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Neutral Flow Coupling in Helicon Plasmas EARL SCIME, ZACHARY SHORT, MIGUEL HENRIZQUEZ, JACOB MCLAUGHLIN, LUKE NEAL, DEREK THOMPSON, West Virginia Univ — Neutral particle distributions are critical to the study of plasma boundary interactions, where ion-neutral collisions, e.g. via charge exchange, may modify energetic particle populations impacting the boundary surface. Neutral particle behavior at absorbing boundaries thus underlies a number of important plasma physics issues, such as wall loading in fusion devices and anomalous erosion in Hall thruster channels. Neutral velocity distribution functions (NVDFs) are often measured using laser-induced fluorescence (LIF). Our standard LIF scheme excites the 1s4 non-metastable state of neutral argon with 667.913 nm photons from a tunable diode laser. The subsequent decay emission at 750.590 nm is recorded synchronously with injection laser frequency. The signal-to-noise of this LIF scheme is poor. Here we present NVDF measurements using a recently developed scheme for neutral argon LIF at 706.92 nm (exciting from the 1s5 to the 2p3 state). Emission is observed at 738.60 nm (from the 2p3 state to the 1s4 state). The light source for this LIF scheme is a high-power, tunable dye laser. The NVDF measurements are compared to three-dimensional ion flow field measurements performed at the same locations in a helicon plasma source.

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