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Subsonic and Supersonic shear flows in laser driven high-energy-density plasmas[1] E.C. HARDING, R.P. DRAKE, R.S. GILLESPIE, M.J. GROSSKOPF, C.C. KURANZ, A. VISCO, J.R. DITMAR, University of Michigan, Y. AGLITSKIY, J.L. WEAVER, A.L. VELIKOVICH, Naval Research Lab, O.A. HURRICANE, J.F. HANSEN, B.A. REMINGTON, H.F. ROBEY, M.J. BONO, Livermore National Lab, T. PLEWA, Florida State University — Shear flows arise in many high-energy-density (HED) and astrophysical systems, yet few laboratory experiments have been carried out to study their evolution in these extreme environments. Fundamentally, shear flows can initiate mixing via the Kelvin-Helmholtz (KH) instability and may eventually drive a transition to turbulence. We present two dedicated shear flow experiments that created subsonic and supersonic shear layers in HED plasmas. In the subsonic case the Omega laser was used to drive a shock wave along a rippled plastic interface, which subsequently rolled-upped into large KH vortices. In the supersonic shear experiment the Nike laser was used to drive Al plasma across a low-density foam surface also seeded with a ripple. Unlike the subsonic case, detached shocks developed around the ripples in response to the supersonic Al flow.

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