

Abstract Submitted  
for the DPP11 Meeting of  
The American Physical Society

**Numerical modeling of the Parker instability in a rotating plasma**

IVAN KHALZOV, BEN BROWN, NOAM KATZ, CARY FOREST, University of Wisconsin-Madison — We study numerically the analogue of the Parker (magnetic buoyancy) instability in a rotating plasma screw pinch confined in a bounded cylinder. The goal of the study is to show the possibility of reaching the Parker instability for the plasma parameters achievable in the Madison Plasma Couette Experiment (MPCX). Simulations are performed using the extended magnetohydrodynamic (MHD) code NIMROD for an isothermal compressible plasma model. Both linear and nonlinear regimes of the instability are studied, and the obtained results are compared with analytic results for a slab geometry. It is shown that the effect of plasma rotation in a cylindrical geometry is two-fold: first, centrifugal acceleration acts as analogue of gravity and provides the equilibrium density stratification; second, the presence of Coriolis force results in increase of critical gradient of magnetic field required for the onset of instability.

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Date submitted: 14 Jul 2011

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