Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Studies of electron energization during magnetic reconnection in a laboratory plasma[1] JONGSOO YOO, MASAAKI YAMADA, HANTAO JI, JONATHAN JARA-ALMONTE, BYUNGKEUN NA, CLAYTON E. MYERS, WILLIAM FOX, Princeton Plasma Physics Laboratory — Bulk electron heating and energetic electron generation during magnetic reconnection are studied in the Magnetic Reconnection Experiment (MRX). Analysis of the measured 2-D electron temperature profile shows that electrons are heated non-classically near the electron diffusion region. Electron heating is observed over the broad downstream region during anti-parallel reconnection without a significant density asymmetry across the current sheet. Classical Ohmic heating accounts for about 20% of the required heating power. When there is a strong density asymmetry across the current sheet, the electron temperature profile changes such that the electron temperature is highest near the low-density-side separatrix where strong density gradients and electromagnetic fluctuations in the lower hybrid frequency range are also observed. These laboratory measurements agree with space observations at the dayside magnetopause. Possible mechanisms for bulk electron heating are discussed. Recent diagnostic developments, including 2-D EUV imaging and electron energy analyzer, for measurements of energetic electron generation are presented.

[1]This work is supported by DOE Contract No. DE-AC0209CH11466 and NASA program for the MMS mission under the grant No. NNH11AQ45I.

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Date submitted: 10 Jul 2014 Electronic form version 1.4