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Investigating the Thermal Properties of a Complex Plasma¹ LORI SCOTT, EDWARD E THOMAS JR., UWE KONOPKA, Auburn University, JEREMIAH WILLIAMS, Wittenberg University, MIKHAIL PUSTYLNIK, HUBERTUS THOMAS, Deutsches Zentrum für Luft und Raumfahrt — Complex plasmas are a four-component plasma system composed of electrons, ions, neutrals, and micron-sized, charged particles (dust). The large mass of the dust particles leads to their compression to thin layers when influenced by gravity, but under microgravity conditions, the particles can fill the entire plasma volume which allows the study of smaller interparticle forces that are masked by gravity. To overcome the gravitational influence, we use the dc glow discharge Plasma Kristall-4 (PK-4) microgravity laboratory on the International Space Station (ISS). When dust particles are injected into PK-4, they flow along an axial electric field until stopped by the application of a periodic oscillation of the electric field. This oscillation creates a change in the spatial ordering and thermal state of the dust system. We seek to understand the redistribution of kinetic energy of the dust particles at the onset of this periodic oscillation. This presentation will focus on data obtained using the ground science reference module, initial results from an ISS experiment, and supporting molecular dynamics simulations.

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