Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Using X-ray Thomson Scattering to Characterize Highly Compressed, Near-Degenerate Plasmas at the NIF[1] TILO DOEPPNER, Lawrence Livermore National Laboratory, D. KRAUS, HZDR Dresden, P. NEUMAYER, GSI Darmstadt, B. BACHMANN, L. DIVOL, A.L. KRITCHER, O.L. LANDEN, Lawrence Livermore National Laboratory, L. FLETCHER, S.H. GLENZER, SLAC National Accelerator Laboratory, R.W. FALCONE, M.J. MACDONALD, A. SAUNDERS, UC Berkeley, B. WITTE, R. REDMER, University of Rostock, D. CHAPMAN, R. BAGGOTT, D.O. GERICKE, University of Warwick, S.A. YI, Los Alamos National Laboratory — We are developing x-ray Thomson scattering for implosion experiments at the National Ignition Facility to characterize plasma conditions in plastic and beryllium capsules near stagnation, reaching more than 20x compression and electron densities of 10^{25} cm^{-3}, corresponding to a Fermi energy of 170 eV. Using a zinc He-α x-ray source at 9 keV, experiments at a large scattering angle of 120° measure non-collective scattering spectra with high sensitivity to K-shell ionization, and find higher charge states than predicted by widely used ionization models. Reducing the scattering angle to 30° probes the collective scattering regime with sensitivity to collisions and conductivity. We will discuss recent results and future plans.

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

Tilo Doeppner
Lawrence Livermore National Laboratory

Date submitted: 14 Jul 2017 Electronic form version 1.4