Abstract Submitted
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Altering the hydrodynamic mixing of NIF capsules with shocks and rarefactions[1] J.L. PETERSON, D.S. CLARK, S.W. HAAN, D.E. HINKEL, L.P. MASSE, B.A. REMINGTON, L.J. SUTER, Lawrence Livermore National Laboratory — Defects on inertial confinement fusion capsule surfaces can seed hydrodynamic instabilities, the growth of which can cause the mixing of fuel and ablator material and adversely affect capsule performance. Shocks and rarefactions during the early period of National Ignition Facility (NIF) implosions alter this mixing by determining whether perturbations will grow inward or outward at peak implosion velocity and final compression. Shocks can transport exterior defects to inner capsule surfaces and seed Richtmyer-Meshkov growth, while rarefactions can bring interior defects to outer surfaces such as the ablation front. These processes collectively determine the final seed on the ablation surface that grows exponentially during the main acceleration phase via the Rayleigh-Taylor instability. Through hydrodynamic simulations of multi-shock ignition designs and experiments, we examine how shocks, rarefactions, and capsule surfaces collectively alter the mixing of NIF capsules.

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