



**Chandra X-ray  
Observatory Center**

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**Planetary Nebula Gallery:** Four planetary nebulas located less than 5000 light years from Earth.  
(Credit: X-ray: NASA/CXC/RIT/J.Kastner et al.; Optical: NASA/STScI)

**Caption:** This gallery shows four planetary nebulas from the first systematic survey of such objects in the solar neighborhood made with NASA's Chandra X-ray Observatory. The planetary nebulas shown here are NGC 6543 (aka the Cat's Eye), NGC 7662, NGC 7009 and NGC 6826. X-ray emission from Chandra is colored purple and optical emission from the Hubble Space Telescope is colored red, green and blue. A planetary nebula is a phase of stellar evolution that the sun should experience several billion years from now, when it expands to become a red giant and then sheds most of its outer layers, leaving behind a hot core that contracts to form a dense white dwarf star. A wind from the hot core rams into the ejected atmosphere, creating the shell-like filamentary structures seen with optical telescopes. The diffuse X-ray emission is caused by shock waves as the wind collides with the ejected atmosphere. The properties of the X-ray point sources in the center of about half of the planetary nebulas suggest that many central stars responsible for ejecting planetary nebulas have companion stars.

*Chandra X-ray Observatory ACIS Image*

*CXC operated for NASA by the Smithsonian Astrophysical Observatory*