

Abstract Submitted
for the GEC17 Meeting of
The American Physical Society

Student Excellence Award Finalist: 3D ion and neutral distribution measurements and simulations of the boundary region of a magnetized plasma¹ DEREK S. THOMPSON, West Virginia University, Department of Physics, SHANE KENILEY, RINAT KHAZIEV, DAVIDE CURRELI, University of Illinois at Urbana-Champaign, Department of Nuclear, Plasma, and Radiological Engineering, M. UMAIR SIDDIQUI, Phase Four, Inc., MIGUEL F. HENRIQUEZ, DAVID D. CARON, ANDREW J. JEMIOLO, JACOB W. MCLAUGHLIN, MIKAL T. DUFOR, LUKE A. NEAL, EARL E. SCIME, West Virginia University, Department of Physics — We present the first paired 3D laser induced fluorescence measurements of ion and neutral velocity distribution functions (I/NVDFs) in a plasma boundary. These measurements are performed in the presheath region of an absorbing boundary immersed in a background magnetic field that is obliquely incident to the boundary surface ($\psi = 74^\circ$). Parallel and perpendicular flow measurements demonstrate that cross-field flows occur and that ions within several gyro-radii of the surface are accelerated in the $\vec{E} \times \vec{B}$ direction. We present electrostatic probe measurements of electron temperature, plasma density, and electric potential in the same region. Ion, neutral and electron measurements are compared to particle-in-cell and Boltzmann simulations, allowing direct comparison between measured and theoretical distribution functions for all three species.

¹NSF PHYS 1360278

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Date submitted: 16 Jun 2017

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