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Spatially Resolved LIF Measurements of a Current Free Double Layer in an Argon Helicon Plasma<sup>1</sup> EVAN AGUIRRE, UMAIR SIDDIQUI, EARL SCIME, West Virginia Univ — We report preliminary 2-dimensional, spatially resolved observations of a double layer in an expanding helicon plasma. These new measurements investigate the origins of previously observed multiple ion beam populations in the downstream plasma. We use Laser Induced Fluorescence (LIF) to measure the ion velocity distribution functions (IVDFs) of argon ions and neutrals both parallel and perpendicular to the background magnetic field and an rfcompensated Langmuir probe to determine the local plasma potential. These are the first multi-dimensional LIF measurements of ion acceleration in a current-free double layer and were obtained with a recently installed, internal scanning probe system in the HELIX-LEIA experimental facility.

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