Abstract Submitted
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Direct-Drive, Low-Adiabat ICF Implosions J.P. KNAUER, K. ANDERSON, R. BETTI, T.J.B. COLLINS, V.YU. GLEBOV, V.N. GONCHAROV, F.J. MARSHALL, D.D. MEYERHOFER, P.B. RADHA, S.P. REGAN, C. STOECKL, Laboratory for Laser Energetics, U. of Rochester, J.A. FRENJE, C.K. LI, R.D. PETRASSO, F.H. SÉGUIN, PSFC, MIT — A series of experiments has been started to study and optimize low-adiabat (α), direct-drive implosions of CH targets. α is defined as the shell pressure divided by the Fermi pressure, and low adiabat is defined as $\alpha \leq 4$. The OMEGA laser system was used to irradiate solid CH targets with shell thicknesses up to 35 μm and CH foam targets. The CH foam targets are mass and density equivalent to cryogenic D_2 targets with a 5-μm CH layer on top of a 0.18-g/cc, 90-μm-thick, foam layer. Ablation-interface perturbations were changed by varying the smoothness of the laser irradiation with SSD. X-ray diagnostic data will be presented showing the measured shell trajectory and core formation. Nuclear diagnostic data will be presented to show the core conditions and fusion performance. Selected target implosions are simulated with both 1-D and 2-D hydrodynamic simulations. The results from the simulations are compared to the experimental data in order to assess what physical processes limit the performance of low-adiabat implosions. This information is then used to optimize the laser pulse shape and target design. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-92SF19460.

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