

Abstract Submitted  
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**Vertical Modes and Discrete Instabilities in Two-Dimensional Dust Particle Clusters** KE QIAO, JORGE CARMONA-REYES, JIE KONG, LORIN MATTHEWS, TRUPELL HYDE, CASPER - Baylor University — The coupling observed between horizontal and vertical wave modes in large plasma crystals and their resulting instability formation are current topics of interest, both theoretically [1] and experimentally [2]. Similarly, horizontal [3] and vertical [4] normal modes in finite dust clusters have been examined theoretically but to date, only horizontal modes have been experimentally observed. In this research, dust clusters are formed within a modified GEC rf reference cell, using a glass box placed on the lower powered electrode to provide horizontal confinement. The resulting thermal motion of the dust particles is tracked and analyzed. Using the power spectra obtained, both horizontal and vertical normal modes are identified and discrete instabilities as predicted theoretically [5] are shown to be induced due to the coupling between the horizontal and vertical modes.

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