

Abstract Submitted
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Dynamical Response of Continuum Regime Langmuir Probe H.L.

RAPPAPORT, Enig Associates, Inc. — Probe dynamic response is sometimes used as a way to increase the amount of information obtained from Langmuir probes [1]. In this poster, the effects of frequency dependent probe capacitance and coupling of probe fields to damped Langmuir waves and damped ion acoustic waves are considered. In the continuum regime, with small Debye length to spherical probe radius ratio, the probe DC current vs. voltage characteristic displays a hard saturation at sufficiently large probe potential [2]. In this regime, the sheath thickness varies little with the applied voltage although the plasma response can still be measured. A goal of the present investigation is to show that the probe dynamical response is richer as a result of modulation of sheath thickness or shielding particularly in the larger Debye length to probe radius ratio regime. Inertia inhibits ion response at sufficiently high frequency and deviation from the DC characteristic is shown.

[1] D. N. Walker, R.F. Fernsler, D.D. Blackwell, and W.E. Amatucci, Phys. Plasmas 15, 123506 (2008).

[2] E. Baum and R.L. Chapkis, AIAA J. 8, 1073 (1970).

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