Abstract Submitted
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Studies of sheath physics in two ion species plasmas with diode laser LIF[1] GREG SEVERN, University of San Diego, NOAH HERSHKOWITZ, University of Wisconsin-Madison, M.M. TURNER, Dublin City University, Dublin Ireland, USD-UW-DCU COLLABORATION — Recent diode laser based Laser-Induced Fluorescence (LIF) measurements of Ar ion flows at the sheath-presheath boundary in single and multiple ion species plasmas have confirmed that the usual Bohm Criterion holds for the single ion species plasma but must be generalized for multiple ion species plasmas to include the possibility that the ions may reach the sheath edge traveling either faster or slower than its individual ion sound speed. These results are in accord with the Generalized Bohm Criterion and PIC code simulation results for the experimental case of two ion species plasmas which are relatively collisionless and of low temperature (ArI+HeI plasmas, $P_{ArI} \sim 0.1mTorr$, $0 \leq P_{He}/P_{Ar} \leq 25$, and $\lambda_{Debye} \ll \lambda_{mfp}$, $T_e \leq 2eV$). Both experimental and numerical simulation results will be presented concerning the details of the ion velocity distribution functions (ivdfs) near the sheath edge in two ion species plasmas for the cases of He and Xe ions as the other ion species besides Ar. Our goal is ultimately to diagnose both ion species in a two ion species plasma with diode laser LIF, some thing which is still difficult to do, but which would significantly extend the range of possible experiments that test existing theory.

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