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Microsecond Plasma Changes and the Effect on Millisecond Dust Dynamics[1] LORIN MATTHEWS, TRUELL HYDE, DUSTIN SANFORD, Baylor University, KATRINA VERMILLION, Baylor Univeristy, PETER HARTMANN, Wigner Research Centre for Physics, MARLENE ROSENBERG, UCSD — The PK-4 device on the International Space Station (ISS) provides a platform for the investigation of complex plasma systems in microgravity. The charged particles in the dust clouds have proven a versatile analog for the study of self-ordered (soft matter) systems. Recent experiments and numerical simulations have shown that the seemingly homogeneous DC discharge column is highly inhomogeneous on microsecond time scales. Simulations of the plasma discharge using our 2D particle-in-cell with Monte Carlo Collisions (PIC/MCC) code show that ionization waves dominate the plasma structure. In addition, the DC polarity switching used to keep the dust cloud from drifting causes strong radial gradients in the electric field. Here we apply the time-varying plasma conditions from the PIC/MCC model to an N-body simulation of the ions and dust to examine the effect on the dust dynamics and the formation of stringy dusty fluids.

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