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Measuring Ionization at Extreme Densities DOMINIK KRAUS, University of California, Berkeley, TILO DOEPPNER, ANDREA KRITCHER, BENJAMIN BACHMANN, Lawrence Livermore National Laboratory, LUKE FLETCHER, SLAC National Accelerator Laboratory, ROGER FALCONE, University of California, Berkeley, DIRK GERICKE, University of Warwick, SIEGFRIED GLENZER, SLAC National Accelerator Laboratory, NATHAN MASTERS, RYAN NORA, KURT BOEHM, LAURENT DIVOL, OTTO LANDEN, Lawrence Livermore National Laboratory, AUSTIN YI, JOHN KLINE, Los Alamos National Laboratory, RONALD REDMER, University of Rostock, PAUL NEUMAYER, GSI Darmstadt — A precise knowledge of ionization at given temperature and density is crucial in order to properly model compressibility and heat capacity of ICF ablator materials for efficient implosions producing energy gain. Here, we present a new experimental platform to perform spectrally resolved x-ray scattering measurements of ionization, density and temperature in imploding CH or beryllium capsules on the National Ignition Facility. Recording scattered x-rays at 9 keV from a zinc He-alpha plasma source at a scattering angle of 120 degrees, first experiments show strong sensitivity to k-shell ionization, while at the same time constraining density and temperature. This platform will allow for x-ray Thomson scattering studies of dense plasmas with free electron densities up to 10^{25} cm^{-3}, giving the possibility to investigate effects of continuum lowering and Pauli blocking on the ablator ionization state right before stagnation of the implosion.

Dominik Kraus
University of California, Berkeley

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