Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Magnetic Field Generation by the Nonlinear Rayleigh–Taylor Instability in Laser-Driven Planar Plastic Targets L. GAO, I.V. IGUMENSHCHEV, S.X. HU, C. STOECKL, D.H. FROULA, Laboratory for Laser Energetics, U. of Rochester, P.M. NILSON, J.R. DAVIES, R. BETTI, D.D. MEYERHOFER, Laboratory for Laser Energetics and Fusion Science Center for Extreme States of Matter, U. of Rochester, M.G. HAINES, Imperial College — Magnetic field generation during the nonlinear phase of the Rayleigh–Taylor (RT) instability in an ablatively driven plasma using ultrafast laser-driven proton radiography has been measured. Thin plastic foils were irradiated with ~4-kJ, 2.5-ns laser pulses focused to an intensity of ~10^{14} W/cm^2 on the OMEGA EP Laser System. Target modulations were seeded by laser nonuniformities and amplified during target acceleration by the RT instability. The experimental data show the hydrodynamic evolution of the target and MG-level magnetic fields generated in the broken foil. The experimental data are in good agreement with predictions from 2-D magnetohydrodynamic simulations. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

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Date submitted: 10 Jul 2012

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