Contribution ID: **18** Type: **Talk**

Study of the chiral phase transition with vector and axial-vector mesons in an extended linear sigma model within the functional renormalization group approach

Thursday, July 14, 2016 1:30 PM (30 minutes)

We use the functional renormalization group (FRG) technique to explore the characteristics of the chiral phase transition between the hadronic phase of quantum chromodynamics and the quark-gluon plasma. The restoration of chiral symmetry at high temperatures and/or net-baryon densities leads to changes in the in-medium spectral properties of light vector mesons, directly affecting the dilepton spectrum measurable in heavy-ion collisions. Therefore a study of vector and axial-vector mesons is indispensable for understanding the underlying mechanism of chiral symmetry restoration.

The theoretical framework for our investigation is the so-called extended linear sigma model (eLSM). This model is an effective description of the strong interaction which features besides scalars and pseudoscalars also vector and axial-vector mesons. Here, all degrees of freedom in the eLSM are exclusively treated beyond mean-field, i.e. they are involved in the FRG flow and, consequently, are subject to quantum and statistical fluctuations.

Recent results on the order of the chiral phase transition and on the mass degeneracy of chiral partners occurring beyond the phase boundary are presented. The chiral limit as well as the effect of the axial anomaly are examined. Finally, the inclusion of quark fields will be discussed. This study may serve as the starting point for computing the vector meson spectral functions in the near future.

Primary author: ESER, Jürgen (Goethe-University Frankfurt)

Co-author: RISCHKE, Dirk (University Frankfurt)

Presenter: ESER, Jürgen (Goethe-University Frankfurt)

Session Classification: Parallel Track 3