

Macias and Horiuchi Reveal Mystery Gamma Rays Arise from Ancient Stars

Oscar Macias and Shunsaku Horiuchi, in collaboration with researchers from Australia, Germany, and New Zealand, have discovered that a mysterious gamma-ray signal from the center of the Milky Way arises from ancient stars, rather than dark matter as previously thought.

When NASA's Fermi Gamma-Ray Space Telescope launched in 2008, it opened an unprecedented view of the gamma-ray sky, bringing a surprising and mysterious gamma-ray signal coming from the center of the Milky Way. It had been speculated that the signal could be a dark matter phenomenon, emitted when dark matter particles collide with their anti-particles.

Yet the Galactic center is not only rich in dark matter; it is also populated by stars billions of years old that make up a structure called the Galactic bulge. Macias, Horiuchi, and collaborators showed that the mysterious gamma-ray signal closely traces the distribution of the Galactic bulge, disfavoring a dark matter origin. The results have been published in *Nature Astronomy* (see here for a copy <http://rdcu.be/IScT>).

The team hypothesizes that the signal arises from old neutron stars that been spun up, called millisecond pulsars, which are known emitters of gamma-ray radiation. Thousands of millisecond pulsars are expected to populate the Galactic bulge, blending together to generate a smoothly distributed signal closely following the bulge. Ongoing observational and theoretical work is underway to verify or refute the hypothesis that millisecond pulsars are responsible for the gamma-ray signal.

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