Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

**Neon photoionized plasma experiment at Z**[1] D. C. MAYES, R. C. MANCINI, University of Nevada, Reno, J. E. BAILEY, G. P. LOISEL, G. A. ROCHAU, Sandia National Laboratories — We discuss an experimental effort to study the atomic kinetics in neon photoionized plasmas via K-shell line absorption spectroscopy. The experiment employs the intense x-ray flux emitted at the collapse of a Z-pinch to heat and backlight a photoionized plasma contained within a cm-scale gas cell placed at various distances from the Z-pinch and filled with neon gas pressures in the range from 3.5 to 30 torr. The experimental platform affords an order of magnitude range in the ionization parameter characterizing the photoionized plasma from about 3 to 80 erg*cm/s. An x-ray crystal spectrometer capable of collecting both time-integrated and time-gated spectra is used to collect absorption spectra. A suite of IDL programs has been developed to process the experimental data to produce transmission spectra. The spectra show line absorption by several ionization stages of neon, including Be-, Li-, He-, and H-like ions. Analysis of these spectra yields ion areal-densities and charge state distributions, which can be compared with results from atomic kinetics codes. In addition, the electron temperature is extracted from level population ratios of nearby energy levels in Li- and Be-like ions, which can be used to test heating models of photoionized plasmas.

[1]This work was sponsored in part by the DOE National Nuclear Security Administration Grant DE-FG52-09NA29551, DOE Office of Science Grant DE-SC0014451, and the Z Facility Fundamental Science Program of SNL.

Daniel Mayes
University of Nevada, Reno

Date submitted: 15 Jul 2016 Electronic form version 1.4