

"Long before it's in the papers"

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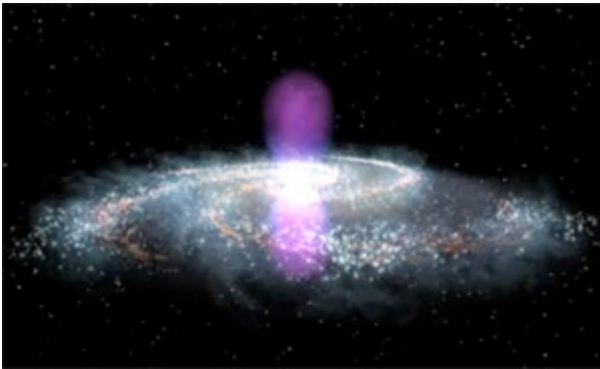
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# Giant bubbles found at heart of Milky Way

Nov. 9, 2010  
Courtesy of NASA  
and World Science staff

**A NASA space telescope has unveiled a giant, previously unseen structure resembling a pair of giant bubbles at the center of our Milky Way galaxy, astronomers say.**

**The feature spans 50,000 light-years, or about half the width of the galaxy itself, and may be the remnant of an eruption from a supersized black hole at the center of our galaxy, they add.**



This artist's illustration depicts the approximate way astronomers believe newly identified, giant bubbles in the Milky Way would look to an observer outside the galaxy, if their light were visible. (Courtesy NASA GSFC)

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**“What we see are two gamma ray-emitting bubbles that extend 25,000 light-years north and south of the galactic center,” above and below the galactic disc itself, said Doug Finkbeiner, an astronomer at the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass. “We don’t fully understand their nature or origin.”**

**The structure spans more than half the visible sky, from the constellation Virgo to the constellation Grus, and it may be millions of years old, Finkbeiner and colleagues said. A paper on the findings, based on research using NASA’s Fermi Gamma-ray Space Telescope, has been accepted for publication in *The Astrophysical Journal*.**

**Finkbeiner and Harvard graduate students Meng Su and Tracy Slatyer said they discovered the bubbles by processing publicly available data from the observatory, which has the most sensitive gamma-ray detector ever launched. Gamma rays are the highest-energy form of light, invisible to the unaided eye.**

**The bubbles had eluded previous detection partly because of a fog of gamma rays that appears throughout the sky, according to Finkbeiner and colleagues. This fog, they said, arises when particles moving near the speed of light interact with light and gas in the Milky Way. Researchers using the telescope constantly refine models to uncover new sources of gamma-ray light obscured by this so-called diffuse emission. By using various estimates of the fog, Finkbeiner and his colleagues said they isolated it from the telescope data and unveiled the giant bubbles.**

**Scientists are conducting more analyses to find out how the structure was formed.**

**The bubble emissions are described as having well-defined edges. The structure’s shape and emissions suggest it was formed as a result of a large, relatively fast energy release — from where, no one knows, researchers added. One possibility includes a particle jet from the “supermassive” black hole at the galactic center. A black hole is a super-compact object that is so heavy that its gravity draws in even light.**

**In many other galaxies, astronomers see fast particle jets powered by matter falling toward a central black hole. While there is no evidence the Milky Way’s black hole has such a jet today, it may have in**

the past, researchers said. The bubbles also may have formed as a result of gas outflows from a burst of star formation, perhaps the one that produced many massive star clusters in the Milky Way's center several million years ago, some speculated.

"In other galaxies, we see that starbursts can drive enormous gas outflows," said David Spergel, a scientist at Princeton University. "Whatever the energy source behind these huge bubbles may be, it is connected to many deep questions in astrophysics."