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Spatial evolution of the dust acoustic wave[1] 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. The dust acoustic wave mode has been the subject of intense experimental and theoretical study since being predicted in 1990 and identified experimentally in 1994. In this work, high speed video imaging is employed to measure of the evolution of wave fronts of a propagating dust acoustic wave as it propagates through a weakly-coupled dusty plasma system in an argon, dc glow discharge plasma. In particular, measurements of the growth, saturation and then damping of the wave mode as the wave propagates through the cloud are reported. It is observed that the wave amplitude initially exhibits rapid growth while the wave front compresses. After this initial growth, the width of the wave front remains relatively constant while the amplitude of the wave front evolves like the background dust medium. In some cases, it is also observed that the wave amplitude can decay more quickly than the background dust medium.

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