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Probe Induced Low Density Dust Regions in Complex Plasma
BRANDON HARRIS, NATALIE WALKER, JORGE CARMONA REYES, JIMMY SCHMOKE, MIKE COOK, LORIN MATTHEWS, TRUELL HYDE, CASPER - Baylor University — Spherical, micrometer particles within a Coulomb crystal levitated in the sheath above the powered lower electrode in a GEC reference cell are examined using a Zyvex S100 nanomanipulator. Using the S100, a vertical probe was positioned within the cell at various locations with respect to the crystal formed within the sheath. As the probe was lowered toward the horizontal plane of the dust layer, a low density, circular dust region was formed. In this case, a horizontal force balance exists between the confining potential, the interparticle Coulomb repulsion and the probe, which acquires a negative charge (if unpowered) in the same manner as the dust. Treating the probe analytically as a line charge while adjusting its height and dc bias, the dust charge and Debye length were determined. These analytical and experimental results will be compared to Samsonov's previous experiment employing a charged wire.

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