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Measurement of the Interaction Force between Dust Particles within a Glass Box in a GEC RF Reference Cell MUDI CHEN, JIE KONG, KE QIAO, JORGE CARMONA-REYES, BRANDON HARRIS, LORIN MATTHEWS, TRUELL HYDE, CASPER - Baylor University — A wide variety of structural states (for example, Coulomb balls, one-dimensional vertically aligned dust particle chains, helical dust structures, etc.) have been observed for dust particles confined within a glass box placed on the lower electrode of a GEC rf reference cell. Both the interparticle interaction force and the confinement force play important roles in the formation of these structures. Unfortunately, since the exact nature of the confinement force produced by the walls of the glass box is yet unclear, it is difficult to differentiate between the effects produced by the interparticle interaction force and the effects created by the confinement force. In this experiment, a free-falling dust particle in the box acts as an in-situ probe, providing information on the structure of the confinement force. It will be shown that the data provided by this mapping procedure allows the interaction force between particles within various dust particle structures to be measured through perturbation of individual particles employing a diode pumped solid state laser (Coherent VERDI).

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