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Astronomy

We might finally know what made the mysterious Wow! signal

Alex Wilkins

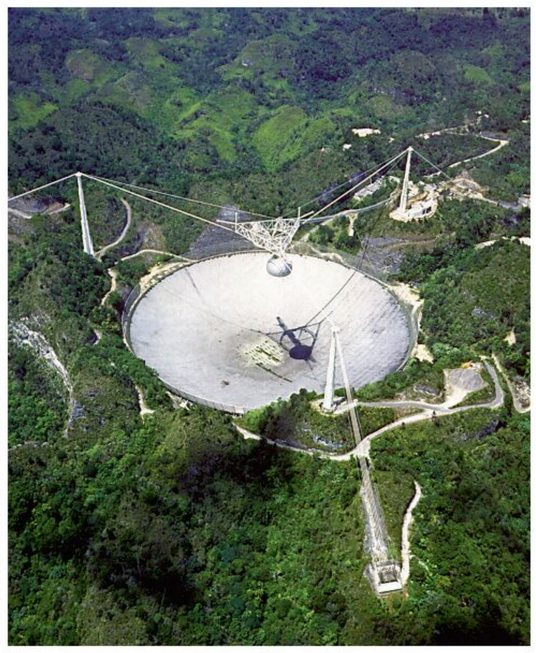
AN UNEXPLAINED radio blast detected in 1977 known as the Wow! signal, which some have interpreted as an alien message, may have been the result of a natural galactic laser-like beam.

On 15 August 1977, the Big Ear radio telescope at Ohio State University detected a brief, powerful burst of radio waves with an unusually narrow range of frequencies, similar to atomic hydrogen's natural emission frequency. No known astronomical processes could have produced such an emission, and astronomer Jerry Ehman, who worked at the telescope, jotted down the phrase "Wow!" in red pen on a printout of the signal.

The now famous Wow! signal has defied explanation in the decades since its observation. Some people have said that an advanced alien civilisation could have been responsible. Astronomers have also put forward less exotic ideas, such as fast-moving comets releasing clouds of hydrogen gas, but it was unclear how they might produce a strong enough signal.

Now, Abel Méndez at the

Astronomer Jerry Ehman's jottings led to the Wow! signal's name



NAIC/ARECIBO OBSERVATORY/NSF

The Arecibo telescope in Puerto Rico detected signals like the Wow! one

University of Puerto Rico at Arecibo and his colleagues have spotted similar signals from clouds of hydrogen atoms in front of red dwarf stars in our galaxy. They are less powerful than the original Wow! signal, but Méndez and his team think a powerful light source passing behind the clouds, like a flare from a highly magnetic neutron star – a magnetar – could stimulate the hydrogen atoms to fire out a beam of microwave radiation, known as a maser.

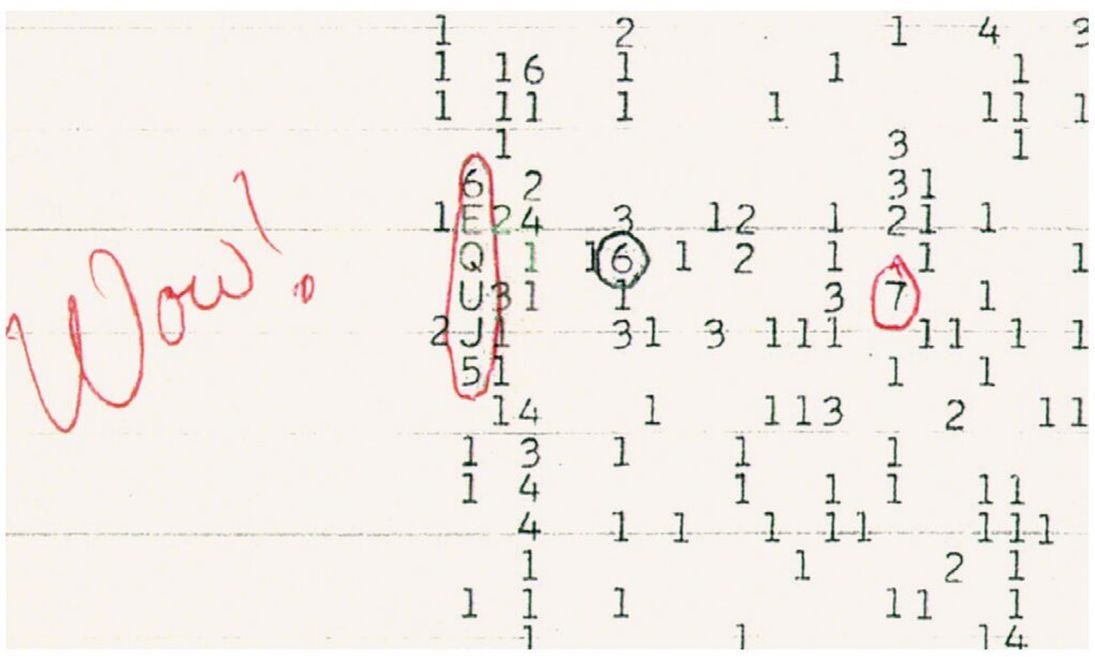
Méndez started looking for Wow!-like signals when he realised that the Arecibo telescope, which collapsed in 2020, and the Big Ear telescope had similar experimental set-ups. He and his team were already searching for signals from nearby red dwarf stars as part of a project looking for habitable exoplanets, so they combed this data and found multiple examples that were very similar in their frequency range to the Wow! signal.

"The signals that we detected from these clouds are less bright because they are not illuminated by a magnetar," says Méndez. "When you do the calculation, they will become much, much brighter [if they were]."

While astronomers have spotted masers in space from hydrogen molecules – pairs of hydrogen atoms bonded together – they have never seen one from an atomic hydrogen cloud, which is what would be required to reproduce the Wow! signal, says Méndez.

Proving that this was what caused the signal would be an astrophysical discovery in itself, he says. Astronomers could survey the original part of the sky to try to find a hydrogen cloud in front of a magnetar, but unless this object was letting off a flare, which is very rare, then it would be hard to spot, he says.

It is an interesting idea, says Michael Garrett at the University of Manchester, UK, but it is unclear whether atomic hydrogen masers can exist or whether they are required as an explanation instead of just the magnetar by itself. "A magnetar is going to produce [short] radio emissions as well. Do you really need this complicated maser stuff happening as well to explain the Wow! signal?" he asks. "I don't think so. It just makes a complicated story even more complicated." ▮



PUBLIC DOMAIN

Health

Symptoms of long covid can differ depending on age

Carissa Wong

LONG covid seems to cause different symptoms in younger children and in adolescents. Understanding this better could aid diagnoses.

To date, most long covid research has focused on adults. That is partly due to a misconception that children don't get long covid, says Rachel Gross at New York University.

Now, Gross and her colleagues have tracked 751 children aged 6 to 11 and 3109 aged 12 to 17, who had previously had, according to their caregivers, an infection with the SARS-CoV-2 virus, which causes covid-19.

The researchers defined long covid as having at least one symptom that lasted for more than one month, started or became worse during the covid-19 pandemic and was present at the time of the study.

Among the younger children, these symptoms mainly included sleep problems, trouble focusing and abdominal issues, such as pain, nausea, vomiting and constipation.

These symptoms were much less common among nearly 150 children of the same age who hadn't previously been infected, verified by them having no antibodies against the virus in their blood samples.

In contrast, teenagers' symptoms generally included pain, fatigue and a loss of smell or taste, compared with 1300 of their uninfected counterparts (*JAMA*, doi.org/ndqx).

Why these differences exist between the age groups is unclear, but it could be down to variations in their hormonal and immune systems, says Gross.

Alternatively, teenagers may simply be better able to vocalise their symptoms than younger children, says Danilo Buonsenso at the Gemelli University Hospital in Rome, Italy.

The researchers have developed a scoring system to help diagnose if a young person has long covid. ▮