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WEEKLY 18 May 2024

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Space

A glimpse of alien civilisations?

Infrared signatures of dozens of stars hint they host structures called Dyson spheres

Jonathan O'Callaghan

IS ANYONE out there? Two surveys of millions of stars in our galaxy have revealed mysterious spikes of infrared heat. Astronomers say this could be evidence for alien civilisations harnessing energy from their stars by using vast constructions known as Dyson spheres – although they can't rule out more mundane explanations.

Proposed back in the 1960s, these spheres are hypothesised structures that would surround stars to absorb their energy, a possible means by which advanced aliens might draw huge amounts of power. If such objects exist, they should be warm enough to give off a detectable infrared glow or "technosignature".

To search for this sign, two teams of astronomers, one led by Matías Suazo at Uppsala University in Sweden and the other by Gaby Contardo at the International School for Advanced Studies in Italy, combined data from the European Space Agency's Gaia satellite with infrared survey data from ground and space telescopes.

Each team analysed 5 million stars, and both turned up signs of

DOTTED ZEBRA/ALAMY

Dyson spheres could capture energy by surrounding a star

excess infrared heat that was difficult to explain by known natural processes. "The most fascinating explanation could be actual Dyson spheres," says Suazo.

His team spotted strange signals at seven red dwarfs within 900 light years of Earth. These stars are smaller and dimmer than our sun, but appeared up to 60 times brighter in infrared than expected (arXiv, doi.org/mv6k).

This excess would have been caused by something with a temperature of up to about 25°C (77°F), consistent with what we might expect for a Dyson sphere. Up to 16 per cent of each star would have to be obscured to account for the signal, meaning it is more likely to be a variant of the idea called a Dyson swarm – a collection of large satellites orbiting a star to collect energy – if the cause is truly of artificial origin. "This isn't like a single solid shell around the star," says team member Jason Wright at Pennsylvania State University.

Contardo's results are broader, with 53 candidates found among larger stars at distances of up to 6500 light years from Earth (arXiv, doi.org/mv6m). "Both sets of candidates are interesting," she says, though inconclusive. "You need follow-up observations to confirm anything."

A possible natural explanation is that the stars are surrounded by hot, planet-forming debris discs, but most of the stars found by both teams seem too old for this. Another is that each star could be in front of a distant galaxy giving off an infrared glow.

The infrared signals could also result from an unknown natural process. "It might be something that happens very rarely, like if two planets collide and produce an enormous amount of material," says David Hogg at New York University, who worked with Contardo. "I think it's most likely to be a natural phenomenon."

The James Webb Space Telescope could reveal if the infrared heat comes from natural dusty material or something else. ▮

Agriculture

Spray on sticky oil traps insects without using toxins

STICKY traps consisting of tiny oil droplets can catch small pests on plants while leaving larger insects such as bees unharmed. The researchers who developed the product hope it will help reduce the use of chemical pesticides.

The inspiration for this came from sticky insect-trapping hairs on plants like sundews, says Thomas Kodger at Wageningen University in the Netherlands.

To find a formulation that would work with the sprayers already used by farmers, Kodger and his colleagues oxidised certain vegetable oils and mixed them vigorously with water to create tiny droplets mostly less than a millimetre in diameter. The resulting particles don't clog up sprayers, but do stick to plants for weeks. "It's literally oil, air, a little bit of heat and patience," says Kodger.

The spray-on oil works in the same way as the sticky paper traps often used to catch insects, by physically trapping tiny animals. But the small droplets don't catch bigger insects, including beneficial ones such as bees and hoverflies.

"One of the reasons larger [sticky] traps are not used in greenhouses today is because they devastate pollinators and other beneficial insects," says Kodger.

In their tests, the researchers found that after the sticky oil droplets were sprayed on plants, they caught at least five or six out of every 10 adult thrips that were put on the plants (*PNAS*, doi.org/mv42). Thrips are tiny sap-sucking insects that can damage many plants, from chrysanthemums to tomatoes.

"The sticky oil droplets caught at least five or six out of every 10 adult thrips"

The spray-on approach is even more effective when it comes to trapping thrip larvae, says Kodger. "We have recent data that shows it prevents population explosions."

For crops such as tomatoes, the idea would be to spray plants before fruits develop, but the spray is non-toxic, he says, and safer than chemical pesticides. The team plans to apply for regulatory approval in Europe within a year. ▮

Michael Le Page