Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Oscillating-Field Current-Drive Experiments on MST[1] K.J. MCCOLLAM, J.K. ANDERSON, F. EBRAHIMI, D.J. DEN HARTOG, J.A. REUSCH, J.S. SARFF, H.D. STEPHENS, D.R. STONE, UW-Madison, D.L. BROWER, W.X. DING, UCLA — Oscillating-field current drive (OFCD) is a proposed method of efficient, steady-state current drive in which applied AC poloidal and toroidal loop voltages interact with magnetic relaxation to produce a DC plasma current. OFCD at a moderate power level is added to Ohmically sustained reversed-field pinch plasmas in the MST device, and its effects on equilibrium profile evolution, global magnetic fluctuations, and energy balance are examined using a variety of measurements. For the optimal phase between the two applied AC voltages, the cycle-average plasma current increases by up to 10% with Ohmic efficiency, while both the energy confinement time τ_{E} and normalized thermal pressure β slightly improve, consistent with a reduction in magnetic fluctuation amplitudes. Nonlinear, 3D, resistive-MHD simulations reproduce the main experimental features, especially the phase dependence of the added current. Internal fluctuation measurements are underway to examine changes in the relaxation dynamics. A new programmable power supply is to be used in optimizing OFCD performance with longer pulses, more power, and improved waveform control, including nonsinusoidal OFCD.

[1]This work is supported by the US DOE.

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Date submitted: 15 Jul 2010 Electronic form version 1.4