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Precision Electron Density Measurements in the SSX MHD Wind Tunnel[1] EMMA M. SUEN-LEWIS, LUKE J. BARBANO, JARON E. SHROCK, MANJIT KAUR, Swarthmore College, DAVID A. SCHAFFNER, Bryn Mawr College, MICHAEL R. BROWN, Swarthmore College — We characterize fluctuations of the line averaged electron density of Taylor states produced by the magnetized coaxial plasma gun of the SSX device using a 632.8 nm HeNe laser interferometer. The analysis method uses the electron density dependence of the refractive index of the plasma to determine the electron density of the Taylor states. Typical magnetic field and density values in the SSX device approach about $B \cong 0.3$ T and $n = 0.4 \times 10^{16}\ cm^{-3}$. Analysis is improved from previous density measurement methods by developing a post-processing method to remove relative phase error between interferometer outputs and to account for approximately linear phase drift due to low-frequency mechanical vibrations of the interferometer. Precision density measurements coupled with local measurements of the magnetic field will allow us to characterize the wave composition of SSX plasma via density vs. magnetic field correlation analysis, and compare the wave composition of SSX plasma with that of the solar wind [1]. Preliminary results indicate that density and magnetic field appear negatively correlated.

[1] G. G Howes et al., *The Astrophysical Journal Letters*, vol. 753, July 2012.

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