

# UW-Madison: Peering under galactic dust, study reveals radiation at center of milky way

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MADISON - Thanks to 20 years of homegrown galactic data, astronomers at the University of Wisconsin-Madison, UW-Whitewater and Embry-Riddle Aeronautical University have finally figured out just how much energy permeates the center of the Milky Way.

The researchers say it could one day help astronomers track down where all that energy comes from. Understanding the source of the radiation could help explain not only the nature of the Milky Way, but the countless others that resemble it.

Writing in the journal *Science Advances* on July 3, UW-Madison astronomy graduate student Dhanesh Krishnarao, UW-Whitewater Professor of Astronomy Bob Benjamin and Embry-Riddle Professor of Astronomy Matt Haffner report that the Milky Way's center occupies a middle ground of galactic radiation levels known as a LINER-type galaxy.

In many ways, the Milky Way is among the most mysterious galaxies. Although we call it home, our view of the galaxy's dense and active center is blocked by immense clouds of dust. However, working with the Wisconsin H-Alpha Mapper telescope, (WHAM), the researchers recently stumbled onto a fortuitous path toward understanding more about the energy at the center of the Milky Way.

A few years ago, Benjamin was reviewing two decades worth of information gathered by WHAM about ionized hydrogen gas across the entire galaxy. Gas that's ionized has absorbed enough energy to strip it of its electrons, and it gives off a red hue that telescopes can capture.

He noticed an anomaly. In a bubble protruding beneath the dark dust toward the center of the galaxy, some of the gas was heading in the direction of Earth when that shouldn't have been possible.

“That didn't make any sense because galactic rotation can't produce that,” says Benjamin.

The errant gas not only begged to be explained, but also offered an opportunity to understand the energy permeating the galactic center. Because the bubble of gas extended away from the heaviest clouds of dust, it allowed the researchers to see further toward the galactic center than is normally possible. Measuring how much of the gas was ionized would tell them how much radiation existed in the galactic center.

So, Krishnarao set WHAM's sights squarely on this protruding bubble to gather additional information on the ionized nitrogen, oxygen and hydrogen that resided there. He then turned his attention to a 40-year-old model of galactic gas that might help him explain his data.

STORY CONTINUES AT <https://news.wisc.edu/peering-under-galactic-dust-study-reveals-radiation-at-center-of-milky-way/>