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Ion energization during magnetic reconnection in the RFP[1] D.J. DEN HARTOG, R.M. MAGEE[2], S.T.A. KUMAR, A.F. ALMAGRI, B.E. CHAPMAN, G. FIKSEL[3], V.V. MIRNOV, M.D. NORNBERG, Univ of Wisconsin-Madison and CMSO, E.D. MEZONLIN, J.B. TITUS, Florida A & M Univ — In the MST RFP, ions are strongly heated to several times Te during impulsive magnetic reconnection events. Three new experimental observations may help distinguish among theoretical explanations. First, spatially localized spectroscopic measurements of impurity C^{+6} ions reveal that the thermal heating is anisotropic, with perpendicular Ti always increasing more than parallel Ti. Second, measurements of neutral particle energy spectra and neutron flux show the generation of a high-energy tail on the distribution function of the majority ions during reconnection events. Fast ion density is typically a few percent of thermal ion density, and the fast ions have a power-law energy spectrum. The fast ion acceleration mechanism may be distinct from the thermal heating mechanism, although both exhibit characteristics that are clearly dependent on plasma density. Third, spectroscopic measurements of various impurity ions (Al^{+1}, Al^{+2}, O^{+1}, O^{+2}, O^{+3} and N^{+2}) have been made in the MST edge plasma to investigate the charge and mass dependence of impurity ion heating.

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[2]Currently at West Virginia University.
[3]Currently at Laboratory for Laser Energetics, Rochester, NY.

Daniel Den Hartog
University of Wisconsin-Madison

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