

Abstract Submitted
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Conduction-Zone Measurements Using X-Ray Self-Emission Images A.K. DAVIS, D.T. MICHEL, R. EPSTEIN, S.X. HU, J.P. KNAUER, D.H. FROULA, Laboratory for Laser Energetics, U. of Rochester — Time-gated soft x-ray self-emission images of directly driven implosions were used to measure the hydrodynamic conditions between the critical-density surface and the ablation front of a CH target (conduction zone) at the beginning of a laser pulse. These images were calibrated using the time-resolved broadband soft x-ray spectrometer Dante, azimuthally averaged to reduce the noise, and Abel-inverted to determine the emissivity at each point in the plasma. The electron temperature was determined using co-timed images taken with three different filters to obtain a coarse measurement of the emission spectrum at each point. With the temperature determined, the density profile in the corona was determined from the emissivity profile. This measurement is critical for inertial confinement fusion since it governs the length of time that the plasma is too small to provide substantial beam smoothing through thermal conduction, determining the laser imprint efficiency. This region has previously proven challenging to probe because the density is too high for optical diagnostics and the temperature is too high for x-ray radiography. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.

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