

Abstract Submitted
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Ion-crystal metamorphoses in the Paul trap VARUN URSEKAR,
YUN SEONG NAM, REINHOLD BLMEL, Wesleyan Univ — We construct a generalized time-independent pseudo potential to describe the crystal morphologies and transitions between them for a three-ion Coulomb-interacting system in a Paul trap. The derivation of this pseudo potential extends a similar method that was already successfully constructed for the two-ion case to the case of three ions. Our method is based on keeping second-order micro-motion terms in the derivation of the pseudo potential. The resulting improved pseudo potential predicts ion-crystal morphologies that are corroborated by numerical simulations but are not captured by the standard pseudo potential. We provide a general method for extending this improved pseudo potential to a system of N Coulomb-interacting ions in a Paul trap.

Varun Ursekar
Wesleyan Univ

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