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Diagnosing Turbulent Shear in HED Experiments on NIF[1] K.A. FLIPPO, J.L. KLINE, F.W. DOSS, T.S. PERRY, B. DEVOLDER, T.J. MURPHY, E.C. MERRITT, I.A. TREGILLIS, E.N. LOOMIS, D. SCHMIDT, D. CAPELLI, Los Alamos National Laboratory, S.P. REGAN, LLE, University of Rochester, M.A. BARRIOS, C.M. HUNTINGTON, S.A. MACLAREN, Lawrence Livermore National Laboratory — We report on experiments planned for and performed at the NIF to investigate turbulent mix in and HED régime using a platform scaled from the Omega laser facility. We are investigating turbulence-driven mix from the shear induced Kelvin-Helmholtz instability, like those experienced in an ICF capsule with instabilities present. Two shocks are generated at either end of cylinder, inside CH foams act as a light fluid and the evolution of an Al tracer layer heavy fluid in the center plane is observed using the Big Area Backlighter (BABL), an especially large area backlighter developed for this project. Simulations of the BABL were carried out to optimize spatial profile. Another backlighter, the Long Duration Backlighter (LDBL) a variation of the BABL has also been developed and shot on NIF. The LDBL has been tuned spatially and temporally to emit x-rays in a very flat profile over a 7 ns time frame. Comparison of this data with simulations using the Besnard-Harlow-Rauenzahn (BHR) model is used. BHR is intended for turbulent transport in fluids with large density variations and has the ability to improve our predictive capability of mix in ICF experiments.

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Kirk Flippo
Los Alamos National Laboratory

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