Spatially-Resolved X-ray Spectroscopy in the Cygnus Loop

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Abstract

In the nearby and bright Cygnus Loop, we examine the evolution of the supernova remnant blast wave as it propagates through the inhomogeneous interstellar medium. At the western limb, the *Chandra*-ACIS field of view includes a well-developed interaction between the blast wave and a large cloud, as well as the encounter of the shock front and the walls of the cavity that the supernova progenitor carved. The spectral variations we detect on large scales reveal the characteristic non-uniformity of supernova remnant evolution globally, which is a consequence of shock deceleration in the cavity walls and dense cloud medium and the development of reflected shocks. On small scales, however, equilibrium approximations of thermal plasma emission are reasonable. In particular, the equilibrium temperatures we measure are robust, and non-equilibrium ionization models are unnecessary on the spatial scales that *Chandra* resolves.

CATEGORY: SUPERNOVAE, SUPERNOVA REMNANTS AND ISOLATED NEUTRON STARS