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Measurements of the kinetic dust temperature of a weakly-coupled complex (dusty) plasma¹ JEREMIAH WILLIAMS, EDWARD THOMAS, Auburn University — A complex (dusty) plasma (CDP) 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, one can extract a kinetic temperature for the microparticle component of a CDP. This presentation describes ongoing experimental measurements of the velocity space distribution of the dust component and ongoing numerical studies on the application of stereo-PIV to the measurement of thermal properties of CDPs. It will be shown that the temperature of the dust component is anisotropic and significantly larger than the other plasma components (electrons, ions and background neutrals), a result which is consistent with previous measurements of the kinetic temperature using the plasma crystal.

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Prefer Oral Session
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