

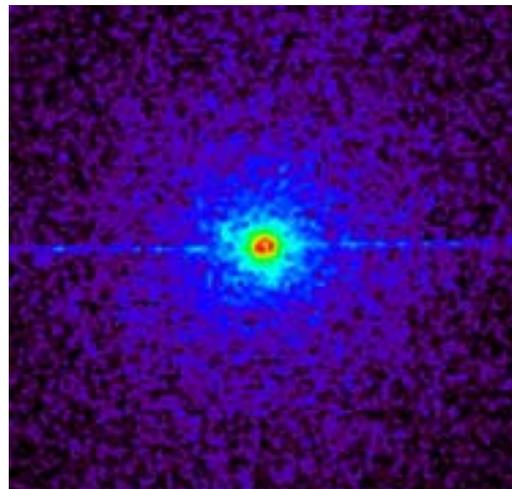


Chandra Science Highlights

Chandra Shows New Way to Measure Cosmic Distances

Cygnus X-3 and Scattering Halo

- The Chandra X-ray ACIS/ HETG image of Cygnus X-3 shows a halo (beyond the yellow ring in the center) due to scattering by interstellar dust grains. The sharp horizontal line is an instrumental effect. The energy band is between 700 eV and 4 keV, and the field shown here is 200 arcsec on a side.



Credit: NASA/SRON/MPE

- The X-ray emission from the X-ray binary Cygnus varies regularly with a 4.8 hour period, as a compact object, a neutron star or black hole, circles a nearby companion star.

- The radiation from the halo is delayed and smeared out, so the variations are damped. By observing the variations at annuli of 1-5 arcsec, 4-9 arcsec, and 6-11 arcsec, and assuming a uniform distribution of dust along the path to the source, the distance to the source is found to be 9 kiloparsec, to an accuracy of about 20%. The result does not depend critically on the dust distribution.

- Longer observations covering 2 to 3 orbital periods should yield 10% accuracy in the distance.

Reference: P. Predehl et al, *Astron. & Astrophys.* (2000, in press).

A Chandra press release on this observation is planned for April, 2000.

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