

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Characterization of High Beta Boundary Driven Spherical Flows

ROBERT SILLER, VLADIMIR MIRNOV, CARY FOREST, Univ of Wisconsin, Madison — The Madison Plasma Dynamo Experiment (MPDX) has started to investigate a new regime of plasma characteristics with the application of a variable strength Helmholtz field with the same axis as the rotation profile. We examine the theoretical fluid response of the fully compressible, isothermal plasma in a wide range of parameters applicable to MPDX in a full spectral code, assuming axisymmetric flows. To model the experiment, we look at both a specified velocity boundary condition, and a specified current distribution to model the experimental flows. We look at the dependence on plasma beta of the omega effect and the suppression of driven poloidal circulation. We look at a generalization of Ferraro's Theorem of isorotation and its applicability to non-ideal spherical flows, and the motion towards validity in the limit of strong applied field.

Robert Siller
Univ of Wisconsin, Madison

Date submitted: 24 Jul 2015

Electronic form version 1.4