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**Spectrally Resolved X-ray Scattering from Implosion Targets** ANDREA KRITCHER, UC Berkeley, LLNL, TILO DOPPNER, LLNL, HAE JA LEE, UC Berkeley, SLAC, PAUL DAVIS, UC Berkeley, OTTO LANDEN, SIEGFRIED GLENZER, LLNL — Spectrally resolved x-ray Thomson scattering has been applied at the Omega Laser Facility to investigate the capsule adiabat of cone-in-shell targets. The technique of scattering from implosion targets was developed and tested for use as a diagnostic at the National Ignition Facility (NIF), LLNL. Measurement of the adiabat is applied to test low-adiabat pulse shaping methods, designed for optimum compressibility and stability. Theoretical equation of state models (EOS) can also be studied for conditions encountered during implosion. In these experiments, the noncollective, or microscopic behavior of the plasma, was probed with a Zn He-alpha x-ray source at a scattering angle of  $113^\circ$ . For these degenerate plasmas, the width of the inelastic scattering peak is proportional to the Fermi energy, and thus the electron density. The electron temperature is obtained from the measured intensities of the elastic and inelastic features. In-flight scattering measurements yielded electron densities of  $\sim 1.2 \times 10^{24} \text{cm}^{-3}$ , temperatures of  $\sim 10$  eV, and an ionization state of C(+4)H(+1). This work was performed under the auspices of the DOE by LLNL under Contract No. DE-AC52-07NA27344, LDRD 08-ERI-003, and the Nat. Lab. User Fac. Prog.

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