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Measuring E and B fields in Laser-Produced Plasmas through Monoenergetic Proton Radiography C.K. LI, F.H. SÉGUIN, J.A. FRENJE, J.R. RYGG, R.D. PETRASSO, MIT, R.P.J. TOWN, P.A. AMENDT, S.P. HATCHETT, D.G. HICKS, O.L. LANDEN, A.J. MACKINNON, P.K. PATEL, LLNL, V.A. SMALYUK, T.C. SANGSTER, J.P. KNAUER, UR-LLE — Electromagnetic (E/B) fields generated by the interaction with plasmas of long-pulse, low-intensity laser beams relevant to inertial confinement fusion have been measured for the first time using novel monoenergetic proton radiography methods. High-resolution, time gated radiography images of a plastic foil driven by a 10^{14} W/cm^2 laser implied B fields of $\sim$ 0.5 MG and E fields of $\sim 1.5\times10^8$ V/m. Complete simulations of these experiments with LASNEX+LSP have been performed and are quantitatively consistent with the data both for field strengths and for spatial distributions; this is the first direct experimental test of the B-field generation package in LASNEX. The experiments also demonstrated that laser phase plates substantially reduce small-scale chaotic field structure. Future experiments designed for characterizing the field formation and evolution due to the interactions of multiple laser beams with a foil will be discussed. The work described here was performed in part at the LLE National Laser User's Facility (NLUF), and was supported in part by US DOE (Grant No. DE-FG03-03SF22691), LLNL (subcontract Grant No. B504974), and LLE (subcontract Grant No. 412160-001G).

Richard Petrasso
MIT Plasma Science and Fusion Center

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