Abstract Submitted
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A spherical Couette experiment to observe inductionless MHD instabilities at medium Reynolds numbers ELLIOT KAPLAN, BENJAMIN GOHL, THOMAS GUNDRUM, MARTIN SEILMAYER, FRANK STEFANI, Helmholtz Zentrum Dresden Rossendorf — Turbulent spherical Couette flows in a strong axial magnetic field ($\mathrm{Re} \in (10^4, 10^6)$, $\mathrm{Ha} \in (0, 3000)$) have given rise to an interesting set of instabilities. Like the, long sought after, magnetorotational instability (MRI) they transport angular momentum outward. Unlike the MRI they are azimuthally nonaxisymmetric and change their equatorial symmetry as the applied field is increased [Sisan (2004)]. Subsequent theoretical and numerical investigations found a set of inductionless (Rm=0) instabilities that replicate both these properties [Hollerbach (2009), Gissinger (2011)]. A liquid metal (GaInSn) spherical Couette flow is being carried out at the Helmholtz-Zentrum Dresden-Rossendorf to explore a region of Reynolds-Hartmann space ($\mathrm{Re} \in (10^3, 10^4)$, $\mathrm{Ha} \in (0, 160)$) between the simulations and the experiments. The diagnostic coverage in the new experiment is also much denser (ultrasound Doppler velocimeter array for $\mathrm{m} \leq 3$, electric potential probes for $\mathrm{m} \leq 12$) than that of the 2004 experiment. Data from the initial runs of the experiment and results from the predictive simulations are discussed here.

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