

Abstract Submitted
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Are there internal sheaths in unmagnetized electronegative plasmas?¹ CHI-SHUNG YIP, NOAH HERSHKOWITZ, University of Wisconsin - Madison — Bounded electronegative plasmas are predicted to have electropositive halos. A recent experiment [1] showed that for a negative ion to electron concentration ratio of $\alpha = 0.43$ for an Argon-Oxygen plasma, a positive halo was formed as a consequence of negative ions satisfying a Boltzmann relation. When $T_e/T_- > 5 + \sqrt{24}$ [2] and $\alpha > T_e/T_-$ [3], the negative ions are predicted to be confined by an internal sheath. Experiments are reported in $Ar - SF_6$ and $Ar - Cl_2$ plasmas aimed at finding the internal sheath by varying the gas concentrations. Experiments are carried out in a hot filament discharge in a multi-dipole chamber. Negative ions concentrations are determined from the phase velocity of C.W. Ion Acoustic Waves. Electron temperature and density are determined using Langmuir probes. Plasma potentials are determined by emissive probes. Argon drift velocities are determined by Laser Induced Fluorescence. [1] Ghim, YC and Herskowitz, N, Applied Physics Letters. **94**, 15, 151503 (2009) [2] N. Braithwaite and J.E.Allen, J. Physics. D: Appl. Phys **21**, 1733 (1988) [3] R. N. Franklin, Plasma Sources Sci. Technol. **11**, A31, (2002)

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