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Development of time-resolved particle image velocimetry for laboratory and microgravity dusty plasma studies[1] TAYLOR HALL, UWE KONOPKA, EDWARD THOMAS, Auburn University — For over a decade, particle image velocimetry (PIV) techniques have been used to study particle transport, instabilities, and the thermal properties of the microparticle component of dusty plasmas. However, dedicated PIV systems are often limited in their temporal resolution to a few Hertz because of the requirements to synchronize the various hardware components of the system. By using a high-speed camera that can record digital video at over 100 Hz, it becomes possible to make temporally resolved measurements of particle motion in a dusty plasma. This presentation will describe the development of an imaging system that will be used for time-resolved PIV measurements of a dusty plasma. In particular, results will be presented on experiments in which different video frame rates are used to make measurements of the effects of a pulsed perturbation that is applied to a dusty plasma. These perturbation studies will be used to determine the optimum frame rate for PIV.

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Edward Thomas
Auburn University

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