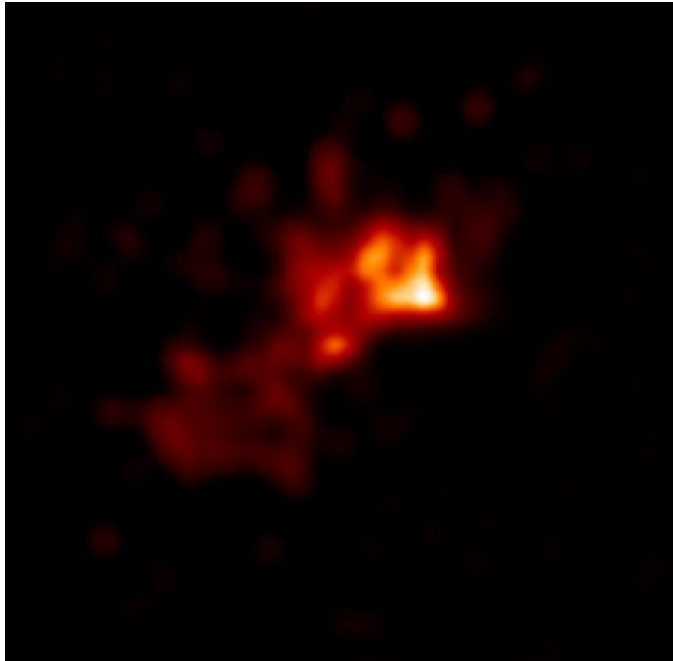




Chandra Science Highlights

NGC 7027: A young planetary nebula about 3,000 light years from Earth in the constellation Cygnus.



Chandra's image of NGC 7027 represents the first detection of X-rays from this young planetary nebula that is about 700 years old. A bubble of 3 million degree Celsius gas with a length about a hundred times that of our solar system is shown in the image. The image is brighter to the upper right -- the side of the nebula nearest the Earth -- where there is less obscuring material to block the X-ray emission. NGC 7027 is the remains of a sun-like star that has ejected much of its mass to expose its hot core. The X-rays are thought to be produced when a "fast" wind from the hot core collides with the "slow" wind that was ejected earlier during the star's red giant phase. This collision heats the matter to several million degrees so that it glows in X-rays.

Credit: X-ray: NASA/RIT/J. Kastner et al.
Chandra X-ray Observatory ACIS image.

Scale: Image is 22 arc seconds on a side.

- Spectrum displays strong emission lines from highly ionized neon, and weaker lines attributed to oxygen, magnesium and silicon.
- Fits to spectral data suggest a temperature $T \sim 3$ MK, and an intrinsic X-ray luminosity $L \sim 1.3 \times 10^{32}$ erg/s.
- Bipolar morphology of X-ray emission appears to trace fast molecular outflow observed at infrared wavelengths, which suggests that the X-rays are due to the collision of a fast stellar wind from the central star of NGC 7027, or from a companion to this star.

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