Abstract Submitted
for the GEC06 Meeting of
The American Physical Society

Response of an Isolated Dust Particulate in a DC Glow Discharge Subjected to External Excitations J. MCFERRAN, J. WEST, V. SUBRAMANIAM, A. KAHRAMAN, Ohio State University — Isolated spheres of borosilicate glass are suspended in a DC glow discharge in neon. The response of spheres 16 to 42 times heavier than in previous work is observed under heavily damped conditions when displaced laterally by applying a transient voltage. It is shown that lateral excitation of the isolated particulate cannot drive the motion to classical resonance as observed in previous work involving axial displacements in RF plasmas. The base excitation (BE) model, rather than the classical forced damped oscillator model, is found to exhibit good agreement with the present results. A new means of estimating charge from the frequency response of the particulate motion using the BE model is described. Sheath polarization and ion drag effects neglected in previous work are included here. Ion drag is found to be the dominant drag mechanism for the heavier particulates. Finally, the trajectory of an isolated sphere displaced by radiation pressure while under heavily damped conditions is observed and analyzed.

J. McFerran
Ohio State University

Date submitted: 15 Jun 2006 Electronic form version 1.4