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Impedance Probe Measurements in Dusty Plasma[1] BRANDON DOYLE, UWE KONOPKA, TAYLOR HALL, EDWARD THOMAS, JR., Auburn University — Impedance probe measurements are a type of active plasma resonance spectroscopy which utilize plasma resonances at or near the electron plasma frequency, ω_{pe}. In this work, we use a two-pronged impedance probe to measure the frequency-dependent transmission of RF signals through plasma. We analyze shifts in these transmission spectra while changing a) the quantity of dust in the plasma, or b) the orientation of the probe with respect to an external magnetic field. Adding dust to a plasma affects ω_{pe} as dust becomes charged. The dust charge is typically highly negative because of the higher mobility of electrons compared to ions. The negative dust charging leads to a reduction in the electron density in the surrounding plasma and a reduction in ω_{pe} related to this electron density depletion. The results from the first experiment presented here reflect this electron density depletion. In the case of magnetized electrons, the electron mobility is greatly reduced in directions perpendicular to the magnetic field, which affects impedance probe transmission. The second experiment presented explores this anisotropy.

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