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The effects of early time laser drive on NIF hydrodynamic growth J.L. PETERSON, D.S. CLARK, L.J. SUTER, LLNL, L.P. MASSE, CEA — 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. In particular, the strength of the first shock, launched at the beginning of the laser pulse, plays an important role in determining Richtmyer-Meshkov (RM) oscillations on the ablation front. These surface oscillations can couple to the capsule interior through subsequent shocks before experiencing Rayleigh-Taylor (RT) growth. We compare radiation hydrodynamic simulations of NIF implosions to analytic theories of the ablative RM and RT instabilities to illustrate how early time laser strength can alter peak velocity growth.

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