Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Magnetic Relaxation with Oscillating Field Current Drive on MST D.R. STONE, A.F. ALMAGRI, G. FIKSEL, K.J. MCCOLLAM, J.S. SARFF, UW-Madison, D.L. BROWER, W.X. DING, L. LIN, UCLA — In oscillating field current drive (OFCD), poloidal and toroidal ac magnetic fields with the same frequency but different phases are inductively applied to the plasma to drive dc plasma current through magnetic relaxation. Measurements of the dynamo mechanisms associated with magnetic relaxation are conducted during OFCD for a variety of phases both to better understand the phase-dependent relaxation dynamics and to aid in optimizing OFCD performance. The fluctuation-induced dynamo $\left\langle \tilde{v}_e \times \tilde{b} \right\rangle_{||}$ and its constituent Hall dynamo $\frac{\left\langle \tilde{j} \times \tilde{b} \right\rangle_{||}}{ne}$ are measured in the edge using insertable probes. The fluctuation-induced magnetic helicity flux $< \tilde{\phi} \tilde{B}_r >$ is also measured. All three are enhanced during OFCD by a factor of two relative to standard RFP operation and, as expected, the induced transport of helicity is in the inward radial direction. Probes used include a secondary-emission capacitive probe that was developed to measure electric fields and tested by comparison to Langmuir probe measurements. Measurement of the Hall $\frac{<\tilde{j} \times \tilde{b}>}{ne}$ dynamo in the core using far-infrared interferometry-polarimetry is in progress as well. This work is supported by the US DOE.

D.R. Stone
UW-Madison

Date submitted: 15 Jul 2011 Electronic form version 1.4