

Abstract Submitted
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Mach probe studies in SSX wind tunnel¹ X. ZHANG, M.R. BROWN, T. GRAY, D.R. DANDURAND, Swarthmore College — Mach probe calibration and performance is examined for weakly-magnetized SSX plasmas. Peak initial flows exceeding 50 km/s are observed in a high-velocity wind tunnel. Velocity measurements using a linear array of magnetic probes offers independent calibration of Mach probe parameters. Calibration for a cylindrical probe geometry in a weakly-magnetized plasma extends existing Mach probe models to more realistic geometries. Rotation of plasma at 10–15 km/s, verified by ion Doppler spectroscopy (IDS), is also observed. Vacuum ultraviolet (VUV) spectroscopy and IDS measures typical electron temperatures, $T_e = 7\text{--}12$ eV, and ion temperatures, $T_i = 10\text{--}25$ eV, resolved throughout the duration of plasma flow. Additional experiments are underway to examine dynamic alignment of plasma flow with magnetic field fluctuations. Numerical simulations with realistic SSX plasma conditions also underway. Results for dynamic alignment and simulations will be presented if available.

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