Abstract Submitted
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The Diamagnetism of Rotating Plasmas in Shaped Magnetic Fields[1] WILLIAM YOUNG, M.R. CLARY, R.F. ELLIS, A. HASSAM, G. SWAN, C.A. ROMERO-TALAMÁS, C. TEODORESCU, I. UZUN-KAYMAK, University of Maryland, MCX TEAM — A combination of diamagnetic and magnetic pick up loops external to the Maryland Centrifugal Experiment's (MCX) vacuum vessel measure changes in the local radial magnetic field and the averaged axial magnetic field. The measurements provide an axial profile of the rotating plasma's diamagnetism on a millisecond timescale, limited by the L/R time of the vacuum vessel. The results are compared to an MHD equilibrium model by numerically solving for a perturbative solution to the Grad-Shafranov equation which includes supersonic rotation. Combined with density measurements from a midplane interferometer, the numerical model provides an estimate of the plasma temperature and constitutes a test for the efficacy of centrifugal confinement, a central goal of the MCX experiment. The data also provide some insight into various parameter profiles and symmetry. Preliminary analysis shows remarkable agreement for the magnitudes and axial profiles of plasma diamagnetism across broad parameter variations.

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