Abstract Submitted
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**Computer Simulations of the Magnetorotational Instability (MRI) using the Spectral Finite-Element Maxwell and Navier-Stokes (SFEMaNS) code.**[1] TAHIRI NUNEZ, Hudson County Community College, ERIK GILSON, KYLE CASPARY, Princeton Plasma Physics Lab, FATIMA EBRAHIMI, JEREMY GOODMAN, Princeton University, HANTAO JI, Princeton University, Princeton Plasma Physics Lab, XING WEI, Shanghai Jiao Tong University — Magnetorotational Instability (MRI) is primarily responsible for the transport of angular momentum in accretion disks. We ran simulations using the Spectral Finite-Element Maxwell and Navier-Stokes (SFEMaNS) code (J.-L. Guermond, et al. Nonlinear magnetohydrodynamics in axisymmetric heterogeneous domains using a Fourier/nite element technique and an interior penalty method. J. Comp. Phys., 228:2739-2757, 2009.) to create synthetic diagnostics that help us understand and compare results with what has been measured in laboratory experiments at Princeton. Simulations results are shown to help to understand the behavior of the radial and axial velocity of the flow and magnetic field induced in the MRI experiment; always taking in consideration that the device used in experiments does not completely resemble an accretion disk: the geometry of the container holding the liquid Gallium creates the possibility of other instabilities occurring that we have to sort out in order to recognize MRI. We analyze data for several timesteps, changing different parameters such as rotation speed, and induced magnetic field, in order to determine whether a steady state is reached, or whether there are fluctuations that can be measured.

[1]DOE, Office of WDTS, SULI program

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