Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Measuring Ionization in Highly Compressed, Near-Degenerate Plasmas[1] TILO DOEPPNER, Lawrence Livermore National Laboratory, D. KRAUS, University of California, Berkeley, P. NEUMAYER, GSI Darmstadt, B. BACHMANN, G.W. COLLINS, L. DIVOL, A. KRITCHER, O.L. LANDEN, A. PAK, C. WEBER, Lawrence Livermore National Laboratory, L. FLETCHER, S.H. GLENZER, SLAC National Accelerator Laboratory, R.W. FALCONE, A. SAUNDERS, University of California, Berkeley, D. CHAPMAN, AWE, Reading, R. BAGGOTT, D.O. GERICKE, University of Warwick, A. YI, Los Alamos National Laboratory — A precise knowledge of ionization at given temperature and density is required to accurately model compressibility and heat capacity of materials at extreme conditions. We use x-ray Thomson scattering to characterize the plasma conditions in plastic and beryllium capsules near stagnation in implosion experiments at the National Ignition Facility. We expect the capsules to be compressed to more than 20x and electron densities approaching 10^{25} cm^{-3}, corresponding to a Fermi energy of 170 eV. Zinc He$_\alpha$ x-rays (9 keV) scattering at 120° off the plasma yields high sensitivity to K-shell ionization, while at the same time constraining density and temperature. We will discuss recent results in the context of ionization potential depression at these extreme conditions.

[1]This work was performed under the auspices of the US Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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Date submitted: 14 Jul 2016 Electronic form version 1.4