Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Precision Mapping of Laser-Driven Magnetic Fields and Their Evolution in High-Energy-Density Plasmas* LAN GAO, Princeton Plasma Physics Laboratory, P. NILSON, I. IGUMENSHCHEV, Laboratory for Laser Energetics, M. G. HAINES[1], Imperial College, D. H. FROULA, R. BETTI, Laboratory for Laser Energetics, D. D. MEYERHOFER, Los Alamos National Laboratory — The magnetic fields generated at the surface of a laser-irradiated planar solid target are mapped using ultrafast proton radiography. Thick (50 μm) plastic foils are irradiated with 4-kJ, 2.5-ns laser pulses focused to an intensity of 4 x 10^{14} W/cm^2. The data show magnetic fields concentrated at the edge of the laser-focal region, well within the expanding coronal plasma. The magnetic-field spatial distribution is tracked and shows good agreement with 2D resistive magnetohydrodynamic simulations using the code DRACO when the Biermann battery source, fluid and Nernst advection, resistive magnetic diffusion, and Righi-Leduc heat flow are included. The work provides significant insight into the generation and transport of Biermann fields in laser-produced plasmas, particularly those used in laser-driven magnetic reconnection and laboratory astrophysics experiments. *L. Gao *et al.*, Phy. Rev. Lett. 114, 215003 (2015)

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Date submitted: 15 Jul 2016 Electronic form version 1.4