Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Suppression of runaway electrons with a resonant magnetic perturbation in MST tokamak plasmas.[1] STEFANO MUNARETTO, ORAU, B.E. CHAPMAN, A.F. ALMAGRI, B.S. CORNILLE, A.M. DUBOIS, J.A. GOETZ, K.J. MCCOLLAM, C.R. SOVINEC, University of Wisconsin-Madison — Runaway electrons generated in MST tokamak plasmas are now being probed with resonant magnetic perturbations (RMP's). An RMP with m=3 strongly suppresses the runaway electrons. Initial modeling of these plasmas with NIMROD shows the degradation of flux surfaces with an m=3 RMP, which may account for the runaway electron suppression. These MST tokamak plasmas have Bt=0.14 T, Ip =50kA, and q(a)=2.2, with a bulk electron density and temperature of 5x1017 m-3 and 150 eV. Runaway electrons are detected via x-ray emission. The RMP is produced by a poloidal array of 32 saddle coils at the narrow vertical insulated cut in MST's thick conducting shell. Each RMP has a single m but a broad n spectrum. A sufficiently strong m=3 RMP completely suppresses the runaway electrons, while a comparable m=1 RMP has little effect. The impact of the RMP's on the magnetic topology of these plasmas is being studied with the nonlinear MHD code, NIMROD. With an m=3 RMP, stochasticity is introduced in the outer third of the plasma. No such change is observed with the m=1 RMP. NIMROD also predicts regularly occurring sawtooth oscillations with a period comparable to MHD activity observed in the experiment.

[1]Work supported by USDOE.

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Date submitted: 15 Jul 2016 Electronic form version 1.4