

Abstract Submitted  
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**On the difference of plasma potentials measured by Langmuir probes and emissive probes in the presheath<sup>1</sup>** PEIXUANG LI, NOAH HER-SHKOWITZ, Dept. of Engineering-Physics, University of Wisconsin-Madison, EUGENE WACKERBARTH, AND GREG SEVERN, Dept. of Physics Biophysics, University of San Diego — It is conventional wisdom that Langmuir probes (LPs) do not work in sheaths, but are supposed to yield accurate plasma potentials ( $\phi_{pl}$ ) in quasineutral plasma. Experiments that compared  $\phi_{pl}$  measurements made by partially coated and uncoated LPs and cylindrical LPs with measurements made by emissive probes, were performed in low pressure unmagnetized argon discharges ( $0.1 \leq P_n \leq 1mTorr$ ), with  $T_e$  and  $n_e$  between 1 and 5 eV, and 19 and  $110cm^{-3}$ , respectively. Presheaths were set up in the plasma using negatively biased electrodes. We used both grids and plates for the biased electrode. Results indicate that the emissive probe  $\phi_{pl}$  measurements (in the limit of zero emission) were more negative than LP measurements in the presheath, in the bulk, more positive. In the bulk, the difference was not proportional to  $T_e$  as previously thought. In the sheath, most LP measurements did not go negative but rather became increasingly positive. Only the emissive probe measurements worked in the sheath. These differences are thought to be caused by the ion flow in the presheath toward the negatively biased electrode, characteristic of sheath formation.

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