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Using Monoenergetic Proton Radiography to Probe Magnetic Reconnection of Laser-Generated Plasma Bubbles M. ROSENBERG, C. LI, F.H. SEGUIN, J. FRENJE, M. MANUEL, R. PETRASSO, MIT, C. STOECKL, V. GLEBOV, LLE, J. KILKENNY, A. NIKROO, GA — The magnetic topology changes due to reconnection of laser-generated magnetic fields, which can affect energy transport inside hohlraums and around inertial confinement fusion (ICF) capsule implosions. To probe and better understand this effect, a series of experiments were conducted in which the interaction of azimuthal magnetic fields surrounding laser-produced plasma bubbles was imaged using face-on monoenergetic proton radiography. The timing of the interaction beams with respect to each other and to the backlighter was varied to provide snapshots of the reconnection both during and after the laser-foil interaction. Images and quantitative field-mapping demonstrate a change in magnetic topology during the bubble interaction. Future work will entail side-on radiography of interacting plasma bubbles to probe for Hall fields associated with fast magnetic reconnection. This work was performed at the LLE NLUF, and was supported in part by the US DOE, LLNL, and LLE.

F. Seguin
MIT

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