Abstract Submitted
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Computational investigation of reshock strength in hydrodynamic instability growth at the National Ignition Facility[1] JASON BENDER, KUMAR RAMAN, CHANNING HUNTINGTON, SABRINA NAGEL, BRANDON MORGAN, SHON PRISBREY, STEPHAN MACLAREN, Lawrence Livermore Natl Lab — Experiments at the National Ignition Facility (NIF) are studying Richtmyer-Meshkov and Rayleigh-Taylor hydrodynamic instabilities in multiply-shocked plasmas. Targets feature two different-density fluids with a multimode initial perturbation at the interface, which is struck by two X-ray-driven shock waves. Here we discuss computational hydrodynamics simulations investigating the effect of second-shock ("reshock") strength on instability growth, and how these simulations are informing target design for the ongoing experimental campaign. A Reynolds-Averaged Navier Stokes (RANS) model was used to predict motion of the spike and bubble fronts and the mixing-layer width. In addition to reshock strength, the reshock ablator thickness and the total length of the target were varied; all three parameters were found to be important for target design, particularly for ameliorating undesirable reflected shocks. The RANS data are compared to theoretical models that predict multimode instability growth proportional to the shock-induced change in interface velocity, and to currently-available data from the NIF experiments.

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