Abstract Submitted for the DPP20 Meeting of The American Physical Society

Waves in 1D Dust Chains as Probes in a Streaming Plasma¹ DUSTIN SANFORD, LORIN MATTHEWS, TRUELL HYDE, KATRINA VER-MILLION, Baylor University, PETER HARTMANN, Wigner Research Centre for Physics, MARLENE ROSENBERG, University of California San Diego — In a dusty plasma, the large sizes and long time scales of dust particles provide access to plasma dynamics at the kinetic level. Dust particle trajectories and collective behaviors act as probes for ion and electron dynamics. However, the large gravitational force in terrestrial experiments hides many interesting dust-plasma interactions. The PK4 device onboard the International Space Station allows for the study of these interactions. An investigation of waves in one dimensional dust chains in the streaming plasma PK4 environment is presented. The chains are modeled by the N-body simulation DRIAD (Dynamic Response of Ions and Dust) with plasma boundary conditions provided by a hybrid PIC/MCC model of the DC discharge. The resulting ion flow fields around the grains are used to find the asymmetric particle interaction potentials and pair correlation functions. These functions are used as input for a quasi-localized charge approximation (QLCA) theory. Dispersion relations calculated with QLCA are then compared with the PK4 experiment.

¹This material is based upon work supported by the National Science Foundation and NASA under NSF Grants No. 1740203 and 1707215 and NASA contract 1571701.

> Dustin Sanford Baylor University

Date submitted: 28 Jun 2020

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