



**Chandra X-ray
Observatory Center**

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PSR J2030+4415: A pulsar with a long filament located about 1,600 light years from Earth.
(Credit: X-ray: NASA/CXC/Stanford Univ./M. de Vries; Optical: NSF/AURA/Gemini Consortium)

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 where the X-rays are created by particles flying around the pulsar itself. 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.

Scale: Main image is about 5.8 arcmin (2.7 light-years) across; Inset image is about 42.5 arcsec (0.33 light-years) across.

Chandra X-ray Observatory ACIS Image

CXC operated for NASA by the Smithsonian Astrophysical Observatory
