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Design and simulation of high-energy-density shear experiments on OMEGA and the NIF[1] F.W. DOSS, B. DEVOLDER, C. DI STEFANO, K.A. FLIPPO, J.L. KLINE, L. KOT, E.N. LOOMIS, E.C. MERRITT, T.S. PERRY, Los Alamos National Laboratory, S.A. MACLAREN, P. WANG, Y.K. ZHOU, Lawrence Livermore National Laboratory — High-energy-density shear experiments have been performed by LANL at the OMEGA Laser Facility and National Ignition Facility (NIF). The experiments have been simulated using the LANL radiation-hydrocode RAGE and have been used to assess turbulence models' ability to function in the high-energy-density, inertial-fusion-relevant regime. Beginning with the basic configuration of two counter-oriented shock-driven flows of > 100 km/s, which initiate a strong shear instability across an initially solid density, 20 micron thick Al plate, variations of the experiment have been performed and are studied. These variations have included increasing the fluid density (by modifying the metal plate material from Al to Ti), imposing sinusoidal perturbations on the plate, and directly modifying the plate's intrinsic surface roughness. In addition to examining the shear-induced mixing, the simulations reveal other physics, such as how the interaction of our indirect-drive halfraums with a mated shock tube's ablator impedes a stagnation-driven shock.

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