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Precision Scattered-Laser-Light Spectroscopy in Direct-Drive Implosions D.H. EDGELL, W. SEKA, J.A. DELETTREZ, R.S. CRAXTON, V.N. GONCHAROV, I.V. IGUMENSHCHEV, J.F. MYATT, A.V. MAXIMOV, R.W. SHORT, T.C. SANGSTER, R.E. BAHR, Laboratory for Laser Energetics, U. of Rochester — Analysis of time-resolved, scattered-light spectra from spherical target implosions on OMEGA reveals a discrepancy between the precision measurements and predictions based on hydrocode modeling. The total scattered light measured and the details of the spectral shifts in the scattered light suggest that less power is being absorbed by the target than predicted. Contradictorily, the model accurately predicts "bang times" suggesting that laser absorption is well modeled. Nonlinear LPI behavior that differs for portions of the beams penetrating to different depths in the corona may provide an explanation. Cross-beam power transfer and steepening of the density profile at the critical and/or quarter-critical surfaces are investigated in attempts to reconcile the observations. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

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