

Astronomers find previously unseen giant structure in galaxy

AFP

Washington: Astronomers have discovered a previously unseen structure centred in the Milky Way — a finding likened in terms of scale to the discovery of a new continent on Earth.

The scientists, who found the giant structure using NASA's Fermi Gamma-ray Space Telescope, believe it could be the remnant of an eruption from a supersized black hole at the centre of our galaxy.

Doug Finkbeiner, an astronomer at the Harvard-Smithsonian Centre for Astrophysics (CfA) in Cambridge, Massachusetts, who first recognised the feature, said: "What we see are two gamma-ray-emitting bubbles that extend 25,000 light-years north and south of the galactic centre."

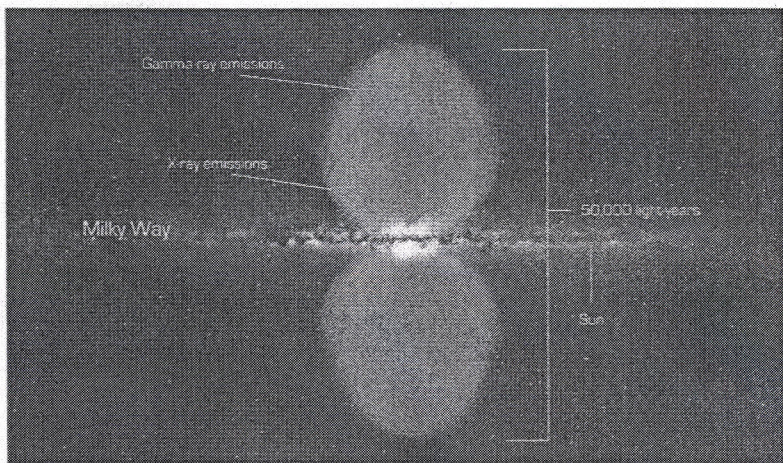
"We don't fully understand their nature or origin," he was quoted as saying by a joint CfA and NASA release. According to the scientists, the structure is believed to be millions of years old.

More than 100 degrees across, it spans more than half of the sky, from the constellation Virgo to the constellation Crux.

A paper on the findings will appear in an upcoming issue of *The Astrophysical Journal*.

Finkbeiner and Harvard graduate students Meng Su and Tracy Slatyer revealed the bubbles by processing publicly available data from Fermi's Large Area Telescope (LAT) — the most sensitive and highest-resolution gamma-ray detector ever orbited.

Gamma rays are the highest-energy form of light and the structures eluded previous astronomers studying gamma rays due in part to the so-called diffuse emission — a fog of gamma rays that appears all over the sky.



This NASA handout image obtained on Wednesday shows from end to end the newly discovered gamma-ray bubbles as they extend 50,000 light-years

The emissions are caused by particles moving near the speed of light interacting with light and interstellar gas in the Milky Way.

By using various estimates of the gamma-ray fog, the scientists were able to subtract it from the LAT data and unveiled the giant bubbles.

"The LAT team confirmed the existence of an extended structure in the direction of the inner part of the Milky Way and we're in the process of performing a deeper analysis to better understand it," said Simona Murgia, a Fermi researcher at the SLAC National Accelerator Laboratory in California.

The researchers believe that an important process for producing the galaxy's gamma-ray fog, called inverse Compton scattering, also lights up the bubbles. In that process, electrons moving near the

speed of light collide with low-energy light, such as radio or infrared photons. The collision increases the energy of the photons into the gamma-ray part of the electromagnetic spectrum.

The bubble emissions are much more energetic than the gamma-ray fog seen elsewhere in the Milky Way. The bubbles also appear to have well-defined edges.

Taken together, the structure's shape and emissions suggest that it was formed as a result of a large and relatively rapid energy release — the source of which remains a mystery, Finkbeiner noted.

One possibility includes a particle jet from the supermassive black hole at the galactic centre. While there is no evidence that the Milky Way's black hole sports such a jet today, it may have in the past, said the scientists. PTI