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title : Charge Exchange in the Cygnus Loop?

abstract :

Recent X-ray studies have shown that supernova shock models are unable to satisfactorily explain X-ray emission in the rim of the Cygnus Loop, a supernova remnant. In an attempt to account for this "anomalously" enhanced X-ray flux, we fit the region with a model including theoretical charge exchange (CX) data along with shock and background X-ray models. The model includes CX collisions of H and He-like O, N, and C with H at a collisional energy of 1 keV/u (438 km/s). The observations reveal a strong emission feature near 0.7 keV that can not fully be accounted for by a shock model and current CX data. We show that inclusion of CX, specifically He-like oxygen with H, does provide for a statistically significant improvement over a pure shock model. A model of the Cygnus Loop including current CX calculations will be presented.