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**A Laboratory Astrophysical Jet to Study Canonical Flux Tubes**[1]

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A new research program aims to simulate a magnetically driven jet launched by an accretion disk in a laboratory experiment. The experiment replaces an accretion disk that would rotate at impractical speeds in the laboratory with three concentric annular electrodes, independently biased by two sets of pulsed power supplies to generate magnetized plasma shear flows [1]. With three electrodes, the radial electric field can be set up to approximate the rotation profile of an accretion disk. The primary diagnostics include arrays of magnetic probes to measure 3D magnetic fields and arrays of lines-of-sight to measure 3D ion flows from vector tomography of ion Doppler spectral lines [2]. The symmetry of fast gas puff sources [3] is fine-tuned with a fast ion gauge [4] to remove any anchoring effects of discrete gas holes on the azimuthal rotation of the plasma jet. The aim is to understand how magnetically driven astrophysical jets become long and collimated, how they become unstable or turbulent, and investigate the physics from a canonical flux tube point-of-view [5]. A canonical flux tube is a fundamental tube of magnetic flux with helical flows.

[1] E. Carroll [2] K. Vereen [3] Y. Kamikawa [4] E.S. Lavine [5] J. von der Linden, S. You group, this meeting.

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