NON-RADIATIVE SHOCKS IN THE CYGNUS LOOP: H2 IN HH2 FLOURESCENCE OR COLLISIONS?

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Final Report

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The FUSE observations of a non-radiative shock wave in the Cygnus Loop were obtained in June and October 2000. The two main results were near equilibration of the kinetic temperature of oxygen with protons and electrons and inferred 3D structure and pre-shock density for the shock including resonance scattering. The 3D structure in turn implies density fluctuations in keeping with the level expected for interstellar turbulence. Major results are contained in an ApJ paper in press and some extensions are contained in a conference proceedings paper in Rev. Mex. A&A in press. Very early results were given in the Ghavamian et al. paper in 2000.

The observations of HH2 have not yet been obtained due to the pointing constraints of FUSE. They were scheduled for early January 2003, but we have not yet received the processed data. We are hoping to get the data shortly.

Meeting support:
Winds, Bubbles and Explosions, Patzcuaro, Mexico, Sept. 2002

APS Division of Plasma Physics Minisymposium on "Blending of Plasma and Neutral Gas in the Sun, the Heliosphere, and the Interstellar Medium" Orlando, FL Nov. 2002

Young Supernova Remnants: Eleventh Astrophysics Conference, College Park, MD Oct. 2000.

Publications:
"Far Ultraviolet Spectra of a Non-Radiative Shock Wave in the Cygnus Loop," J.C. Raymond, P. Ghavamian, R. Sankrit, W.P. Blair & S. Curiel 2003, ApJ, in press.

"Clouds and Instabilities in Supernova Remnant Structure: Interstellar Turbulence and Rippled Shocks," J.C. Raymond 2003, Rev. Mex. A&A, in press.

"Far ultraviolet spectroscopy of a nonradiative shock in the Cygnus Loop: Implications for the postshock electron-ion equilibration", P. Ghavamian, J.C. Raymond and W.P. Blair, in Young Supernova Remnants: Eleventh Astrpohysics Conference, S.S. Holt and U. Hwang, eds. (Melville, NY; AIP) p. 189