Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Improvements and modeling calculations for a laboratory photoionized plasma experiment at Z relevant to astrophysics[1] T.E. LOCKARD, D.C. MAYES, T. DURMAZ, R.C. MANCINI, University of Nevada-Reno, G. LOISEL, J.E. BAILEY, G.A. ROCHAU, Sandia National Laboratories, D.A. LIEDAHL, R.F. HEETER, Lawrence Livermore National Laboratories — Creating a photoionized plasma in a controlled laboratory environment is difficult due to the intense x-ray flux needed to drive the plasma. This is overcome by the intense flux of x-ray photons produced by the pulsed power Z-machine at Sandia National Laboratories. We discuss improvements to a gascell experiment at Z including new ultrathin windows and window plates, and lower filling pressures that permit producing photoionized plasmas of larger ionization parameters. To understand the radiation environment, constrained view-factor calculations have been performed to model the x-ray flux at the gascell. Radiation-hydrodynamic simulations were also done to provide information on the overall evolution of the plasma and, in particular, the radiation heating of the plasma including non-equilibrium effects. We will also discuss a series of collisional-radiative atomic kinetics calculations that were done using a collection of laboratory and astrophysics codes. These results are useful to understand the relative importance of photon- and particle-driven atomic processes in the plasma.

[1]This work is sponsored in part by the National Nuclear Security Administration under the High Energy Density Laboratory Plasmas grant program through DOE Grant DE-FG52-09NA29551, and the Z Facility Fundamental Science Program of SNL.

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Date submitted: 11 Jul 2013 Electronic form version 1.4