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Three- and Two- Dimensional Simulations of Re-shock Experiments at High Energy Densities at the National Ignition Facility[1] PING WANG, KUMAR RAMAN, STEPHAN MACLAREN, CHANNING HUNTINGTON, SABRINA NAGEL, LLNL — We present simulations of recent high-energy-density (HED) re-shock experiments on the National Ignition Facility (NIF). The experiments study the Rayleigh-Taylor (RT) and Richtmyer-Meshkov (RM) instability growth that occurs after successive shocks transit a sinusoidally-perturbed interface between materials of different densities. The shock tube is driven at one or both ends using indirect-drive laser cavities or hohlraums. X-ray area-backlit imaging is used to visualize the growth at different times. Our simulations are done with the three-dimensional, radiation hydrodynamics code ARES, developed at LLNL. We show the instabilitygrowth rate, inferred from the experimental radiographs, agrees well with our 2D and 3D simulations. We also discuss some 3D geometrical effects, suggested by our simulations, which could deteriorate the images at late times, unless properly accounted for in the experiment design.

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