Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

2D MHD simulations of the High to Ordinary Mode Transitions in MCX[1] I. SHAMIM, C. TEODORESCU, P. GUZDAR, A. HASSAM, R. CLARY, R. ELLIS, R. LUNSFORD, IREAP, University of Maryand, College Park, MD, USA
— The plasma in the Maryland Centrifugal Experiment (MCX) device makes an abrupt transition from a good confined state (H mode) to a poorly confined state (the O mode). To model this transition a 2D time-dependent MHD code is used to determine the dynamical equilibrium states of the MCX configuration. An additional momentum loss term is added to the system of equations to model the coupling of the plasma to the neutrals in the vicinity of the two insulators at the mirror throats. An input momentum source is treated as a control parameter to drive the poloidal rotation which in the machine is accomplished by the radial electric field and the ensuing ExB rotation. It is found that for small values of the source, the equilibrium state is not centrifugally confined enough and hence experiences additional drag from the neutrals in the vicinity of the insulators. However, at a critical forcing, the plasma makes an abrupt transition to a good centrifugally confined state in which the plasma has pulled away from the end insulator plates. As it pulls away the drags from the neutrals in the throat region decreases which further increases the rotation thereby leading to better centrifugal confinement. The good confined state is reached when the momentum source balances the diffusive damping.

[1]Work supported by DOE.

P. Guzdar
IREAP, University of Maryand, College Park, MD, USA

Date submitted: 17 Jul 2007 Electronic form version 1.4