

Abstract Submitted
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Volumetric measurement of synchronization in a weakly-coupled dusty plasma system¹ JEREMIAH WILLIAMS, Wittenberg University — A complex (dusty) plasma is a four-component system composed of ions, electrons, neutral particles and charged microparticles. The presence of the microparticles gives rise to new plasma phenomena, including collective modes such as the dust acoustic wave (DAW). The dust acoustic wave (also known as the dust density wave) is low-frequency, longitudinal mode that propagates through the dust component of the dusty plasma system and is self-excited by the free energy from the ion streaming through the dust component. In the laboratory setting, the majority of the self-excited dust acoustic waves that are observed are nonlinear, which allows for detailed studies of the nonlinear properties of waves at the kinetic level. One such nonlinear process is synchronization, where a self-excited wave or oscillations interacts with a driving force causing an adjustment of the wave or oscillation frequency. In this presentation, we report on experimental measurements of the volumetric nature of the synchronization process of the naturally-occurring dust acoustic wave with an external modulation in an rf discharge.

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