Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Hydrodynamic and atomic-kinetic modeling of photoionised neon plasmas IAIN HALL, TUNAY DURMAZ, ROBERTO MANCINI, Univ. of Nevada, Reno, JIM BAILEY, GREGORY ROCHAU, Sandia Nat. Labs., MICHAEL ROSENBURG, DAVID COHEN, Swarthmore College, IGOR GOLOVKIN, JOSEPH MACFARLANE, Prism Comp. Sciences, MANOLO SHERRILL, JOSEPH ABDALLAH, LANL, ROBERT HEETER, MARK FOORD, SIEGFRIED GLENZER, LLNL — Photoionised plasmas are common in astrophysical environments and in recent years, high resolution spectra from such sources have been recorded by the Chandra and XMM-Newton satellites. These have motivated several recent efforts to understand the atomic-kinetic and radiative characteristics of such plasmas in detail. The Z-pinch facility at the Sandia lab is the most powerful terrestrial source of X-rays and provides an opportunity to produce photoionised plasmas in a well characterised radiation environment. We present modeling work and experimental design considerations for a forthcoming experiment at Sandia in which the X-ray emission from a collapsing Z-pinch will be used to photoionise low density neon contained in a gas cell. View factor calculations were used to evaluate the radiation environment at the gas cell. These were used to design shielding which maximises the contribution of Z-pinch emission to the total X-ray flux incident on the gas cell. The Helios-CR code was used to examine the hydrodynamic characteristics of the gas cell, in particular looking at the heating, temperature and ionisation of the neon and the absorption of radiation by the plastic walls enclosing the gas.

Iain Hall
University of Nevada, Reno

Date submitted: 20 Jul 2007 Electronic form version 1.4