

Pulsar G359 - Galactic 'Bone'

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Pulsar G359 Galactic 'Bone' Latest News

Astronomers have identified the likely cause of a fracture in a long, bone-like structure in the Milky Way Galaxy, known as G359.13142-0.20005 (G359.13 or "The Snake"), using data from the Chandra X-ray Observatory and MeerKAT radio array.

About Pulsar G359 - Galactic 'Bone'

- **G359.13 is one of the longest and brightest non-thermal filaments** in the Galaxy, stretching **about 230 light-years** and located **~26,000 light-years** from Earth, near the **Galactic Center**.
- These **galactic "bones"** are **elongated structures** seen primarily in **radio waves** and aligned with **magnetic field lines**. Their appearance is due to **charged particles spiraling** along these magnetic fields, emitting synchrotron radiation.
- **A fracture has been detected** in the otherwise continuous structure of G359.13. This **disruption aligns** with the location of a **pulsar**, identified via both **X-ray (Chandra)** and **radio data (MeerKAT and VLA)**.

- The **pulsar is a fast-moving, highly magnetized neutron star**, created by the **collapse of a massive star** during a **supernova explosion**. It travels at speeds estimated between **1 to 2 million miles per hour**.
- The pulsar appears to have **collided with G359.13**, causing a **distortion in its magnetic field**, which in turn **warped the radio signal** and physically **fractured the filament**.
- The **Chandra X-ray data** revealed **blue-colored emission** from the suspected pulsar. **Additional X-ray sources near the pulsar** may originate from **electrons and positrons** (antimatter particles) that have been **accelerated to extremely high energies**.
- This event provides critical insights into **high-energy astrophysical processes**, especially the **interaction of pulsars with galactic magnetic structures**.

About Chandra X-ray Observatory

- The **Chandra X-ray Observatory** is **NASA's flagship space telescope** for detecting **X-ray emissions** from **super-hot regions** of the universe, like **supernova remnants, black holes, and galaxy clusters**.
- **Launched on July 23, 1999**, by the **Space Shuttle Columbia (STS-93)**, Chandra operates in **high Earth orbit** at altitudes up to **139,000 km** to avoid X-ray absorption by Earth's atmosphere.
- It is part of NASA's **"Great Observatories" program**, along with the **Hubble Space Telescope, Spitzer Space Telescope**, and the **now-retired Compton Gamma Ray Observatory**.
- Chandra has **eight-times greater resolution** than earlier X-ray missions and can **detect X-ray sources 20 times fainter** than any of its predecessors.
- It is managed by **NASA's Marshall Space Flight Center** and supports international collaboration for studying **extreme environments** in the cosmos.

Source: **PHY**

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