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Electric Field Measurements in a Helicon Source Based on Stark Splitting of Neutral Helium Lines STEPHANIE SEARS, SAIED HOUSH-MANDYAR, JERRY CARR, MATTHEW GALANTE, KATHERINE TALLAKSEN, SAIKAT CHAKRABORTY THAKUR, EARL SCIME, West Virginia University — For laser injection along the axial magnetic field, splitting of the 587.56 nm line of neutral helium has been observed during laser-induced-fluorescence experiments in a helicon plasma source. In a radially uniform region of magnetic field, the line splitting is localized to within ± 1 cm of the axis of the device. The spatial localization and independence of magnitude of the splitting on the source magnetic field strength rule out Zeeman splitting as an explanation for the observations. When compared to previous measurements of Stark splitting of the 587.56 nm He I line [*Ritschl*, 1934], the observed line splitting suggests electric field strengths on the order of kV/cm. Here we report measurements of the observed line splitting (and absolute shifts) as a function of neutral pressure, plasma density, plasma density profile, and magnetic field strength. Similar measurements are presented for the nearby, but weaker, He I line at 587.60. This work was supported by NSF award PHY-0611571.

Stephanie Sears
West Virginia University

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