

Abstract Submitted
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Measurements of Bohm speeds of positive ions with LIF in Ar/O₂, electronegative plasmas and comparison to ion acoustic wave phase velocities¹ YOUNG-CHUL GHIM (KIM), NOAH HERSHKOWITZ, University of Wisconsin - Madison — The negative ion concentration in an electronegative plasma can be determined from the phase velocities of ion acoustic waves. It can also be determined from planar Langmuir probe data. These two approaches often disagree quantitatively. Plasmas with $n_e \sim 10^9 \text{ cm}^{-3}$, $T_e \sim 1 \text{ eV}$ and the ratio of negative ions to positive ions varying from 0 – 0.3 are generated in a dc multidipole hot filament discharge for total pressure of Ar/O₂ from 0.3 – 1.0 mTorr. Laser induced fluorescence (LIF) measurements of the Ar II excitation transition at 668.614 nm determined metastable ion speed at the sheath edge. An emissive probe is used to determine the potential drop between the sheath edge and the bulk, and the location of the sheath edge. The LIF data for small concentration of negative ions show that positive ions attain the usual Bohm speed of $(T_e/m_i)^{1/2}$ at the sheath edge which suggests the presence of a double layer potential structure. Planar Langmuir data were corrected using Sheridan's model². Quantitative agreement of negative ion concentration from two approaches is achieved. ² T.E. Sheridan, Phys. Plasmas **7**, 3084 (2000)

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Young-chul Ghim (Kim)
University of Wisconsin - Madison

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