

Abstract Submitted  
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**High Frequency Input Admittance of Continuum Regime Langmuir Probe** H.L. RAPPAPORT — Measurement of probe complex input impedance, or admittance, has been suggested as a way to increase the amount of information obtained from Langmuir probes [1]. In this poster, a spherical probe immersed in a weakly ionized homogeneous plasma is considered in the regime in which the probe radius is small compared with the Debye length. When the magnitude of the probe potential exceeds the plasma temperature in volts, the low frequency AC input admittance of the negatively biased probe is given by the ion conductivity times  $4\pi$  times the probe radius plus the admittance associated with the probe vacuum capacitance. The real part of the input admittance falls rapidly when the drive frequency exceeds the reciprocal of the time it takes ions to diffuse a distance on the order of the probe radius. An analytic solution to this problem found by applying the method of matched asymptotic expansions to the describing differential equation is given. Probe circuit models and boundary conditions are reviewed.

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

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