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Temperature measurement of short-pulse heated beryllium using non-collective x-ray Thomson scattering with a Zn K-α line source[1]
T. DOEPPNER, LLNL, A.L. KRITCHER, LLNL, UC Berkeley, O.L. LANDEN, LLNL, H.J. LEE, UC Berkeley, S.T. LE PAPE, LLNL, C. STOECKL, W. THEOBALD, LLE, S.H. GLENZER, LLNL — Experiments are fielded on the OmegaEP laser facility at the Laboratory of Laser Energetics in Rochester that use the unique capability of sending two kJ-class short pulse beams on target. One of the beams is used to generate hot electrons that isochorically heat a 250 μm Be cube to T_e = 20-100 eV at n_e $\sim$3 x 10^{23} cm^{-3}. The second beam creates Zn K-α x-rays at 8.6 keV to measure Thomson scattering in the non-collective regime with time resolution of $\sim$10 ps. T_e can be inferred from Doppler-broadening of the Compton feature that is energy down-shifted from the Rayleigh signal. Future experiments will aim at measuring collective scattering from plasmon oscillations. The collisionality can be inferred from broadening of the plasmon signal, allowing measurement of the conductivity at conditions encountered during capsule implosions at the National Ignition Facility.

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