Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Resistive Wall Mode Study in a Line-tied Screw Pinch C. PAZ-SOLDAN, W.F. BERGERSON, D. HANNUM, R. KENDRICH, C.B. FOREST, University of Wisconsin-Madison — The resistive wall mode (RWM) is an active area of study for magnetic fusion devices, with most facilities employing active magnetic feedback or bulk plasma rotation for its mitigation, though other methods are theoretically possible. An experiment has been constructed to test the hypothesis that the RWM can be stabilized by two differentially rotating walls. The conducting walls allow stabilizing image currents to form, with the skin effect allowing the moving wall to appear as an ideal conductor. The RWM can rotate with (or lock to) either the stationary or the moving wall, but not both simultaneously. Recent results from the Rotating Wall Machine (UW-RWM) will highlight engineering design of the rotating wall and static-wall physics. The nominal RWM was altered by a mu-metal boundary condition to produce the ferritic wall mode (FWM), which simulates the ferritic steels planned for future device designs. The growth time of these modes is found to be 10x larger than expected by current theories. The rotating wall will reach 6000 rpm, necessitating a unique design subject to the demands of a magnetic confinement device. The UW-RWM studies the RWM through 120 radial, axial, and azimuthal flux loops in screw pinch geometry 1m long and 20cm across. Discharges up to 7kA can be maintained at flat top for 20ms or ramped by a pulse width modulation scheme.

Carlos Paz-Soldan
University of Wisconsin-Madison

Date submitted: 18 Jul 2008 Electronic form version 1.4