

Abstract Submitted
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Development of a Compact RF Pre-Ionization System for an MHD-Driven Jet Experiment VERNON H. CHAPLIN, PAUL M. BELLAN, Caltech, HANNAH V. WILLETT, Cambridge University — We are studying MHD-driven jets relevant to spheromak formation and to magnetically threaded accretion disks in astrophysics. At present, the jet density and velocity in our experiment are constrained by the requirement that the initial neutral gas density be high enough to achieve plasma breakdown in the applied electric field. This constraint could be overcome by puffing pre-ionized plasma into the chamber instead of neutral gas. We are investigating pre-ionization with a pair of 13.56 MHz class D RF power amplifiers capable of outputting over 3 kW pulsed power each. One RF source is tuned to output a high voltage and initiate breakdown, while the other is tuned to maximize power transfer and sustain the pre-ionized plasma. Helicon waves may be used to efficiently couple RF power to the plasma. The RF amplifiers are mounted on printed circuit boards and powered by AA batteries, allowing them to float at the high voltage of the center electrode of the jet experiment. Characterization of the RF source behavior and spectroscopic measurements of the pre-ionized plasma properties will be presented.

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