

Abstract Submitted
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Study of small Debye clusters in highly anisotropic potential wells

KEVIN WELLS, T.E. SHERIDAN, Ohio Northern University — A Debye cluster is a group of n dust particles in a plasma interacting through a shielded Coulomb (i.e., a Debye) potential. A rectangular trap forms an anisotropic potential well which confines the cluster into a two-dimensional ellipse. It is expected that as the well anisotropy increases, the elliptical cluster will become elongated and at some point all the particles will lie in a straight line so that the cluster is fully one dimensional. Experiments performed in the DONUT experiment (Dusty Ohio Northern University experiment) for two confinement geometries and for $n = 2$ to 24 particles have shown the stages of the two-to-one dimension transition. We find that as the number of particles decreases, the two-dimensional ellipse shrinks and then grows two linear tails forming a “barred elliptical” cluster. For n less than or equal to 6 the clusters are fully one dimensional.

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