Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

A Photoionized Plasma Experiment Driven by a Long Duration X-Ray Flux at OMEGA EP ROBERTO MANCINI, D MAYES, R SCHOENFELD, J ROWLAND, University of Nevada, Reno, R HEETER, D LIEDAHL, Lawrence Livermore National Laboratory, S REGAN, University of Rochester —
Achieving photoionization equilibrium in the laboratory is a standing challenge of photoionized plasma experiments and key for testing physics models employed in the interpretation of x-ray astronomy observations. An experimental platform has been developed at the OMEGA EP laser in which a tamped silicon sample is driven by a three-Cu hohlraum source that produces a 30ns-duration, broadband x-ray flux with a radiation temperature of 90eV. The long duration x-ray flux is critical for producing a photoionized plasma in steady-state in the laboratory. The x-ray source performance is monitored with VISAR and its spectral distribution is characterized with a grating spectrometer. The silicon plasma is diagnosed with L-shell self-emission and K-shell absorption spectroscopy. The latter is afforded by using a laser beam to drive a separate short-duration source of backlighting photons. Probing the silicon plasma at different times provides an experimental check of the steady-state condition in the photoionized plasma. We will discuss modeling simulations done to design the experiment and the observations recorded during the first series of shots at OMEGA EP. This work is supported by DOE NNSA NLUF Grant DE-NA0003936.

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Date submitted: 09 Jul 2020 Electronic form version 1.4