Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

**Stability of a Zero-Net Current Line-Tied Screw Pinch**[1] MATTHEW BROOKHART, CARLOS PAZ-SOLDAN, CARY FOREST, University of Wisconsin-Madison — The internal kink instability in the Rotating Wall Machine (RWM) has an ideal character, but also exhibits reconnection events that periodically flatten the current profile and change the magnetic topology. The line-tied boundary conditions present an ideal analogue to coronal loop and solar flare physics. Internal measurements of B, J, and $V_z$ have been extensively gathered in the screw-pinch geometry. Through shot-to-shot averaging 2D equilibrium profiles and steady-state merger of current filaments are measured. The line-tying conditions in the RWM are examined through the structure of the measured magnetic field. Theories of coronal loop formation and stability indicate that current in coronal loops may be created by twisting vortices in the photosphere at the line-tied footprints of loops. Such convection necessarily creates a coaxial current structure where current on axis flows oppositely to current at larger radii. To study the equilibria and MHD stability of these "Zero Net Current" structures, the modular current injection scheme on the RWM has been modified to allow coaxial current injection. Construction and preliminary results from these studies are presented.

[1]Supported by NSF.

Matthew Brookhart
University of Wisconsin-Madison

Date submitted: 22 Jul 2011 Electronic form version 1.4