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Study of energy transfer in the magnetic reconnection layer in the MRX laboratory plasma MASA AKI YAMADA, JONGSOO YOO, HANTAO JI, CLAYTON MYERS, JON JARAALMONTE, TIM THARP, PPPL, Princeton University — As the process of magnetic energy dissipation is key to magnetic reconnection, the MRX research focus has recently been shifted to a new phase: the study of the heating and acceleration of plasma particles. We have initiated a study of electron acceleration and heating characteristics while we continue the study of ion flows and heating at the diffusion region. In recent measurements of 2-D T_e profiles using triple Langmuir probes, we observe enhanced T_e at the exhaust of the reconnection layer. Likewise, with an improved Ion Dynamics Spectroscopy Probe (IDSP), we observe an acceleration and heating of ions at the exhaust of the reconnection layer. A strong potential well in the reconnection plane has also been measured in MRX. This observation is in general agreement with space observations¹ and simulations^{2,3} regarding the particle dynamics of the reconnection layer. By comparing our experimental data with simulations and analytical theory, we investigate the physics of particle heating.

¹J. Wygant et al., *JGR*, 110:A09206 (2005)

²P. Pritchett, *JGR (Space Phys.)*, 115:10208 (2010)

³J. Drake et al, *Astrophys. J.*, 700:L16-L20 (2009)

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