Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

The effects of sinusoidal initial conditions on finite-thickness, HED shear flows CARLOS DI STEFANO, ELIZABETH MERRITT, FORREST DOSS, TIFFANY DESJARDINS, KIRK FLIPPO, JOHN KLINE, ERIC LOOMIS, ALEX RASMUS, Los Alamos National Laboratory — Hydrodynamic shear instability plays a role in any system in which shear flow across materials can be found, including in high-energy-density examples such as fusion plasmas and many astrophysical systems. In this work we describe experiments, performed on the OMEGA laser, exploring shear instability through the use of carefully-controlled, single-mode initial conditions. A novel aspect of these experiments is that they employ counter-propagating shocks separated by a collimating layer. This produces a region of shear flow in which the pressure is balanced across flow, simplifying theoretical analysis and modeling. We discuss two interesting behaviors seen in these experiments. First, at early times, radiographs show the expansion of the collimator and the spectral evolution of the initial perturbation features from laser-drive heating of the material. The evolved features then couple to the primary shear instability we seek to probe. Second, at late times, we observe the persistence of a coherent long-wavelength mode in the mixing layer, driven by the imposed surface perturbation, which resonates with and the length scale introduced by the finite thickness of the collimator.

Carlos Di Stefano
Los Alamos National Laboratory

Date submitted: 15 Jul 2016 Electronic form version 1.4