

Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Monoenergetic Proton Radiography Measurements of Implosion Dynamics in Direct-Drive Inertial Confinement Fusion C.K. LI, F.H. SEGUIN, J.R. RYGG, J.A. FRENJE, R.D. PETRASSO, MIT PSFC, V.A. SMALYUK, R. BETTI, J. DELETTREZ, J.P. KNAUER, F.J. MARSHALL, D.D. MEYERHOFER, D. SHVARTS, UR LLE, R.P.J. TOWN, O.L. LANDEN, LLNL — Time-gated, monoenergetic proton radiography provides unique measurements of implosion dynamics of spherical capsules in direct-drive inertial confinement fusion. Proton radiographs obtained at different times, from acceleration through coasting, deceleration, and final stagnation, display a complete picture of ICF spherical implosion. Critical information inferred directly from such images uniquely characterizes the spatial structure and temporal evolution of plasma areal density and field distributions in an imploded target that was hitherto unavailable from conventional measurements. Data are contrasted with both self-emitted x rays and hydro simulations. The work described here was performed in part at the LLE National Laser User's Facility (NLUF), and was supported in part by US DOE, LLNL, LLE and FSC at the Univ. Rochester.

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Date submitted: 18 Jul 2007

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