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3-D MHD modeling and stability analysis of jet and spheromak plasmas launched into a magnetized plasma.¹ DUSTIN FISHER, YUE ZHANG, BEN WALLACE, MARK GILMORE, University of New Mexico, WARD MANCHESTER, University of Michigan, C. NICK ARGE, Air Force Research Laboratory — The Plasma Bubble Expansion Experiment (PBEX) at the University of New Mexico uses a coaxial plasma gun to launch jet and spheromak magnetic plasma configurations into the Helicon-Cathode (HelCat) plasma device. Plasma structures launched from the gun drag frozen-in magnetic flux into the background magnetic field of the chamber providing a rich set of dynamics to study magnetic turbulence, force-free magnetic spheromaks, and shocks. Preliminary modeling is presented using the highly-developed 3-D, MHD, BATS-R-US code developed at the University of Michigan. BATS-R-US employs an adaptive mesh refinement grid that enables the capture and resolution of shock structures and current sheets, and is particularly suited to model the parameter regime under investigation. CCD images and magnetic field data from the experiment suggest the stabilization of an m=1 kink mode trailing a plasma jet launched into a background magnetic field. Results from a linear stability code investigating the effect of shear-flow as a cause of this stabilization from magnetic tension forces on the jet will be presented. Initial analyses of a possible magnetic Rayleigh Taylor instability seen at the interface between launched spheromaks and their entraining background magnetic field will also be presented.

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Dustin Fisher Univ of New Mexico

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