

Abstract Submitted
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Magnetic Field Measurements Inside a Supersonic Plasma Jet Formed by a Pulsed Railgun¹ D. MARTENS, University of Cincinnati, S.C. HSU, LANL — The Plasma Liner Experiment (PLX) at Los Alamos National Laboratory (LANL) was designed to create a spherically imploding plasma liner via the merging of 30 supersonic plasma jets formed by pulsed plasma railguns. The propagation and merging of two plasma jets is being studied via spectroscopy, a photodiode array, and interferometry to analyze plasma temperature, velocity, density, and ionization fraction of the evolving jets. Although the magnetic field strength is known to be strong (> 1 T) within the bore of the plasma railgun, no measurements have been made of the field in the jet once it propagates away from the gun. Based on the expected jet radius (~ 5 cm) and temperature (~ 1 eV) near the exit of the gun, the classical diffusion time of the field ($\sim 3 \mu\text{s}$) is expected to be short enough such that the field will be very small by the time the jets propagate a few tens of centimeters. This work presents the design of a magnetic probe array to measure the magnetic field vectors at 5 and 30 cm from the plasma gun nozzle, and also the initial experimental results from the magnetic probe diagnostic.

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