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Experimental study of the dynamics of expanding magnetized HED plasmas SOPHIA MALKO, Princeton Plasma Physics Laboratory, DEREK SCHAEFFER, Dept. of Astrophysical Sciences, Princeton University, WILL FOX, Princeton Plasma Physics Laboratory, GENNADY FIKSEL, Center for Ultrafast Optical Science, U. Michigan, AMITAVA BHATTACHARJEE, Princeton Plasma Physics Laboratory, ANATOLY SPITKOVSKY, Dept. of Astrophysical Sciences, Princeton University, PATRICK KNAPP, Sandia National Laboratory, JONATHAN DAVIES, Laboratory for Laser Energetics, U. Rochester — Magnetic field dynamics and its coupling with HED plasmas play a key role in magnetized fusion schemes, magnetic reconnection, and laboratory astrophysics experiments. The understanding of magnetic field transport properties in HED plasma is thus a primary goal for these applications. We present recent experiments designed to study cross-field transport in magnetized HED plasmas at the OMEGA laser facility, generated by expanding a laser-produced plasma into a background magnetic field and observing the expansion and collapse dynamics of the associated diamagnetic bubble. A laser-ablated plasma expanded into a pre-existing magnetic field powered by MIFEDS. The evolution of the 2D global topology of the magnetic fields was imaged with proton radiography by 3 and 15 MeV protons, acquired at different plasma expansion times. The interactions were explored for different laser energies and target orientations relative to initial field. The corresponding local electron temperature and density were measured with 2ω Thomson scattering.

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