EXPLORING THE VARIABILITY OF ION HEATING AT RECONNECTION EVENTS IN MST, M.S. Cartolano[1], D. Craig*[1], D.J. Den Hartog[2], S.T.A. Kumar[2], M.D. Nornberg[2], Wheaton College[1], Department of Physics, Wheaton, IL 60187, University of Wisconsin-Madison[2], Madison, WI 53706, darren.craig@wheaton.edu

The variability of ion heating for individual reconnection events in the Madison Symmetric Torus (MST) is correlated with key plasma parameters to give insight into the process of ion heating. Magnetic reconnection is a process that converts energy stored in the magnetic field in the plasma into ion thermal energy. The change in impurity ion temperature during several thousand reconnection events was analyzed for standard plasmas in MST. These changes in the ion temperature were then correlated with various plasma parameters to try to understand the variations in the amount of heating. Understanding possible causes of these variations may give insight into the heating mechanism for the ions. As expected, the change in ion temperature correlates strongly with the change in magnetic energy. Magnetic fluctuations in MST are thought to be responsible for driving reconnection, and larger amounts of ion heating do correspond to larger increases in the amplitudes of these magnetic fluctuations during the event. The strongest correlation is with the rate of change in the amplitude of magnetic fluctuations that are resonant in the edge of the plasma. Other anomalous behavior appears during reconnection, such as dynamo activity and electron thermal transport. When these activities are stronger, the amount of ion heating is also stronger. Finally, a toroidal asymmetry to the ion heating is examined as a possible cause for the variation in ion heating.

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