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Small Dust Cluster Probes within a Dusty Plasma JIE KONG, KE QIAO, LORIN MATTHEWS, TRUELL HYDE, CASPER - Baylor University — Small-number dust particle clusters are often seen in dusty plasmas. Interestingly, such clusters can often be used as in-situ probes providing plasma diagnostics. The number of dust particles, as well as the cluster size and shape, can be easily controlled employing a glass box placed on the powered lower electrode within a GEC rf reference chamber to provide confinement of the dust. Adjusting the rf power alters the plasma conditions creating structural changes within the cluster. This effect can be used to probe the relationship between the rf power and other plasma parameters of interest. This experiment employs the sloshing and breathing modes of small cluster oscillations to examine the relationship between the system's rf power and the plasma screening length inside the glass box as well as determine the particle charge. Experimental results indicate that both the screening length and the dust charge decrease as the rf power inside the box increases.

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