



INSTITUTE OF ASTRONOMY PUBLIC OPEN EVENING

— 5 FEBRUARY 2020 —



Ancient 'monster' galaxy suddenly went dark



An artist's impression of the massive star-forming galaxy XMM-2599. Credit: NRAO/AUI/NSF/Saxton;ESA/Foley; NASA/StScI.

A team of astronomers based in California has found an ancient monster galaxy, which appears to have spontaneously shut down its star-formation over 12 billion years ago.

The ancient galaxy, known as XM-2599, appears to astronomers as an 'inactive' galaxy, which is no longer forming stars. But when the scientists looked at the galaxy's star formation history, there were surprises in store.

"Even before the universe was 2 billion years old, XMM-2599 had already formed a mass of more than 300 billion suns, making it an ultramassive galaxy," said Dr Benjamin Forrest (University of California, Riverside) who led the study. "More remarkably, we show that XMM-2599 formed most of its stars in a huge frenzy when the universe was less than 1 billion years old, and then became

inactive by the time the universe was only 1.8 billion years old."

So what caused this giant galaxy to suddenly go dark, after such a vibrant start?

"In this epoch, very few galaxies have stopped forming stars, and none are as massive as XMM-2599," said Professor Gillian Wilson (also at UCR) in a statement.

"Even though such massive galaxies are incredibly rare at this epoch, the models do predict them. The predicted galaxies, however, are expected to be actively forming stars. What makes XMM-2599 so interesting, unusual, and surprising is that it is no longer forming stars, perhaps because it stopped getting fuel or its black hole began to turn on. Our results call for changes in how models turn off star formation in early galaxies."

TONIGHT'S SPEAKER



Nina Sartorio

Ecological Stars: The Recycling Machines of the Universe

Our weekly welcome

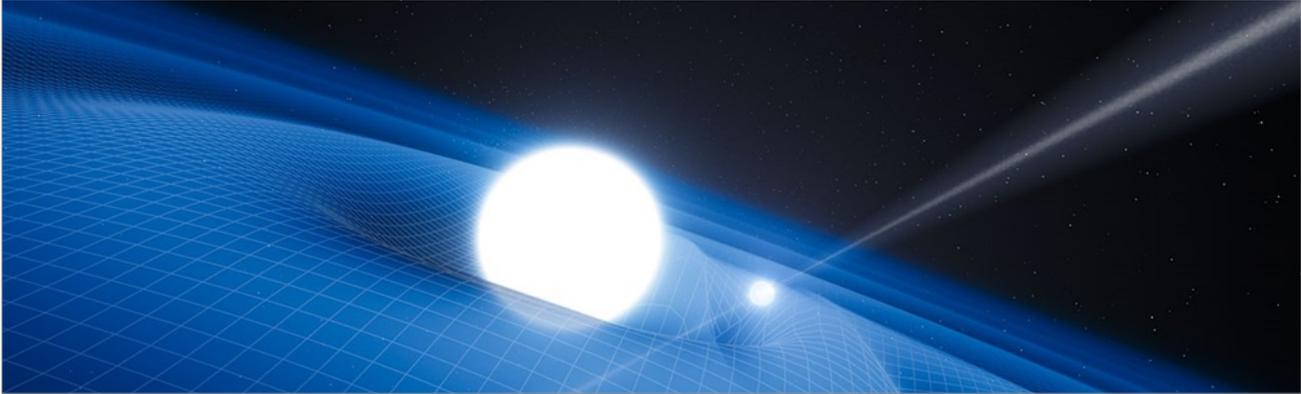
WELCOME to our weekly public open evenings for the 2019/20 season. Each night there will be a half-hour talk which begins promptly at 7.15pm. Please note that the talk will be recorded and archived for online streaming.

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

Swirling pulsar proves Einstein correct



An artist's impression of a white dwarf-neutron star binary, dragging spacetime around them. Image credit: ESO/L. Calçada

A new paper appearing in the journal *Science* has accurately measured the rotation speed of a white dwarf in the pulsar binary system PSR J1141-6545, finding evidence for a strange effect known as 'frame dragging'.

Also known as 'the Lense-Thirring effect' (after its discoverers, Josef Lense and Hans Thirring), frame dragging describes a relativistic effect whereby a rotating object will 'swirl' spacetime around it.

Both the white dwarf and the

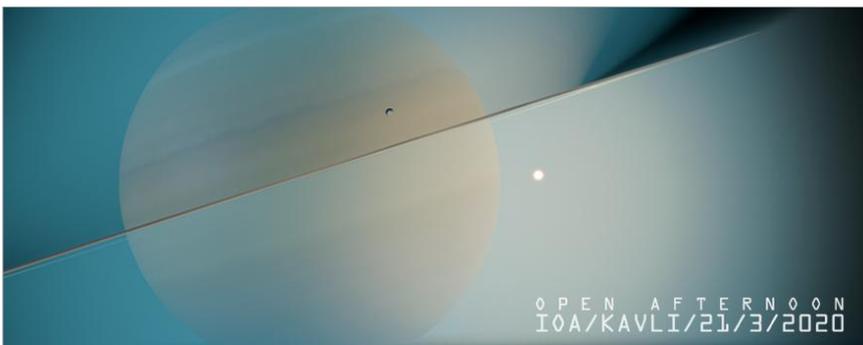
neutron star in this system are rather unusual. The white dwarf formed first, and began to gravitationally 'steal' material from the other star (which would later become a pulsar), speeding up the White Dwarf's spin.

What scientists are actually able to detect are the beams of radio waves emitted by the spinning neutron star. But by timing the arrival of the radio pulses, the team were able to infer information about the swirling eddies of spacetime it was passing through.

Since astronomers started observing this system around 20 years ago, the pulsar's orbit has been moved around by approximately 150 kilometres -- all by the effect of swirling spacetime.

"Here Albert Einstein gave us a tool, which we can now use to find out more about pulsars and their companions in the future," said co-author Matthew Bailes of Swinburne University, Australia.

Open day at the Institute of Astronomy



On Saturday 21st March, the Institute of Astronomy and the Kavli Institute for Cosmology will open their doors to the public for our annual Open Afternoon! We will be open from 2pm-6pm.

Come along for a day of astronomical fun and games, activities, talks and demonstrations -- suitable for all ages! Entrance is

completely free, and there is no need to book.

As well as the wide range of astronomical activities, we are also pleased to announce that special guests DanceEast will be joining us, performing specially-created pieces of astronomically-themed dance and theatre.

See you there!

The Astropod has landed!

The Astropod is the new monthly space science podcast from Cambridge University. Tune in for the latest news from the worlds of astronomy, astrophysics and cosmology!

To listen, go to bit.ly/theastropod

Joke of the Week

What kinds of basketball games do they play in space? All-star games!