Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Turbulent reconnection driven by kinetic instabilities in colliding laser-produced plasmas[1] GENNADY FIKSEL, University of Michigan, Ann Arbor, MI, W. FOX, PPPL, Princeton, NJ, S.X. HU, LLE, Rochester, NY, M. ROSENBERG, LLNL, Livermore, CA, D.B. SCHAEFFER, J. MATTEUCCI, A. BHATTACHARJEE, Princeton University, Princeton, NJ — Magnetic reconnection experiments are conducted in a low-collisionality regime at the OMEGA EP facility. Magnetic fields are generated in expanding plasmas by the Biermann battery effect. Collision of multiple plasma bubbles produces a magnetic reconnection current sheet and drives magnetic reconnection. A novel aspect of these experiments is that a gap is introduced between the targets lowering the plasma density at the reconnection layer, and allowing high resolution proton radiography. Proton radiography reveals, for the first time, a cascade of plasmoid instabilities from short wavelength to long wavelength. The initial short-wavelength tearing is strongly modified by plasma anisotropy driven by the counter-streaming flows forming the current sheet, and is a hybrid of Weibel and tearing instability. The results have implications for magnetic reconnection driven in low-collisionality, compressive systems such as planetary magnetospheres and the heliosheath. Results on particle energization during reconnection will be reported.

[1]This work is supported by the Department of Energy (DOE) through Grants No. DE-NA0002731 and No. DE-SC0016249

Gennady Fiksel
University of Michigan, Ann Arbor, MI

Date submitted: 14 Jul 2017 Electronic form version 1.4