

Abstract Submitted
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Some results on metastable states of two-dimensional dusty plasma AUSTIN R. HOWELL, T.E. SHERIDAN, Ohio Northern University — In dusty (complex) plasma, charged microscopic dust particles are confined inside a regular electron-ion plasma. Small clusters of identical dust particles can be confined to two dimensions at the edge of the plasma sheath, and will take the overall shape of the confining potential well. For strongly-coupled systems, clusters with more than a few particles may be trapped in metastable arrangements due to potential barriers that block rearrangement. We have experimentally characterized the arrangements of clusters with $n = 14$ to 30 dust particles confined in a two-dimensional biharmonic potential well. Ensembles of particle arrangements are created by applying a step increase to the plasma density, which briefly melts the cluster to create a new arrangement state. For $n = 14$ dust particles we find a single arrangement state without interior particles. When n is increased to 15, we observe a number of different arrangement states with interior particles. Most of these states must be metastable. We suggest that particles in the interior of the cluster cannot easily move, thereby preventing rearrangement into the minimum energy state.

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