

Abstract Submitted
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Determining plasma potential from rf measurements using an impedance probe¹ DAVID WALKER, Global Strategies Group, Inc, RICHARD FERNSLER, DAVID BLACKWELL, WILLIAM AMATUCCI, Naval Research Laboratory — By using rf techniques with plasma probes in laboratory experiments we have demonstrated the existence of collisionless resistance in the sheath of a spherical probe, shown that this leads to a method of finding the electron sheath density profile, and proposed a method of measuring electron temperature using the rf results.² Most recently we are able to determine plasma potential and the electron distribution function from the rf measurements, the latter requiring only a first derivative of the inverse ac resistance with respect to bias. The technique has general application to diverse areas of plasma investigations in the laboratory, or in space plasma measurement application. It can be used with *in situ* instrumentation itself and can be extended to provide an estimate of the sheath structure for arbitrarily shaped surfaces. Because the magnitude of the applied signal used is much smaller in magnitude than typical applied dc potentials, it is transparent to the existing plasma/probe interface.

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²Walker, D.N., R.F. Fernsler, D.D. Blackwell, W.E. Amatucci, *Phys of Plasmas*, **15**, 123506 (2008)

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