Abstract Submitted
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Temperature structures in MST helical core plasmas[1] STEFANO MUNARETTO, MARK D. NORNBERG, BRETT E. CHAPMAN, ELI PARKE, DANIEL J. DEN HARTOG, Department of Physics and Center for Magnetic Self-Organization in Laboratory and Astrophysical Plasmas, University of Wisconsin-Madison, Madison, WI — The RFP configuration is dominated by several MHD tearing modes with poloidal periodicity $m = 1$. These modes are resonant at different radii within the plasma core, giving rise to stochastization of the magnetic field. Increasing the plasma current (and consequently the Lundquist number S) tends to channel the perturbation energy to the innermost resonant tearing mode, leaving the other modes with negligible amplitude (QSH state). A further topological transition takes place when the main magnetic axis and island X point vanish leaving the O-point as the new helical magnetic axis (SHAx state). Previous work on RFXmod has shown the formation of a thermal structure that becomes wider during the transition between QSH to SHAx states. In MST we have performed experiments at similar $S$to RFXmod plasmas. Ion Doppler spectroscopy and Thomson scattering measurements reveal the presence of in-outboard asymmetries in the impurity ion temperature radial profiles and the formation of a hot electron region. The changes in both the temperature radial profiles are associated with the transitions to non-axisymmetric equilibria. Further analysis will be performed to characterize the thermal structures also through charge-exchange spectroscopy measurements of ion temperature.

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