Ionization and X-ray Doppler Velocities in the Wind of Cen X-3/V779 Cen

Patrick S. Wojdowski, Duane A. Liedahl , Christopher W. Mauche (*Lawrence Livermore National Laboratory*), Masao Sako , Frits Paerels , Steven M. Kahn (*Columbia University*)

Abstract

We have observed Cen X-3 over an eclipse with *Chandra*/HETG. We find upper limits of a few hundred $\mathrm{km\,s^{-1}}$ for the line widths and shifts, indicating directly, for the first time, that the highly ionized wind may be significantly slower than the winds of isolated hot stars. In eclipse, the resonance lines are strong relative to the other components of the helium-like triplets indicating the importance of resonant line scattering.

Fits of the emission line spectrum from the wind with photionization/recombination models indicate that the neutron star was in a low-luminosity state. and that the wind is more tenuous and less highly ionized than in an observation with *ASCA* in 1995. The wind in Cen X-3 may be driven by X-ray heating and so the tenuousness of the wind may be caused by the low luminosity of the neutron star. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

CATEGORY: BLACK HOLE AND NEUTRON STAR BINARIES