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The Generation of Magnetized Jets Using 3D Printed Loads on a Pulsed-Power Driver[1] HANNAH HASSON, MARISSA ADAMS, MATTHEW EVANS, ROMAN SHAPOVALOV, IMANI WEST-ABDALLAH, JAMES YOUNG, University of Rochester, JOHN GREENLY, DAVID HAMMER, BRUCE KUSSE, CHARLES SEYLER, Cornell University, PIERRE GOURDAIN, University of Rochester — Astrophysical jets are diverse yet ubiquitous structures, typically associated with a gravitational engine that generates the axial flows from an accretion disk. However, the processes that maintain jet collimation and stability remain poorly understood. To explore the mechanisms at play, we propose to conduct a stability study of magnetized jets generated by pulsed-power drivers. Making an argument of magnetohydrodynamic stability, we may justify scaling our laboratory system by matching dimensionless parameters of the plasma jet: $Re > 10^3$, $R_M \sim 10^3$, $M > 1$, and $\beta \gg 1$. Our experiment will use a quasi-axisymmetric load, driven by 1MA pulsed power driver and capable of producing converging flows that transition into a strongly collimated, magnetized plasma jet. Using 3D extended MHD simulations from PERSEUS, we explore how the jet properties can be controlled by changing the load dimensions, the flow angular momentum and the overall magnetization of the system.

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