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Laboratory photoionized plasma experiments at Z - Comparison with modeling[1] D. MAYES, T. LOCKARD, T. DURMAZ, I. HALL, R. MANCINI, Physics Dept, University of Nevada, Reno, J. BAILEY, G. ROCHAU, G. LOISEL, Sandia National Laboratories, R. HEETER, D. LIEDAHL, Lawrence Livermore National Laboratory — Photoionized plasmas are common in astrophysical environments, such as x-ray binaries and active galactic nuclei. We discuss an experimental and modeling effort to study the atomic kinetics in plasmas of this type via K-shell line absorption spectroscopy. Results from a first pass thru our 2nd-generation dataset are compared with results of several modeling codes attempting to simulate our experimental conditions. The experiment employs the intense x-ray flux emitted by the collapse of a z-pinch to produce and backlight a Neon photoionized plasma in a cm-scale gas cell at various distances from the z-pinch. The filling pressure is monitored in situ providing the plasma particle number density. High-resolution spectra from a TREX spectrometer are processed with a suite of specially designed IDL tools to produce transmission spectra, which show absorption in several ionization stages of Neon. Analysis independent of atomic kinetics calculations yields the charge state distribution and ion areal densities used to benchmark atomic kinetics codes. In addition, the electron temperature, extracted from a level population ratio, is used to test heating models.

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