

Abstract Submitted  
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**Stark Broadening Density Profile Measurements in the ZaP Experiment** G.V. VOGMAN, U. SHUMLAK, Aerospace and Energetics Research Program, University of Washington — The ZaP Flow Z-Pinch experiment uses sheared flow to mitigate MHD instabilities. The high-pressure plasma pinches exhibit Stark broadened emission spectra, which are analyzed to determine plasma density. A 20-chord spectroscopic system has been calibrated to quantify chord-to-chord variation in throughput, optical curvature effects, instrument wavelength displacement, and instrument broadening. By correcting for these effects and accounting for Doppler broadening, a Stark broadening profile can be resolved and used as a measure of plasma density. The local electric field from the plasma Stark broadens the spectral shape of line emission producing a Voigt profile. A Fourier expansion technique is used to approximate the Voigt profile for a C III spectral line, which is emitted from the center of the plasma column, and the  $H_{\beta}$  line, which is used to resolve density in the peripheral regions of the plasma. By measuring density at different locations, a radial density profile is generated. This profile is then compared to interferometry measurements and is used to gain a better understanding of Z-pinch equilibrium.

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