

## **Measurements of Thermal Effects in the Dispersion Relation of the Dust Acoustic Wave**

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A complex (dusty) plasma is a four-component system composed of ions, electrons, neutral particles and charged microparticles. The charged microparticles interact with, and self-consistently modifies, the surrounding plasma medium; resulting in a new and unique state of matter that can support a wide range of physical phenomena. Among these is a new wave mode known as the dust acoustic, or dust density, wave (DAW). The DAW is a low frequency, longitudinal mode that propagates through the microparticle component of the dusty plasma system and is self-excited by the energy from the ions streaming through this component.

Over the past twenty years, the dust acoustic wave has been a subject of intense study and recent studies have shown that thermal effects can, in some cases, have a significant role in the measured dispersion relation. In this talk, we report on the results of an experimental study of the dispersion relation of this wave mode over a range of neutral gas pressures in a weakly-coupled dusty plasma system in an rf discharge plasma. The experimental dispersion relation are modeled using a theoretical dispersion relation that includes thermal effects and the effects of dust correlations that arise from the confinement of dusty plasmas in the plasma volume. (K. Avinash, Phys. Plasmas, 22, 033701, 2015)