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The impact of Hall physics on magnetized plasma jets produced by radial foil configurations[1] P.-A. GOURDAIN, J.B. GREENLY, D.A. HAMMER, B.R. KUSSE, P.C. SCHRAFEL, C.E. SEYLER, Cornell University, Ithaca, NY, USA, S.N. BLAND, G.N. HALL, S.V. LEBEDEV, F. SUZUKI-VIDAL, Imperial College, London, UK — Although no one argues that plasma resistivity is important to include in the astrophysical simulations, based upon experiments with magnetized jets on pulsed power machines in the laboratory, we believe it may also be important to include the Hall term in the generalized Ohm's law in astrophysics simulation codes. In this talk, experiments carried out at Cornell University and at Imperial College on 1 to 1.5 MA pulsed power generators feature a plasma disk and a collimated, axial plasma jet with large Re (10^5) and Rem (10^3). The plasma jet is generated by ablation from electrical currents, which flow in a thin aluminum foil and converge to a central multi-pin cathode located under the foil. A twist in the pins produce the axial magnetic field necessary to magnetized the jet. It was observed that changing the polarity of the current alters drastically the plasma dynamics, an indication of the importance of the Hall effect in plasmas produced by radial foils. The overall agreement between experimental results and numerical simulations indicates that PERSEUS accounts properly for Hall physics in this geometry and plasma parameter range. Scaling to astrophysical occurrences via numerical simulations should highlight how Hall physics affects the dynamics of larger accretion disks.

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