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HYDRA Simulations Relevant to Collisionless Shock Experiments to be Performed at NIF CHRISTOPHER PLECHATY, CHANNING HUNTINGTON, FREDERICO FIUZA, DMITRI RYUTOV, HYE-SOOK PARK, STEVEN ROSS, Lawrence Livermore National Laboratory, RADU PRESURA, University of Nevada, Reno, BRUCE REMINGTON, Lawrence Livermore National Laboratory — Collisionless shocks are ubiquitous in the universe, and occur when the thickness of the shock is much smaller than the Coulomb collision mean free path. In astrophysical systems, collisionless shocks lead to the generation of magnetic fields, which are thought to play an important role in several different phenomena, such as particle acceleration, and the structuring of supernova remnants. The development and evolution of these self-generated magnetic fields is not entirely understood. To investigate the microphysics which plays a role in collisionless shock formation and magnetic field generation in the laboratory, experiments will be performed at the National Ignition Facility. In these experiments, two opposing polyethylene (CH2) targets will be each irradiated with $\sim 10^{16}$ W/cm^2 to produce counter-streaming flows. In preparation for these experiments, in this work we model the plasma flow in the context of radiation hydrodynamics, by employing the Arbitrary Lagrange-Eulerian (ALE) radiation hydrodynamics code HYDRA [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.

[1] M. Marinak, et al., POP 8, 2275 (2001).

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