

Abstract Submitted
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Study of ion heating mechanisms during magnetic reconnection in MRX JONGSOO YOO, M. YAMADA, H. JI, S. DORFMAN, E. OZ, C. MYERS, T. THARP, E. LAWRENCE, PPPL — The mechanisms of energy dissipation during magnetic reconnection have been studied intensively. Previous research [1] indicates that ions are heated non-classically during magnetic reconnection in MRX [2]. However, it is not yet known which non-classical ion heating mechanisms are present. As a candidate for the mechanism, ion heating and acceleration by the in-plane electric field is investigated. A 4 channel Ion Doppler Spectroscopy Probe (IDSP) is used to measure radial profiles of ion temperature and radial ion flow velocity in a single plasma discharge. The radial in-plane electric field is calculated from floating potential measurements. Potential wells on the order of 10V, on top of the inductive electric field generated by the time varying toroidal field (TF) coil current, are observed. Since ions are unmagnetized around the diffusion region, they are expected to gain energy from the potential well as they approach the X point. To estimate the effect of the electron temperature on the floating potential, radial profiles of the electron temperature and floating potential are measured at the same time.

[1] S. C. Hsu *et al.*, *Phy. Rev. Lett.*, 84(17), 3859 (2000).

[2] M. Yamada *et al.*, *Phys. Plasmas*, 4, 1936 (1997).

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