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Real-Time 2-Dimensional Particle Tracking in Magnetized Plasmas[1] BRIAN LYNCH, UWE KONOPKA, EDWARD THOMAS, Auburn University — Complex plasmas are a four component plasma system consisting of electrons, ions, neutral particles, and electrically charged (nanometer to micrometer) sized "dust" particles. In laboratory plasmas, collisional processes lead to a net negative charge residing on the dust grain surface. As a result, dust clouds may be suspended in a plasma sheaths vertical electric field and studied using digital imaging systems with laser sheet illumination. Particle Tracking Velocimetry (PTV) is an analysis technique in which each dust particle is tracked through imaging data. The velocity fields extracted using PTV provide a spatially resolved dust particle phase space distribution (PSD) function, which can be used to calculate transport and thermal properties of the system. In this presentation, we apply "real-time" PTV analysis to the Magnetized Dusty Plasma Experiment (MDPX). The introduction of a magnetic field is shown to significantly modify the global dust cloud PSD as well as individual dust particle dynamics. Finally, we present preliminary plans for the development of a new experimental study to use real-time PTV to observe single particle deflection in a magnetic field - as a means to investigate ion drag and charging of the dust grain.

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