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Two-Dimensional Investigation of Neutron-Yield Performance in Direct-Drive, Low-Adiabat D_2 Implosions on OMEGA S.X. HU, P.B. RADHA, J.A. MAROZAS, R. BETTI, T.J.B. COLLINS, R.S. CRAXTON, J.A. DELETTREZ, D.H. EDGELL, R. EPSTEIN, V.N. GONCHAROV, I.V. IGUMENSHCHEV, F.J. MARSHALL, R.L. MCCRORY, P.W. MCKENTY, D.D. MEYERHOFER, S.P. REGAN, T.C. SANGSTER, S. SKUPSKY, V.A. SMALYUK, D. SHVARTS, Laboratory for Laser Energetics, U. of Rochester — Neutron yields of direct-drive, low-adiabat ($\alpha \approx 2$ to 3) cryogenic D_2 target implosions on OMEGA have been systematically investigated using 2-D, radiation hydrodynamics *DRACO* simulations. We have focused on the neutron-yield degradation caused by initial target offset, ice-layer roughness, and low-mode laser-irradiation nonuniformities. Simulations provide a reasonably good guide to understanding experimental neutron-yield degradation for thin-shell (5μm) cryogenic implosions. The neutron yields are found to be sensitive to the phase between the target offset and the ice-layer roughness. For 10-μm-thick-shell implosions, the experimental yield is generally lower than what low-mode *DRACO* simulations predict, for which high-mode studies will also be presented. This work was supported by U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

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