

Abstract Submitted  
for the GEC15 Meeting of  
The American Physical Society

**Perpendicular diffusion of a dilute beam of charged particles in the PK-4 dusty plasma**<sup>1</sup> BIN LIU, JOHN GOREE, Univ. of Iowa, Dept. of Physics and Astronomy, Iowa City, IA USA — We study the random walk of a dilute beam of projectile dust particles that drift through a target dusty plasma. This random walk is a diffusion that occurs mainly due to Coulomb collisions with target particles that have a different size. In the direction parallel to the drift, projectiles exhibit mobility-limited motion with a constant average velocity. We use a 3D molecular dynamics (MD) simulation of the dust particle motion to determine the diffusion and mobility coefficients for the dilute beam. The dust particles are assumed to interact with a shielded Coulomb repulsion. They also experience gas drag. The beam particles are driven by a prescribed net force that is not applied to the target particles; in the experiments this net force is due to an imbalance of the electric and ion drag forces. This simulation is motivated by microgravity experiments, with the expectation that the scattering of projectiles studied here will be observed in upcoming PK-4 experiments on the International Space Station.

[1] Bin Liu and J. Goree, *Physics of Plasmas*, 21, 063704 (2014).

<sup>1</sup>Supported by NASA and DOE.

John Goree  
Univ. of Iowa, Dept. of Physics and Astronomy, Iowa City, IA USA

Date submitted: 12 Jun 2015

Electronic form version 1.4