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Effect of Resonant Magnetic Perturbations on 3D equilibria in the MST RFP STEFANO MUNARETTO, B.E. CHAPMAN, A.F. ALMAGRI, J. BOGUSKI, Univ of Wisconsin, Madison, WI, USA, M. CIANCIOSA, The Oak Ridge National Laboratory, Oak Ridge, TN, USA, D.J. DEN HARTOG, A.M. DUBOIS, J.A. GOETZ, Univ of Wisconsin, Madison, WI, USA, J.D. HANSON, Physics Department, Auburn University, Auburn, AL, USA, D.J. HOLLY, K.J. MCCOLLAM, T. NISHIZAWA, M.D. NORNBERG, R.J. NORVAL, J.S. SARFF, Univ of Wisconsin, Madison, WI, USA — The orientation of 3D equilibria in the MST RFP can now be controlled with application of a resonant magnetic perturbation (RMP). This control has led to improved diagnosis revealing enhancements in both the central electron temperature and density. Coupled to a recent advance in the V3FIT code, reconstructions of the 3D equilibria have also been improved. The RMP also inhibits generation of high-energy (>20keV) electrons, which are otherwise produced with the 3D state. This state occurs when the normally broad spectrum of core-resonant m = 1 tearing modes condenses, with the innermost resonant mode growing to large amplitude $\sim$ 8% of the axisymmetric field. As the dominant mode grows, eddy current in MST's conducting shell slows the mode's rotation, eventually leading to locking of the 3D structure. An m = 1 RMP with an amplitude br/B $\sim$ 10% can force the 3D structure into any desired orientation relative to MST's diagnostics. Reduced stochasticity and improved confinement of high-energy electrons during the formations of the 3D structure are observed. This work is supported by the US DOE.

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