

Abstract Submitted
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Electron sheaths in low-pressure weakly-collisional plasma¹ N. HERSHKOWITZ, D. S. BAALRUD, B. LONGMIER, Department of Engineering Physics, University of Wisconsin-Madison — The plasma potential in anode sheaths can be negative going measured from the anode (electron sheaths) or positive going (ion sheaths). In weakly-collisional low-pressure plasma, electron sheaths are normally only present near small probes when they are biased more positive than the plasma potential or at electron emitting surfaces. Electron sheaths created along the axis of a large positively biased plate (diameter = 10 cm) located in a multi-dipole argon plasma are described here. Experimental data show non-ambipolar electron loss in which the electron sheath collects almost all electrons produced by ionization if sufficient loss area is provided for ions at the chamber walls. Measurements of the plasma potential with emissive probes and Langmuir probes show potential dips form at the sheath edges to limit electron loss and increase ion energy. The use of electron sheaths for extracting electron beams from both dc and rf plasma will also be discussed.

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