Chandra Science Highlight

Mz 3, BD+30-3639, Hen 3-1475, and NGC 7027: Planetary Nebulas – Fast Winds from Dying Stars

This panel of composite images (x-ray/blue, optical/green, and infrared/red) shows part of the unfolding drama of the last stages of the evolution of sun-like stars. Dynamic elongated clouds envelop bubbles of multimillion degree as produced by high-velocity winds from dying stars. BD+30-3639 appears spherical, but other observations indicate that it is viewed along the pole.

- Planetary nebulas – so called because some of them resemble a planet when viewed through a small telescope – are produced in the late stages of moderate-mass star’s life.
- Over a period of a few hundred thousand years, much of a star’s mass is expelled at a relatively slow speed, creating a more or less spherical cloud around the star.
- The mass loss eventually uncovers the star’s hot core, and the velocity of the gas flowing away from the star jumps to about a million miles per hour.
- Shock waves generated by the collision of high-speed gas from the hot core with the previously ejected loud create the multimillion degree bubbles observed by Chandra.
- The origin of the funnel-shaped winds may be related to strong, twisted magnetic fields near the hot stellar core.

References:
- J. Kastner et al. 2003, Astrophys. J. 591, L37 (Mz 3)