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Direct comparison of neutral velocity distribution measurements and simulations in the vicinity of an absorbing boundary oblique to a magnetic field MIGUEL F. HENRIQUEZ, DEREK S. THOMPSON, West Virginia University, Department of Physics and Astronomy, SHANE KENILEY, DAVIDE CURRELI, University of Illinois Urbana-Champaign, Department of Nuclear, Plasma, and Radiological Engineering, THOMAS E. STEINBERGER, DAVID D. CARON, ANDREW J. JEMIOLO, JACOB W. MCLAUGHLIN, MIKAL T. DUFOR, LUKE A. NEAL, EARL E. SCIME, West Virginia University, Department of Physics and Astronomy, M. UMAIR SIDDIQUI, Phase Four Inc. — Plasma-boundary interactions are strongly affected by the sheath and presheath structures that form near the boundary surface. Recent measurements have observed ion transport across magnetic field lines in regions where the surface is oblique to the background magnetic field ($\psi = 74°$). In these boundary regions, charge exchange collisions may provide a mechanism through which neutral particles interact with the long distance presheath electric field. We report efforts to directly compare Boltzmann and particle-in-cell simulations with 3D neutral velocity distribution functions (NVDFs) using laser induced fluorescence (LIF) in a magnetized plasma boundary region. We present a novel LIF method for measuring Ar-II metastable velocity distributions, in which we observe the 738.6014 nm fluorescence ($2p_3$ to $1s_4$ in Paschen's notation), that results from absorption of the 706.9167 nm ($1s_5$ metastable to $2p_3$) pump laser, providing neutral temperatures and flows. We additionally describe electrostatic probe measurements in the same region.

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