Abstract Submitted
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Ion heating due to reconnection and turbulence in SSX[1] M.R. BROWN, T. GRAY, B.S. GERBER-SIFF, K.R. LABE, E.H. DEWEY, L.D. BOOKMAN, C.D. COTHRAN, M.J. SCHAFFER, Swarthmore College — Ion heating is measured in the SSX device with a high resolution ion Doppler spectrometer. The SSX IDS instrument measures the width and Doppler shift of either the nascent C_{III} impurity 229.7 nm line or a doped He_{II} impurity 468.6 nm line to determine the temperature and line-averaged flow velocity. The velocity resolution of the instrument is ≤ 5 km/s. There is enough signal to resolve the full line within an MHD dynamical time (about 1 μs in SSX). Peak ion temperatures of 80 eV (C_{III}) have been recorded during reconnection events as well as flows up to 40 km/s. Spheromak merging in a new oblate flux conserver ($R = 0.25$ $m, L = 0.4$ m) has resulted in some stable FRC configurations but often results in excitation of several unstable MHD modes. We plan to study the effect of reconnection and turbulence on ion heating for various ion masses (He, C, Xe). Preliminary results indicate that the temperature of helium and carbon ions is comparable but systematic studies are planned. Results from a new ion energy analyzer as well as a high purity gas delivery and mixing system will be presented.

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