

Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Faraday cup measurements of the charge on dust grains in magnetized Q machine plasma¹ S.H. KIM, J.R. HEINRICH, M. MILLER, R.L. MERLINO, University of Iowa — We have installed a Faraday cup (FC) detector to measure the charge on individual dust grains falling through a Q machine plasma. The Q machine plasma consists of singly-charged K ions and electrons confined by a solenoidal magnetic field with variable strength up to 0.4 T. The plasma is nearly fully ionized (background neutral pressure $\sim 10^{-6}$ Torr), with plasma densities in the range of 10^{15} m⁻³, and electron and ion temperatures, $T_e \approx T_i \approx 0.2$ eV. Initial measurements were made using hollow glass microspheres with sizes in the range of 33 to 44 microns. The microparticles get charged as they pass through the plasma and fall into the Faraday cup where the charge is measured. We will report results of our preliminary experiments on the charging of dust in a plasma with a large concentration of negative ions. In future experiments we plan to investigate the effects of magnetic fields and neutral collisions on dust charging.

¹This work was supported by the DOE Grant No. DE-FG01-04ER54795.

R. L. Merlino
University of Iowa

Date submitted: 19 Jul 2011

Electronic form version 1.4