Structural phase transitions and topological defects in ion Coulomb crystals

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http://www.sciencedirect.com/science/article/pii/S0921452614008850 [2]

We use laser-cooled ion Coulomb crystals in the well-controlled environment of a harmonic radiofrequency ion trap to investigate phase transitions and defect formation. Topological defects in ion Coulomb crystals (kinks) have been recently proposed for studies of nonlinear physics with solitons and as carriers of quantum information. Defects form when a symmetry breaking phase transition is crossed nonadiabatically. For a second order phase transition, the Kibble–Zurek mechanism predicts that the formation of these defects follows a power law scaling in the rate of the transition. We demonstrate a scaling of defect density and describe kink dynamics and stability. We further discuss the implementation of mass defects and electric fields as first steps toward controlled kink preparation and manipulation.

- Result [3]
- SIQS [4]
- 15.20.Lp Linear Paul traps [5]

Links:
[1] http://qurope.eu/users/omarty
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