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Establishing the Transition to Turbulence in HED Shear Experiments on the NIF[1] KIRK FLIPPO, F.W. DOSS, J.L. KLINE, L. KOT, T.S. PERRY, B. DEVOLDER, T.J. MURPHY, E.N. LOOMIS, E.C. MERRITT, D.W. SCHMIDT, D. CAPELLI, T. CARDENAS, R.B. RANDOLPH, F. FIERRO, G. RIVERA, Los Alamos National Laboratory, C.M. HUNTINGTON, S.R. NAGEL, S.A. MACLAREN, Lawrence Livermore National Laboratory — We report on hydrodynamic experiments performed at the NIF to investigate turbulent mixing in a High Energy Density (HED) régime using the LANL Shock/Shear platform. We investigate turbulence-driven mix from a counter-propagating shear-flow induced Kelvin- Helmholtz instability. Such flows may be present in an ICF capsule that has low-mode asymmetries and bulk mixing of the shell into the fuel. In the NIF LANL Shear experiment two shocks are generated at either end of cylinder, inside which CH foams act as a light fluid and the evolution of a tracer layer (a "heavy fluid") in the center plane is imaged using the Big Area Backlighter (BABL), a large area x-ray backlighter, developed for this project. Edge views of the tracer layer are studied to quantify growth of the mix layer into the foam. Additionally, plan views (90-degrees to the edge view) are imaged to look at the complex hydrodynamic behavior of the foil, revealing coherent structures like rollers and wigglers similar to those seen in dye marker pure fluid shear experiments, features that can be made to evolve quickly into a state of randomness when the foil is roughened.

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Kirk Flippo
Los Alamos National Laboratory

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