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Comparison of 3D ion velocity distribution measurements and models in the vicinity of an absorbing boundary oriented obliquely to a magnetic field MIGUEL F. HENRIQUEZ, DEREK S. THOMPSON, West Virginia University Department of Physics, SHANE KENILY, RINAT KHAZIEV, University of Illinois at Urbana-Champaign, Department of Nuclear, Plasma, and Radiological Engineering, TIMOTHY N. GOOD, Gettysburg College Department of Physics, JULIANNE MCILVAIN, M. UMAIR SIDDIQUI, West Virginia University Department of Physics, DAVIDE CURRELI, University of Illinois at Urbana-Champaign, Department of Nuclear, Plasma, and Radiological Engineering, EARL E. SCIME, West Virginia University Department of Physics — Understanding particle distributions in plasma boundary regions is critical to predicting plasma-surface interactions. Ions in the presheath exhibit complex behavior because of collisions and due to the presence of boundary-localized electric fields. Complete understanding of particle dynamics is necessary for understanding the critical problems of tokamak wall loading and Hall thruster channel wall erosion. We report measurements of 3D argon ion velocity distribution functions (IVDFs) in the vicinity of an absorbing boundary oriented obliquely to a background magnetic field. Measurements were obtained via argon ion laser induced fluorescence throughout a spatial volume upstream of the boundary. These distribution functions reveal kinetic details that provide a point-to-point check on particle-in-cell and 1D3V Boltzmann simulations. We present the results of this comparison and discuss some implications for plasma boundary interaction physics.

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