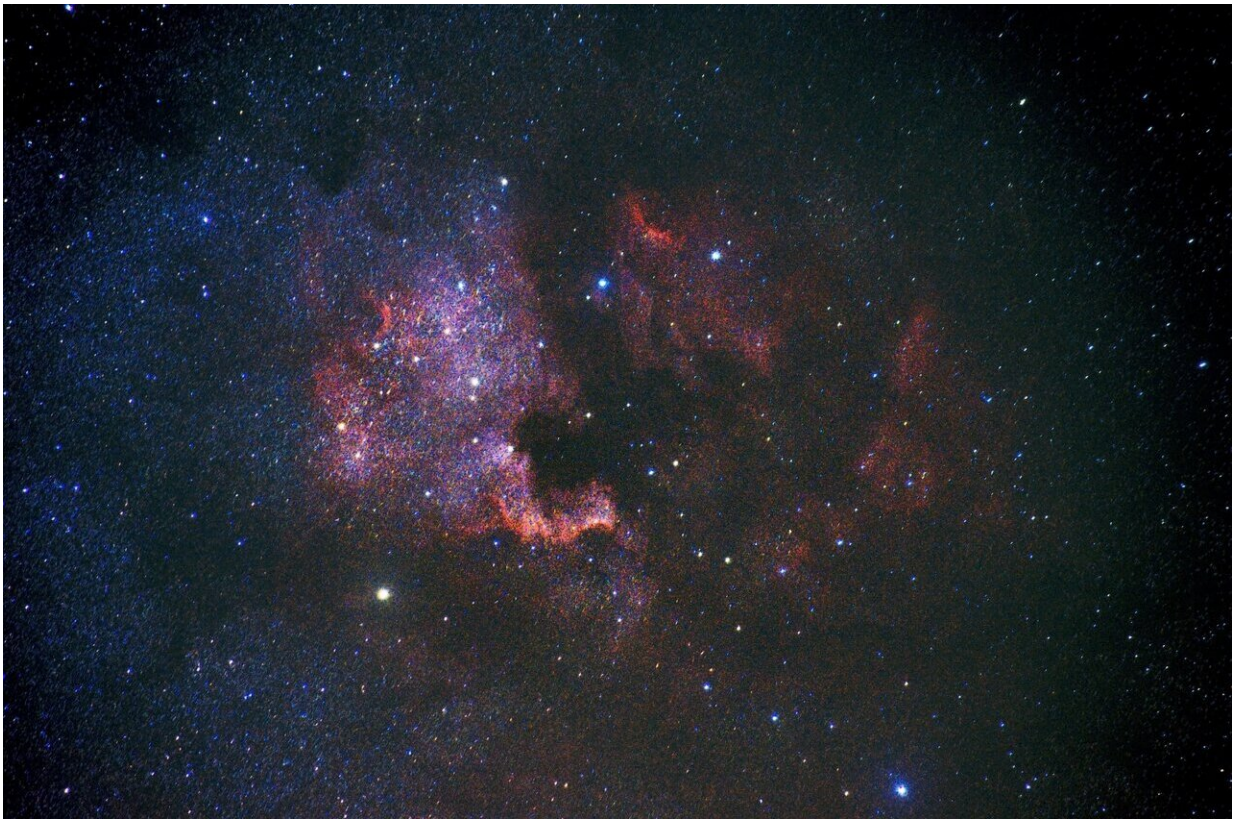


Spinning stars shed new light on strange signal coming from galactic center

April 28 2022



Credit: Unsplash/CC0 Public Domain

Researchers from The Australian National University (ANU) have found an alternative explanation for a mysterious gamma-ray signal coming from the center of the galaxy, which was long claimed as a signature of

dark matter.

Gamma-rays are the form of electromagnetic radiation with the shortest wavelength and highest energy.

Co-author of the study Associate Professor Roland Crocker said this particular gamma-ray signal—known as the Galactic Center Excess—may actually come from a specific type of rapidly-rotating neutron star, the super-dense stellar remnants of some stars much more massive than our sun.

The Galactic Center Excess is an unexpected concentration of gamma-rays emerging from the center of our galaxy that has long puzzled [astronomers](#).

"Our work does not throw any doubt on the existence of the signal, but offers another potential source," Associate Professor Crocker said.

"It is based on millisecond pulsars—[neutron stars](#) that spin really quickly—around 100 times a second.

"Scientists have previously detected gamma-ray emissions from individual millisecond pulsars in the neighborhood of the solar system, so we know these objects emit gamma-rays. Our [model](#) demonstrates that the integrated emission from a whole population of such stars, around 100,000 in number, would produce a signal entirely compatible with the Galactic Center Excess."

The discovery may mean scientists have to re-think where they look for clues about [dark matter](#).

"The nature of dark matter is entirely unknown, so any potential clues garner a lot of excitement," Associate Professor Crocker said.

"But our results point to another important source of gamma-ray production.

"For instance, the [gamma-ray](#) signal from Andromeda, the next closest large galaxy to our own may be mostly due to [millisecond pulsars](#)."

ANU Masters student Anuj Gautam led the research, which also involved scientists from The Australian Defense Force Academy, University of Canterbury, and University of Tokyo.

The research has been published in *Nature Astronomy*.

More information: Roland Crocker, Millisecond pulsars from accretion-induced collapse as the origin of the Galactic Centre gamma-ray excess signal, *Nature Astronomy* (2022). [DOI: 10.1038/s41550-022-01658-3](#).
www.nature.com/articles/s41550-022-01658-3

Provided by Australian National University

Citation: Spinning stars shed new light on strange signal coming from galactic center (2022, April 28) retrieved 25 April 2024 from <https://phys.org/news/2022-04-stars-strange-galactic-center.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.