Fluctuation-Induced Helicity Transport in Oscillating Field Current Drive Tests on MST D.R. STONE, A. ALMAGRI, G. FIKSEL, K.J. MCCOLLAM, M.C. MILLER, J.S. SARFF, UW-Madison — In oscillating field current drive (OFCD), poloidal and toroidal frequency-matched ac magnetic fields are inductively applied to the plasma in order to drive dc plasma current. The fields interact to inject net magnetic helicity into the plasma depending on their phase difference. Measurements of helicity balance for OFCD tests in MST are done both to better understand the role of helicity in plasma dynamics and to aid in optimizing OFCD performance. The equilibrium helicity injection rate is roughly balanced by equilibrium helicity dissipation, but helicity transport or dissipation due to fluctuating quantities may be needed for precise balance. Helicity transport due to fluctuations has been measured in MST’s edge with and without OFCD using a radial-magnetic-field probe combined with a triple Langmuir probe to measure plasma potential. Helicity transport over the course of the OFCD cycle is measured for different OFCD frequencies and phases. Helicity transport is also compared for sawtooth crashes with and without OFCD. This work was supported by the US DOE.

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Date submitted: 20 Jul 2008