

Abstract Submitted
for the GEC20 Meeting of
The American Physical Society

Does the discrepancy between Langmuir Probe and emissive probe measurements of plasma potential depend on ion flow and sheath formation?¹ MICHAEL SHAHIN, Dept. of Physics & Biophysics, University of San Diego, PEIXUAN LI, NOAH HERSHKOWITZ, Dept. of Engineering-Physics, University of Wisconsin-Madison, GREG SEVERN, Dept. of Physics & Biophysics, University of San Diego — It has recently been shown that emissive probes (EPs) measure plasma potential profiles correctly in plasma presheaths, and that Langmuir probes (LPs) do not, in low temperature, low pressure plasma. It has been argued that these differences are thought to be caused by inherent, diffuse, ion flow in the presheath region toward the negatively biased electrode, characteristic of sheath formation. One of the roles of experiment is that of suggesting models and to spur theory formation. In pursuit of this goal, we test the hypothesis that ion flow to the boundary plays an essential role by examining the difference between plasma potential measurements made by Langmuir probes and emissive probes in single ion species plasmas of differing mass number. The Bohm speeds for Xe, Kr, Ar, Ne, and He plasmas are known to vary. Experiments are performed in unmagnetized discharges in the parameter regimes, $0.1 \leq P_n \leq 1 \text{mTorr}$, with $1 \leq T_e \leq 5 \text{eV}$, and $1 \times 10^9 \leq n_e \leq 1 \times 10^{10} \text{cm}^{-3}$. Results are discussed.

¹Work supported by NSF grant nos. PHY-1804654, 1804240

Gregory Severn
Univ of San Diego

Date submitted: 15 Jun 2020

Electronic form version 1.4