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Modeling Ionization Wave Effects on Dust Chain Formation[1] KATRINA VERMILLION, DUSTIN SANFORD, LORIN MATTHEWS, Baylor University, PETER HARTMANN, Wigner Research Centre for Physics, Budapest, Hungary, MARLENE ROSENBERG, University of California at San Diego, TRUELL HYDE, Baylor University — Recently it has been observed that the PK-4 BU ground-based system replicating the PK-4 experiment on the International Space Station exhibits microsecond time scale inhomogeneities. These inhomogeneous features are related to ionization waves moving through the positive column. Initial numerical simulations found that the plasma parameters within these waves can grow to several times larger than the background average values. This is important since previous works have focused on the formation of dust chains levitated within the electric field in the plasma sheath in a stable, homogeneous plasma. Results from a numerical model of the environment within the PK-4 experiment will be reported in this talk. These results allow examination of the various plasma conditions within the observed microsecond time scale inhomogeneities and the effect these conditions have on the formation of flow-aligned dust chains. The numerical model employed incorporates both dust and ion motion in an N-body simulation, where the boundary conditions are determined from plasma parameters derived using a 2D particle-in-cell with Monte Carlo collisions (PIC/MCC) simulation.

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