Chandra Science Highlight

Supernova 1987A: The Remnant of an Exploded Star in the Large Magellanic Cloud Galaxy

X-ray spectra obtained with Chandra show that the velocity of the shock wave is much less than the velocity inferred from the radial expansion rate of the X-ray image. The low measured velocities indicate that the X-rays and the optical bright spots are produced by a shock wave that has encountered relatively dense fingers of gas protruding from the circumstellar ring. The fingers of dense gas were likely produced long ago by the interaction of the high-speed wind with the dense circumstellar cloud. As the supernova shock wave plows deeper into the cool cloud the ring should become larger and much brighter in both optical and X-ray light.


Chandra X-ray Observatory ACIS spectra

The Chandra X-ray image (left) reveals a ring of multimillion-degree gas produced by the collision of an outward-moving supernova shock wave with a ring of cool circumstellar gas. The optical image (right) from the Hubble Space Telescope shows a ring of bright spots that are also caused by the shock wave hitting the cool gas.

Scale: The ring is 1.4 light years in diameter and subtends an angle of 1.6 arc seconds.