Abstract Submitted
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**Equilibrium and stability of flow-dominated Plasmas in the Big Red Ball**[1] ROBERT SILLER, KENNETH FLANAGAN, ETHAN PETERSON, JASON MILHONE, VLADIMIR MIRNOV, CARY FOREST, Univ of Wisconsin, Madison — The equilibrium and linear stability of flow-dominated plasmas are studied numerically using a spectral techniques to model MRI and dynamo experiments in the Big Red Ball device. The equilibrium code solves for steady-state magnetic fields and plasma flows subject to boundary conditions in a spherical domain. It has been benchmarked with NIMROD (non-ideal MHD with rotation - open discussion), Two different flow scenarios are studied. The first scenario creates a differentially rotating toroidal flow that is peaked at the center. This is done to explore the onset of the magnetorotational instability (MRI) in a spherical geometry. The second scenario creates a counter-rotating von Karman-like flow in the presence of a weak magnetic field. This is done to explore the plasma dynamo instability in the limit of a weak applied field. Both scenarios are numerically modeled as axisymmetric flow to create a steady-state equilibrium solution, the stability and normal modes are studied in the lowest toroidal mode number. The details of the observed flow, and the structure of the fastest growing modes will be shown.

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