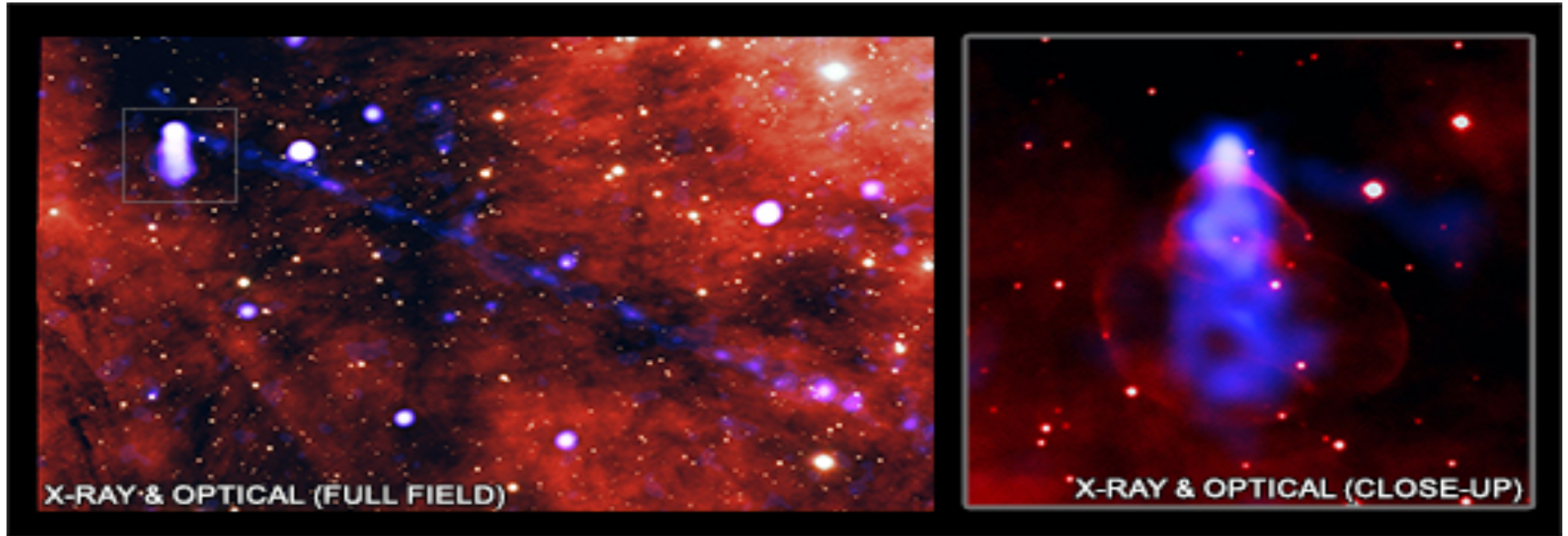




Chandra Science Highlight

Tiny Star Unleashes Gargantuan Beam of Matter and Antimatter



Caption: These images show the pulsar known as PSR J2030+4415 in X-rays from Chandra (blue) and optical light from the Gemini telescope in Hawaii (appearing as red, brown, and black). The left panel shows about one third the length of an extremely long filament, or beam, from the pulsar detected in Chandra data. The right panel contains a close-up showing where the X-rays are created, by particles flying around the pulsar. As the pulsar moves through space at about half a million miles an hour, some of these particles escape and create the long filament. This beam may help explain the surprisingly large numbers of positrons, the anti-matter counterparts to electrons, scientist have detected at Earth. <https://chandra.si.edu/photo/2022/j2030/>

- A city-sized collapsed star has generated a beam of matter and antimatter that stretches for seven light-years (40 trillion miles).
- New data from NASA's Chandra X-ray Observatory revealed the full extent of this beam, or filament.
- This discovery could help explain the presence of positrons detected throughout the Milky Way galaxy and here on Earth.
- Positrons are the antimatter counterpart to the electron.

Distance estimate: About 1,600 light-years

Credit: X-ray: NASA/CXC/Stanford Univ./M. de Vries; Optical: NSF/AURA/Gemini Consortium

Instrument: ACIS

Reference: de Vries, M. and Romani, R., 2022, ApJ, 928, 39; [arXiv:2202.03506](https://arxiv.org/abs/2202.03506)

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