Contribution ID: **106**   Type: **Poster**

The Nonlinear O(3) Model with Chemical Potential in a Dual Representation

Wednesday, 15 July 2015 18:30 (2h 30m)

We study the two dimensional nonlinear O(3) model with a chemical potential coupled to the conserved charge. The complex action problem occurring at nonzero chemical potential is solved by means of a duality transform, which yields real and positive weights and makes Monte Carlo simulations feasible. We find a phase transition at the end of a Silver Blaze region, where a net number of particles appears in the system. We show various results for bulk observables and correlators at finite chemical potential and discuss their finite size behavior. Furthermore, an approximate method to obtain the two particle potential is discussed.

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Session Classification: Poster Session

Track Classification: Nonzero Temperature and Density