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Laser-Collisional Induced Fluorescence Measurements of a Magnetosheath in a Biasable Ring Cusp Source NEIL ARTHUR, JOHN FOSTER, Univ of Michigan - Ann Arbor — This work involves exploring active control of the plasma potential and density spatial distribution in a mulitpole ion source through the active biasing of individual magnetic cusps. Cusp bias can be achieved by applying voltage to the magnetic surface generating the cusp. By controlling the current flow through the cusps, active altering of the primary electron containment length, at least at low voltages, is possible. Electrostatic probes do not work well in the presence of magnetic field and within sheaths. The Laser-Collisional Induced Fluorescence (LCIF) diagnostic is enabling in that it allows for imaging of the electron distribution in the magnetosheath. LCIF is used to quantify the response of electron density to active cusp biasing. We hope to gain insight into the physical processes occurring at the magnetic cusps and elucidate how those processes impact not only the plasma conditions in the bulk plasma, but also source efficiency and stability. The goal is to determine how bulk plasma properties change in response to modifications to current collection at the cusp magnetosheath. If the plasma properties vary with electric field in the cusp, then magnetic cusps must be considered as active rather than passive collectors.

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