Contribution ID : **48**   Type : **not specified**

3D O(2) non-linear sigma model on the lattice and cosmic strings

Content

We present a study of the 3D O(2) non-linear sigma model on the lattice at finite temperature near its second-order phase transition. We consider two disctinct actions: the standard action of this model and a proposed topological action. By analyzing critical exponents and a step-scaling function, we provide evidence that both actions belong to the same universality class. In our study, we investigate two types of topological defects within the model: field vortices and vortex lines. The latter bears strong analogies with global cosmic strings. By employing the gradient flow equation for driving the system towards the phase transition, we explore the formation of topological defects, which shares characteristics with the formation of topological defects in the Early Universe.

Summary

We present a study of the 3D O(2) non-linear sigma model on the lattice at finite temperature near its second-order phase transition. We consider two disctinct actions: the standard action of this model and a proposed topological action. By analyzing critical exponents and a step-scaling function, we provide evidence that both actions belong to the same universality class. In our study, we investigate two types of topological defects within the model: field vortices and vortex lines. The latter bears strong analogies with global cosmic strings. By employing the gradient flow equation for driving the system towards the phase transition, we explore the formation of topological defects, which shares characteristics with the formation of topological defects in the Early Universe.

Primary author(s) :   Mr. LÓPEZ-CONTRERAS, Edgar (ICN-UNAM)

Co-author(s) :   Dr. BIETENHOLZ, Wolfgang (ICN, UNAM); NIETO CASTELLANOS, Jaime Fabián (Facultad de Ciencias); POLANCO EÚAN, Elías Natanael (ICN-UNAM)

Presenter(s) :   Mr. LÓPEZ-CONTRERAS, Edgar (ICN-UNAM)