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Ion heating due to reconnection and turbulence in SSX[1] T.G. GRAY, M.R. BROWN, 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 $\leq 5\ km/s$. There is enough signal to resolve the full line within an MHD dynamical time (about 1 μs in SSX). Spheromak merging in a new oblate flux conserver ($R = 0.25\ m, L = 0.4\ m$) has resulted in some stable configurations but often results in excitation of several unstable MHD modes. After reconnection and instability, we measure a period of ion heating with peak temperatures for carbon $T_C = 40\ eV$ but for helium only $T_{He} = 20\ eV$. Our results are consistent with temperature increasing with ion mass but only scaling like $\sqrt{M_i/m_p}$. We plan a more comprehensive study of the effect of reconnection and turbulence on ion heating for various ion masses (He, C, Xe). A new high purity gas delivery and mixing system is under construction. Results of ion heating with other ions will be presented.

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