

Abstract Submitted
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Impedance Probe Measurements for Plasmas with and without Dust¹ BRANDON DOYLE, UWE KONOPKA, EDWARD THOMAS, JR., Auburn University — Impedance probe measurements are a class of RF plasma spectroscopy which utilizes plasma resonances near the electron plasma frequency, ω_{pe} . Impedance probe measurements can be desirable for diagnosis of dusty plasma parameters because the measurements can potentially be performed with only mild or marginal perturbation to the plasma and dust component, in contrast to the significant influence a traditional Langmuir probe would cause. In this presentation, we describe experiments performed using a double-tipped, transmission-type (S_{21}) impedance probe in two different plasma chambers at Auburn University: in the Magnetized Dusty Plasma Experiment (MDPX), and in a dodecahedral plasma chamber prototype which was originally designed for microgravity experiments. The electron density is determined from the transmission spectra of this probe by assuming a lumped-element circuit model for the probe-plasma system and a fluid model for the plasma itself. This probe design is compared to a single-tipped, reflection-type (S_{11}) impedance probe, and advantages and disadvantages of each design are discussed.

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