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Magnetic reconnection in high-energy-density plasmas in the presence of an external magnetic field W. FOX, A. BHATTACHARJEE, University of New Hampshire, G. FIKSEL, P. NILSON, S. HU, P.-Y. CHANG, D. BARNAK, R. BETTI, Lab for Laser Energetics, University of Rochester — Magnetic reconnection has recently been observed and studied in high-energy-density, laser-produced plasmas. These experiments are interesting both for obtaining fundamental data on reconnection, and may also be relevant for inertial fusion, as this magnetic reconnection geometry, with multiple, colliding, magnetized plasma bubbles, occurs naturally inside ICF hohlraums. We present initial results of experiments conducted on the OMEGA EP facility on magnetic reconnection between colliding, magnetized blowoff plasmas. While in previous experiments the magnetic fields were self-generated in the plasma by the Biermann battery effect, in these experiments the seed magnetic field is generated by pulsing current through a pair of external foils using the MIFEDS current generator (Magneto-Inertial Fusion Electrical Discharge System) developed at LLE. Time-resolved images of the magnetic fields and plasma dynamics are obtained from proton radiography and x-ray self-emission, respectively. We present initial results of the experiments, including comparison to "null" experiments with zero MIFEDS magnetic field, and associated modeling using the radiation-hydro code DRACO and the particle-in-cell code PSC.

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