

Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Measurements and simulations of thermal properties of dusty plasmas JEREMIAH WILLIAMS, EDWARD THOMAS, Auburn University — A 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 and allows the study of fundamental aspects of plasma physics on the kinetic level. Using stereoscopic particle image velocimetry (stereo-PIV), one can measure the velocity of the microparticles in three dimensions and extract a three-dimensional distribution of velocities. From this velocity distribution, it is possible to extract a kinetic temperature for the microparticle component. To understand how this distribution of velocities is related to the underlying velocity space distribution function of the microparticle component, extensive simulations of the PIV measurement have been made. It is found that the width of the distribution, and the resulting kinetic temperature, is smaller than the underlying distribution and strongly depends on the density of the microparticle component. This presentation describes ongoing numerical studies on the application of stereo-PIV to the measurement of thermal properties of dusty plasmas. This work is supported by NSF Grant PHY-0354938.

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Date submitted: 27 Sep 2005

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