Abstract Submitted
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Are there double layers 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 α=0.43 for an Argon-Oxygen plasma a positive halo was a consequence of negative ion satisfying a Boltzmann relation. When Te/T- is greater than $5+\sqrt{24}$ [2] and that α is greater than Te/T- [3], the negative ions are predicted to be confined by a double layer. Experiments are reported in Ar-SF6 and Ar-Cl2 plasmas aimed at finding the double layer by varying the gas concentrations. Experiments are carried out in a filament discharge in a multi-dipole chamber, with no magnetic field on the end walls. An unmagnetized boundary of the plasma is set by a bias plate along the axial direction of the chamber. Negative ion concentrations are determined from the phrase 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 Florescence. [1] Ghim, YC and Hershkowitz, N, Applied Physics Letters. **94**, 15, 151503 (2009) [2] N. Braithwaite and J. E. Allen, J. Phys. D: Appl. Phys. **21**, 1733 (1988) [3] R. N. Franklin, Plasma Sources Sci. Technol. **11**, A31, (2002)

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