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Fuel–Ablator Mix from Surface Nonuniformities in Directly Driven Implosions I.V. IGUMENSHCHEV, V.N. GONCHAROV, T.R. BOEHLY, T.C. SANGSTER, S. SKUPSKY, Laboratory for Laser Energetics, U. of Rochester — Direct-drive ICF targets can have various surface defects/nonuniformities that affect the implosion performance of cryogenic targets. These defects can vary in dimensions from microns to tens of microns and include dust particles, glue spots for target mounting, fill tubes, and manufacturing defects. Two-dimensional hydrodynamic simulations are performed to investigate the effect of surface defects on implosion performance. These simulations show that the defects introduce large amplitude (nonlinear) perturbations to shocks, which compress the targets. The perturbations from defects of the typical size ($\sim$20 to 40 μm) develop a hole in the target shell, through which the ablator material is injected inside the target and mixed with the fuel. It was found that self-generated magnetic fields can enhance this process. The implosion performance is decreased due to the fuel–ablator mix in the hot spot and due to perturbations of the hot-spot introduced by the injected flow. 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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