Abstract Submitted
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First Steps Towards Magnetorotational Instabilities and Dynamos in Plasma Experiments[1] C. COLLINS, N. KATZ, D. WEISBERG, J. WALLACE, C.B. FOREST, University of Wisconsin - Madison, F. EBRAHIMI, University of New Hampshire — A sufficiently hot, unmagnetized flowing plasma experiment is ideal for studying basic mechanisms of astrophysical plasma phenomena. The Plasma Couette Experiment (PCX) will generate a differentially rotating plasma at parameters necessary to study the magnetorotational instability (MRI) or possibly a dynamo, and will explore effects specific to plasma, such as the Hall effect, plasma-neutral interactions, and compressibility. In PCX, plasma is confined by a cylindrical, axisymmetric, highly localized ring cusp magnetic field at the boundary. Emissive filaments are biased in the magnetized region to create JxB torque, and velocity couples inward to the unmagnetized region through viscosity. Torque can be applied at the inner, outer, or endcap boundaries, resulting in a controlled, differentially rotating plasma. Proof of principle studies in Helium plasmas (Te=5 eV, n=1.5x10^{11}, 5 km/s flow speeds) are approaching MRI unstable regimes predicted by local linear analysis and global Hall-MHD numerical simulations. Progress towards establishing controlled differential rotation profiles will be presented.

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