Radiation-Hydrodynamic Simulation of Experiments With Intense Lasers Generating Collisionless Interpenetrating Plasmas

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March 22, 2012

Abstract

Collisionless shocks, shocks generated by plasma wave interactions in regions where the collisional mean-free-path for particles is long

compared to the length scale for instabilities that generate magnetic fields, are found ubiquitously in astrophysics. Experiments whose goal is to investigate the production and growth of magnetic fields in collisionless shocks in laboratory-scale systems are being carried out on intense lasers, several of which are measuring the plasma properties and magnetic field generation in counter-streaming, collisionless flows generated by laser ablation. This poster reports radiation-hydrodynamic simulations using the CRASH code to model the ablative flow of plasma generated in order to assess potential designs, as well as infer properties of collected data from previous experiments.

This work is funded by the Predictive Sciences Academic Alliances Program in NNSA-ASC via grant DEFC52- 08NA28616, by the NNSA-DS and SC-OFES Joint Program in High-Energy-Density Laboratory Plasmas, grant number DE-FG52-09NA29548, and by the National Laser User Facility Program, grant number DE-NA0000850.