome

WELCOME to our weekly public open evenings for the 2019/20 season. Each night there will be a half-hour talk which begins promptly at 7.15pm. Please note that the talk will be recorded and archived for online streaming.

The talk is followed by an opportunity to observe if (and only if!) the weather is clear. The IoA's historical Northumberland and Thorrowgood telescopes, along with our modern 16-inch telescope, will be open for observations. In addition, the Cambridge Astronomical Association will provide a floorshow outdoors on the Observatory lawns, relaying live images from their telescopes and providing a commentary. If we're unlucky and it's cloudy, we'll offer you a conciliatory cup of tea after the talk (with perhaps some more astro-information in the lecture theatre for those who want to stay on).

If you have any questions, suggestions or comments about the IoA Open Evenings please contact Matt Bothwell at bothwell@ast.cam.ac.uk.

The talk schedule for this term can be viewed at: www.ast.cam.ac.uk/public

Extragalactic molecular oxygen detected

Markarian 231, as seen by the Hubble Space Telescope. (NASA/ESA/Hubble Heritage)

Molecules of Oxygen -- the same as we breathe here on Earth -- have been detected outside of our Milky Way for the first time. This is also only the third time molecular oxygen has been spotted outside of our own Solar System.

Oxygen has ben curiously difficult to detect in outer space. After search after search turned up nothing, a team of astronomers (led by Junzhi Wang of the Chinese Academy of Sciences) concluded that 'a comprehensive picture of oxygen chemistry in different interstellar environments is still missing'. Theories for the missing oxygen include the idea that oxygen molecules can freeze onto dust grains, and are only freed by intense environmental shocks.

The two previous detections of oxygen outside the solar system are in the Orion Nebula and the Rho Ophiuchi cloud, both star-forming regions with hot young stars which can blast the dust with radiation and free the oxygen.

This new detection of oxygen in a galaxy known as Markarian 231 is interesting, as the oxygen seems to be far more abundant than seen before, with the oxygen-to-hydrogen ratio over 100 times higher than in Orion.

The current best theory is that molecules flowing outwards from the centra supermassive black hole are interacting with gas in the disc, and producing oxygen. So this new finding might be a way to learn more about how black holes drive molecular outflows!

An all-sky search for extraterrestrial life

For the first time, astronomers plan to sweep the entire sky in a search for extraterrestrial life.

The project will use the Very Large Array (VLA) observatory in New Mexico. Interestingly, this new search for life is happening as a by-product of the VLA's normal activity. "The VLA is being used for an all-sky survey and we kind of go along for the ride," said astrophysicist Andrew Siemion, who is a director at SETI (the Search for Extraterrestrial Intelligence). While the normal astronomy operations are being carried out, the data will be duplicated and searched for any interesting signals.

"Determining whether we are alone in the universe... is among the most compelling questions in science, and [our] telescopes can play a major role in answering it," said Tony Beasley, director of The National Radio Astronomy Observatory.

SETI scientists say that the search for life in the Universe has been bolstered in the last few years by the exciting discoveries in the field of exoplanets, which suggest that as many as 20% of stars might host a habitable planet.

“Now that there might be more habitable real estate out there than we ever imagined early on … it seems to make this next question about intelligent life more realistic", said SETI scientist Jill Tarter.

Joke of the Week

A photon goes to the airport to catch a flight. The desk clerk says "And do you have any bags to check in?" "No," says the photon, "I'm travelling light."