Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Laboratory study of the expansion of a three-dimensional dusty plasma[1] JOHN K. MEYER, ROBERT L. MERLINO, Department of Physics and Astronomy, University of Iowa — The expansion of a three-dimensional dusty plasma was investigated using fast video imaging and particle tracking techniques. The dust suspension was initially trapped in the electrostatic potential formed by an L-shaped grid in a glow discharge plasma. The discharge was formed in argon at a neutral pressure of 125 mtorr at a discharge current of 5 mA. A 3 mT uniform magnetic field was also present. The dust was spherical glass particles of 1 micron diameter, with an initial density on the order of 10^4 cm^{-3}. The electron temperature was 2.5 eV, and the estimated dust charge was -2000 e. The initially confined dust cloud had a volume on the order of 1-2 cm^3. The expansion of the dust cloud was initiated when the confining potential was removed by suddenly switching the bias on the grid to the floating condition. Measurements of the time history of the particle velocities and dust density within the expanding cloud will be presented.

[1]Work supported by DOE and NSF

Robert L. Merlino
Department of Physics and Astronomy, University of Iowa

Date submitted: 11 Jul 2013 Electronic form version 1.4