Abstract Submitted
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Magnetic Reconnection in Highly-Extended Current Sheets at the NIF[1] D.B. SCHAEFFER, Princeton University, Princeton Center for Heliophysics, W. FOX, PPPL, Princeton Center for Heliophysics, M. ROSENBERG, LLE, G. FIKSEL, U. Michigan, J. MATTEUCCI, Princeton University, Princeton Center for Heliophysics, H.-S. PARK, LLNL, A.F. BOTT, K.V. LEZHNIN, Princeton University, A. BHATTACHARJEE, Princeton University, Princeton Center for Heliophysics, D. KALANTAR, B.A. REMINGTON, LLNL, D. UZDENSKY, U. Colorado, C.K. LI, F.H. SÉGUIN, MIT, S.X. HU, LLE — We present results from experiments at the National Ignition Facility to study reconnection in large and highly-extended current sheets. Two highly-elongated plasma plumes were produced by tiling two rows of lasers, with magnetic fields generated in each plume by the Biermann battery effect. X-ray measurements provided estimates of local electron temperature and density scale length, which were also used to benchmark simulations. Detailed magnetic field observations, obtained from proton radiography using a DHe3 capsule implosion, reveal reconnection occurring in an extended, quasi-1D current sheet with large aspect ratio $\sim$100. The 1-D geometry allowed a rigorous and unique reconstruction of the magnetic field, which showed a reconnection current sheet that thinned down to a half-width close to the electron gyro-scale. Despite the large aspect ratio, a large fraction of the magnetic flux reconnected, suggesting fast reconnection supported by the non-gyrotropic electron pressure tensor.

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