



Chandra X-Ray
Observatory Center

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B1957+20: A pulsar, also known as the “Black Widow” pulsar, located about 5,000 light years from Earth.

Credit: X-ray: NASA/CXC/ASTRON/B.Stappers et al., Optical: AAO/J.Bland-Hawthorn & H.Jones

This composite X-ray (red/white) and optical (green/blue) image reveals an elongated cloud, or cocoon, of high-energy particles flowing behind the rapidly rotating Black Widow pulsar (the white point-like source). The pulsar is also moving through the galaxy at a high speed which creates an outer bow shock wave visible to optical telescopes. The pressure behind this outer shock wave creates a second shock wave that sweeps the cloud of high-energy particles back from the pulsar to form the cocoon. The Black Widow pulsar is emitting intense high-energy radiation that appears to be destroying a companion star through evaporation. It is one of a class of extremely rapidly rotating, very old neutron stars called millisecond pulsars.

Scale: Image is 1.2 arcmin on a side.

Chandra X-ray Observatory ACIS Image

CXC operated for NASA by the Smithsonian Astrophysical Observatory