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Time-resolved measurement of global synchronization in a weakly-coupled dusty plasma system[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 (DAW). This naturally-occurring wave mode has been the subject of intense theoretical and experimental study since it was predicted in 1990 and experimentally identified in 1995. In the experimental studies of this wave mode, it has been observed that the naturally-occurring wave mode is the superposition of several wave modes and that the natural wave mode can be synchronized to an external modulation. In this presentation, a time-resolved Hilbert Transform [J. D. Williams, Phys Rev E 89, 023105 (2014)] is applied to high speed video imaging to provide a spatiotemporal measurement of the global synchronization of the DAW with an external modulation in a weakly-coupled dusty plasma in a dc glow discharge plasma.

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