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Space

Strange icy balls may help us to crack mysteries of star formation

Jason Arunn Murugesu

TWO mysterious, gigantic icy balls of gas have been discovered in space and they could alter our understanding of how stars form.

Takashi Onaka at Meisei University in Japan and his team found the objects when analysing data collected by the AKARI spacecraft, a Japanese observatory that examined the Milky Way in infrared from the 1980s until it suffered electrical failure in 2011.

It is unclear exactly what the balls are, or even how far away they lie, but the distance between them as they appear in the sky suggests they are unrelated to each other. They seem to be star-sized spheres of carbon monoxide gas mixed with carbon dioxide and water ices, all containing a hotter source of energy (arxiv.org/abs/2105.11660).

The researchers say nothing quite like this has been seen before. They think they have either spotted stars in the midst of being created or normal stars that are hidden behind a peculiar interstellar cloud.

Both ideas have issues. The balls look similar to a typical young star,

but stars usually evolve in clusters and these objects weren't in a known star-forming region. We have seen isolated stars before, but we know very little about them, including how they moved from where they were born, says Onaka.

If these objects are indeed young stars, that could have major implications for how often stars form in the Milky Way because it means we have underestimated

The AKARI probe observed the Milky Way for decades



COURTESY OF ISAS/JAXA

or overlooked some stellar nurseries. "If these are truly young stellar objects, it may change our understanding of the rate of star birth and thus could affect the evolution of galaxies," says Onaka.

If, however, the objects are just two ordinary stars hidden behind interstellar clouds, there is another mystery to solve. Such clouds are common, but these two appear to be unusually dense and isolated. Studying them could help broaden our understanding of the make-up of interstellar space, says Onaka.

Rene Oudmaijer, who is at the

University of Leeds, UK, says it would be a very important find if the balls turn out to be evolving stars. "It could mean young stellar objects have been escaping their birthplaces at very high speeds, which would imply that we may have missed an important class of object," he says. "It may even mean that our theories of star formation need revisiting."

Tyler Pauly at the Space Telescope Science Institute in Maryland is less certain that these objects are unusual because there may be scenarios Onaka's team hasn't ruled out.

"I would worry that any conclusions one way or another are difficult as lots of stars and dense clouds reside in the galactic plane, and so the line of sight... can get crowded," he says.

Onaka plans to use a large radio telescope to study the objects. He says evolving stars are typically surrounded by warmer gases that may not show up in infrared data, but should be picked up by radio telescopes. Such a detection would suggest the objects are probably young stellar objects. ■

Technology

Cyborg cockroaches with cameras can be steered remotely

A COCKROACH fitted with a "backpack" computer and infrared camera, controlled by electrodes, could help locate warm bodies in the rubble of buildings destroyed by earthquakes.

Hiroataka Sato at Nanyang Technological University in Singapore and his colleagues fitted Madagascar hissing cockroaches with tiny computers connected to electrodes implanted in sensory

organs known as cerci on the left and right side of each insect. When a current is applied to the organ, the insect rotates in that direction, and it stops when the current is removed.

Although the cockroach can be steered, it can control its own legs. The cyborg insects had a success rate of 94 per cent when directed to waypoints in a simulated disaster scene in a lab. Using the infrared camera, the team could discern humans from non-human objects with an average accuracy of 87 per cent (arxiv.org/abs/2105.10869).

The team says the apparatus could operate for 2.2 hours using a battery

light enough to be carried by the insect. Because the cockroach powers the motion, the range is significantly higher than it would be for a robotic device.

The researchers believe hybrid computer-insect robots could be ideal for search-and-rescue missions in the wake of disasters like earthquakes, where swift discovery of survivors is essential but locations may be inaccessible.

"It's unconventional but not out of the question to use cockroaches in search-and-rescue situations"

They hope to add real-time position tracking in the future so that human rescuers can be alerted when the cyborg finds a survivor.

"Any tool that can be used to take human rescuers out of harm's way or to speed up the search process would be highly beneficial," says Alex Rogers at UK search-and-rescue charity SARAID. "Whilst the idea is unconventional, it would not be out of the question to use cockroaches. They would most likely not be used in isolation, but certainly could provide an extra option in the rescuer's toolkit." ■
Matthew Sparkes