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Numerical Study of Large-Scale, Laser-Induced Nonuniformities in Cryogenic OMEGA Implosions I.V. IGUMENSHCHEV, V.N. GONCHAROV, F.J. MARSHALL, K. SILVERSTEIN, J.P. KNAUER, D.H. FROULA, S.P. REGAN, Laboratory for Laser Energetics, U. of Rochester — Performance of direct-drive implosion targets on OMEGA can suffer from large-scale laser-induced nonuniformities with L-modes less than about 10. These nonuniformities develop because of a discrete illumination of targets with the 60 OMEGA laser beams and because of imperfect pointing, profile shaping, energy balance, and timing of these beams. In addition, a significant nonuniformity with $\ell = 1$ can result from an unintentional offset (typically $\sim$10 μm) of targets with respect to the laser beam pointing center. Effects of all these nonuniformities on the evolution of cryogenic implosion targets are studied numerically using 3-D hydrodynamic simulations. Nonuniformities that affect mostly the implosion performance are identified and limits on their magnitude are suggested basing on the results of simulations. 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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