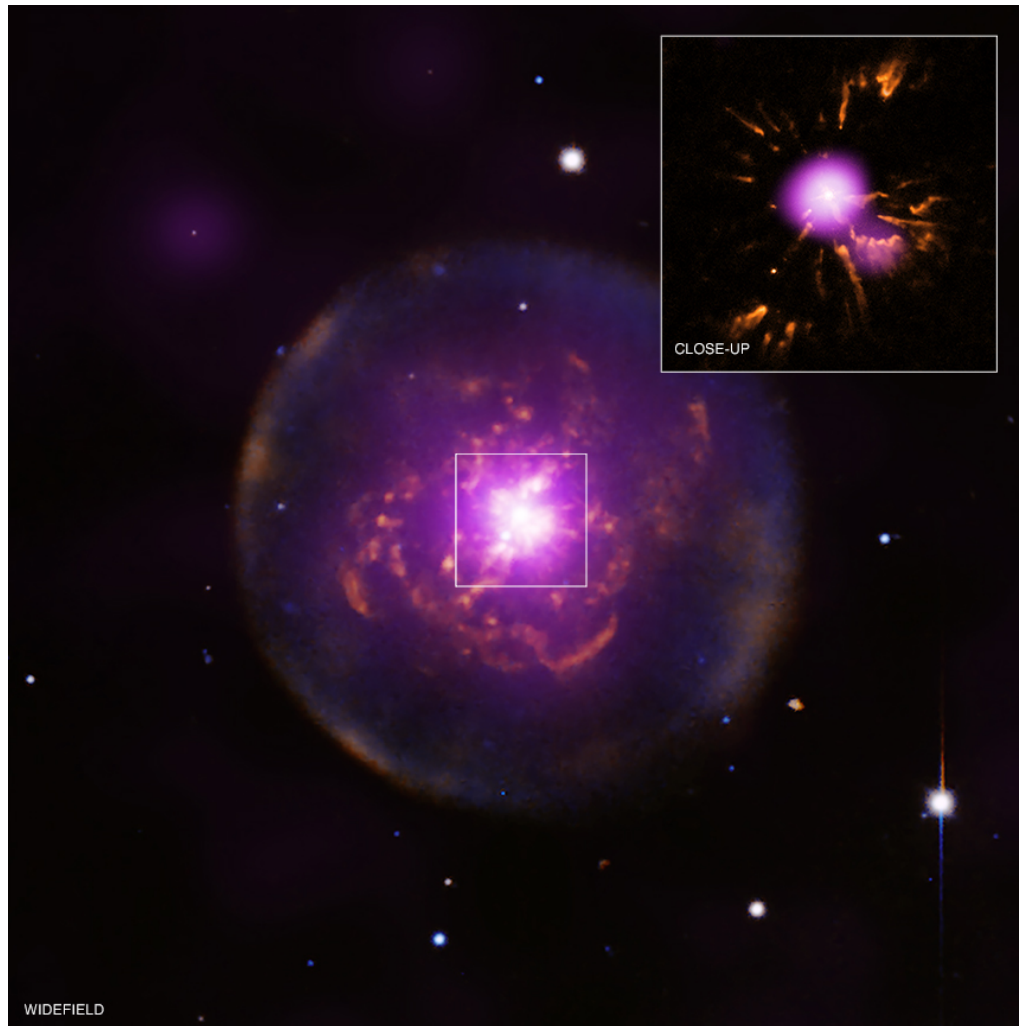




# Chandra Science Highlight

## Abell 30: X-rays from a Reborn Planetary Nebula



Composite image of the planetary nebula Abell 30, showing a wide-field view with an inset featuring the central region. Optical emission from oxygen (orange) and hydrogen (colored green and blue) ions is shown, together with X-ray emission (purple).

- The large nebula seen in the wide-field image has an observed age of about 12,500 years and was formed by the interaction of fast and slow winds associated with the ejection of the outer envelope of the star at the end of the red giant phase of the star's evolution.
- The inner region shows a pattern of knots of hydrogen-poor gas embedded in diffuse hot gas. The observed expansion velocity of the knots implies an age of 850 years.
- A relatively recent thermonuclear pulse has apparently ejected material from the central star, creating a small-scale nebular inside the original one.

Reference: Guerrero, M.A., et al, 2012, ApJ, 755, 129; [arXiv:1202:4463](https://arxiv.org/abs/1202.4463)

Credit: X-ray: Inset X-rays (NASA/CXC/IAA-CSIC/M.Guerrero et al); Inset Optical (NASA/STScI); Wide-field X-ray (ESA/XMM-Newton); Wide-field Optical (NSF/NOAO/KPNL)

Scale: Inset is 37 arcsec across (1 light year); Wide-field image is 3.5 arcmin across (5.6 light years)

Instruments: ACIS

Distance Estimate: About 5500 light years

CXC operated for NASA by the Smithsonian Astrophysical Observatory

**NOVEMBER 2012**