Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Experimental Observation of Energetic Electrons during Magnetic Island Merging BYUNGKEUN NA, JONGSOO YOO, JONATHAN JARA-ALMONTE, WILL FOX, MASAAKI YAMADA, HANTAO JI, Princeton Plasma Phys Laboratory — Non-thermal particles have been observed in space as a consequence of magnetic reconnection, but the exact acceleration mechanisms are not well understood. The energization of electrons during magnetic island merging is studied in the Magnetic Reconnection Experiment (MRX). A double-sided electron energy analyzer is developed to simultaneously measure the electron energy distribution in two directions, parallel and anti-parallel to the electron flow. The bias of the selector grid is swept from -30 to 0 V with respect to the floating potential within 1 μs, comparable to the Alfvén time of the typical MRX plasma. Energetic electrons are found inside the magnetic island after island merging is completed. The measured electron tail distribution is well modeled by a high temperature Maxwellian. In the parallel direction, the tail temperature ($\sim$ 28 eV) is found to be up to four times higher than the bulk temperature ($\sim$ 7 eV). In the anti-parallel direction, a negligible tail population is observed. The measured electron energy distribution is discussed in connection with possible electron acceleration mechanisms.

Byungkeun Na
Princeton Plasma Phys Laboratory

Date submitted: 24 Jul 2015 Electronic form version 1.4