Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Experimental measurement of ion distribution function during magnetic reconnection[1] C. SWANSON, M. YAMADA, H. JI, J. YOO, C.E. MYERS, J. JARA-ALMONTE, P. BOLGERT, Princeton Plasma Physics Laboratory, Princeton, NJ 08543 — The Magnetic Reconnection Experiment (MRX) investigates the process of magnetic reconnection in a laboratory setting. Efficient heating of electrons and ions has been detected and documented during fast reconnection. In order to explore acceleration of charged particles beyond their thermal speeds, seen in space satellite measurements and numerical kinetic simulations, a five-electrode retarding-field energy analyzer was developed to measure the electron and ion distributions in MRX. All electrodes are referenced to the plasma-facing aperture by capacitors to accommodate the dynamically varying plasma potential. An in-line isolation amplifier was placed into the probe shaft to avoid possible picking up electric noise. All electrodes but the collector are electroformed grids of nickel, of which the aperture and rejecter grids have sub-Debye-length spacing. A first version of this probe is designed to measure ions entering the probe aperture perpendicular to local magnetic field. Initial data will be presented and compared with the numerical predictions by kinetic simulations.

[1]This research is supported by DoE Contract Number DE-AC02-09CH11466 and by the Center for Magnetic Self-Organization (CMSO)

Charles Swanson
Princeton Plasma Physics Laboratory, Princeton, NJ 08543

Date submitted: 12 Jul 2013 Electronic form version 1.4