

# Clemson astronomers to study mysterious antimatter in the Milky Way

February 16 2009

---

NASA has awarded Clemson astronomers \$244,000 to use data from several space-based gamma-ray telescopes to study a mysterious emission coming from the central regions of the Milky Way galaxy.

Gamma rays, the light of energy a thousand times more powerful than X-rays, created by antimatter and normal matter coming together, are seen coming from the disk of our galaxy, roughly from where we see the glow of the Milky Way under a dark sky, but mostly from the direction of the center of the galaxy in the Southern hemisphere.

"We're not surprised to see this emission from the Milky Way's disk," said Mark Leising, Clemson University astronomy professor and principal investigator in the study. "We know that massive stars explode as supernovae there, fusing new elements from lighter ones. Such explosions long ago made the oxygen and iron in our blood and the calcium in our bones, along with most other heavy elements. Some of these elements are radioactive and produce antimatter positrons when they decay.

"What is surprising is how bright this emission is from the center of the galaxy," he said. "It is not coming just from the very center, where a black hole lurks that is two million times the Sun's mass, but from a region a few thousand light-years across surrounding the center."

Leising adds the supernova explosions do not occur there, so something else must be making the antimatter. One explanation, he said, involves

black holes, collapsed stars of five to 10 solar masses, pulling matter from close companion stars. Another involves the decay of exotic "dark matter" particles. Dark matter is the name given to something out there that is so far detected only by its gravitational pull on normal matter.

In collaboration with colleagues from Germany, France and NASA's Goddard Space Flight Center, Leising and Clemson students hope to unravel this mystery by combining information from a number of NASA and European Space Agency satellites.

Leising said students have to study many topics in physics and become experts in computational and statistical techniques to do this type work. Leising also notes that such technical advances inevitably lead to spinoff benefits.

"Development of these detectors and analysis techniques aided in the development of PET (positron emission tomography) scanners, in which patients ingest radioactive elements that decay and emit antimatter. We are doing much the same thing, except that we have to sit back 25,000 light years to measure the gamma rays," he said.

Source: Clemson University

Citation: Clemson astronomers to study mysterious antimatter in the Milky Way (2009, February 16) retrieved 24 April 2024 from <https://phys.org/news/2009-02-clemson-astronomers-mysterious-antimatter-milky.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.