

Abstract Submitted
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Network analyzer-based plasma diagnostics using an rf impedance probe¹ DAVID WALKER, GTEC, Inc., Crofton, MD, RICHARD FERNSLER, DAVID BLACKWELL, WILLIAM AMATUCCI, Naval Research Laboratory — We have recently completed an extended experimental series demonstrating the usefulness of a network analyzer in plasma diagnostics in the thin sheath limit.² An rf signal, much smaller than probe dc bias voltages, is applied to a spherical probe by the analyzer which returns both real and imaginary parts of the complex plasma impedance as a function of frequency.³ Plasma impedance is determined by comparing the incident signal to that reflected from the plasma. We show that this information can be used to determine plasma potential and the electron distribution function. We will present data showing results for three spherical probes in addition to preliminary observations using cylindrical probes. The analysis method we present has general application to diverse areas of plasma investigations in the laboratory or in space. It can be used with *in situ* instrumentation and can be extended to provide an estimate of sheath structure about the probe.

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²In Review, Phys. Plasmas (July 2010)

³Phys. Plasmas 13,032108 (2006)

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