

Abstract Submitted  
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**Dust particle string formation in the PK-4 direct current neon discharge**<sup>1</sup> PETER HARTMANN, LORIN S. MATTHEWS, EVDOKIYA KOSTADINOVA, TRUELL W. HYDE, CASPER, Baylor University, One Bear Place 97316, Waco, TX, MARLENE ROSENBERG, Department of Electrical and Computer Engineering, University of California San Diego, La Jolla, California 92093, USA — Using multi-scale numerical modeling we provide a detailed and quantitative description of the dust chain structure formation in the PK-4 experiment operating onboard the International Space Station based on a realistic particle in cell simulation of the neon DC gas discharge, Monte Carlo type dust particle charging computations, and dust-dust interaction calculations. We show, (i) that ionization waves and fast transients appearing during the polarity switching in the gas discharge play an important role to create stable dust particle chains, (ii) how the streaming ions deform the inter-particle interaction potential, and (iii) the mode structure of dust density waves traveling along the dust particle chains.

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