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**A Simple Method to Measure the Interaction Potential between Dielectric Grains in a Dusty Plasma** ZHUANHAO ZHANG, KE QIAO, JIE KONG, LORIN MATTHEWS, TRUELL HYDE, CASPER - Baylor University — A simple, minimally perturbative method is introduced to experimentally measure the interaction potential between two individual dust particles, levitated in the sheath of a radio-frequency (RF) argon discharge. In this technique, a single dust particle is dropped into the plasma sheath to interact with a second individual dust particle already situated at the system's equilibrium point, without introducing any external perturbation. The resulting data is analyzed using a method employing a polynomial fit to the particle displacement,  $X(t)$ , to reduce uncertainty in subsequent calculations. Employing this technique, the interaction potential is measured and shown to be well-described by a screened Coulomb potential and to decrease with increasing pressure. The charge on the particle and the effective dust screening distance are both calculated. It will be shown for the first time experimentally that the charge on a particle in the sheath of an RF plasma decreases with increasing pressure, in agreement with theoretical predictions. The screening distance also decreases with increasing pressure as expected. This technique can be used for rapid determination of particle parameters in dusty plasma.

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