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Progress Toward Kelvin-Helmholtz instabilities in a High-Energy-Density Plasma on the Nike Laser[1] E.C. HARDING, R.P. DRAKE, U. of Michigan, Y. AGLITSKIY, NRL Washington, DC, V.V. DWARKADAS, U. of Chicago, R.S. GILLESPIE, M.J. GROSSKOPF, C.M. HUNTINGTON, N. GJECI, D.A. CAMPBELL, D.C. MARION, U. of Michigan — In the realm of high-energy-density (HED) plasmas, there exist three primary hydrodynamic instabilities: Rayleigh-Taylor (RT), Richtmyer-Meshkov (RM), and Kelvin-Helmholtz (KH). Although the RT and the RM instabilities have been observed in the laboratory, no experiment to our knowledge has cleanly diagnosed the KH instability. While the RT instability results from the acceleration of a more dense fluid into a less dense fluid and the RM instability is due to shock deposited vorticity onto an interface, the KH instability is driven by a lifting force generated by velocity shear at a perturbed fluid interface. Understanding the KH instability mechanism in HED plasmas will provide essential insight into detailed RT-spike development, mass stripping, many astrophysical processes, as well as laying the groundwork for future transition to turbulence experiments. We present 2D simulations and data from our initial attempts to create a pure KH system using the Nike laser at the Naval Research Laboratory.

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