Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Onset and saturation of the kink instability in a current carrying, line-tied plasma surrounded by a conducting shell WILLIAM BERGERSON, C. FOREST, G. FIKSEL, D. HANNUM, R. KENDRICK, J. SARFF, S. STAMBLER, University of Wisconsin — The MHD stability properties of a line-tied plasma have been studied in a linear screw pinch device. An internal kink instability is observed to grow when the safety factor $q = \frac{4\pi^2 r^2 B_z}{\mu_0 I_p(r) L}$ drops below 1 inside the plasma. This mirrors the stability condition for external kinks that the edge q remain above 1. The growth rate scales with the wall time, as predicted by theory. After a brief growth phase, the mode saturates as a helical equilibrium. The main diagnostics for characterizing the MHD activity is a 2D array of 80 radial magnetic field pickup coils surrounding the plasma column, a segmented anode, which serves to measure current distribution inside the plasma, and an array of 40 poloidal and axial magnetic field coils inside the conducting shell. In addition to the ideal mode, reconnection events are observed to periodically flatten the current profile and alter the magnetic topology. The 2D array indicates a plasma dominated by an m=1 mode, while internal axial magnetic field sensors highlight an n=1 mode. Finally, initial results of a resistive wall with a longer wall time surrounding the plasma will be presented. This work was supported by the DoE.

William Bergerson
University of Wisconsin

Date submitted: 22 Jul 2006 Electronic form version 1.4