Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Laboratory high density high Mach number plasmas to study particle acceleration relevant to astrophysical collisionless shocks[1] HYE-SOOK PARK, D. HIGGINSON, B. POLLOCK, B. REMINGTON, J. ROSS, D. RYUTOV, G. SWADLING, Lawrence Livermore Natl Lab, F. FIUZA, A. GRASSI, SLAC, C. LI, R. PETRASSO, MIT, H. RINDERKNECHT, LLE, A. SPITKOVSKY, Princeton University — High velocity, low density, interpenetrating plasma flows are studied on the Omega and National Ignition Facility (NIF) lasers. These interpenetrating flows exhibited strong filamentation via the Weibel instability, which in turn generated microscale magnetic fields that were observed with proton radiography and optical Thomson scattering [1]. On the (NIF), the interpenetrating plasmas extended over much larger time intervals and interaction volumes. Under these conditions on NIF, we observed the evidence of collisionless shock formation, as demonstrated by an abrupt increase in density, with significant increase in temperature [2]. In addition, the electron spectrometer observes non-thermal high-energy enhancement of electron spectrum. This paper will present the recent results from Omega and NIF. [1] C. M. Huntington et al., Nature Physics, 11, 173 (2015). [2] F. Fiuza et al., in preparation (2019).

[1]This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Hye-Sook Park
Lawrence Livermore Natl Lab

Date submitted: 09 Aug 2019 Electronic form version 1.4