Physics > Atomic Physics

Effective Long-Range Interactions in Confined Curved Dimensions

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We explore the effective long-range interaction of charged particles confined to a curved low-dimensional manifold using the example of a helical geometry. Opposite to the Coulomb interaction in free space the confined particles experience a force which is oscillating with the distance between the particles. This leads to stable equilibrium configurations and correspondingly induced bound states whose number is tunable with the parameters of the helix. We demonstrate the existence of a plethora of equilibria of few-body chains with different symmetry character that are allowed to freely move. An outline concerning the implications on many-body helical chains is provided.

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