Universität Bielefeld Fakultät für Physik

Seminar

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Patterns and partners for chiral and $U(1)_A$ restoration

The nature of chiral symmetry restoration and the identification of its correct pattern in terms of $O(4)$ and $U(1)_A$ symmetries are central problems for our present understanding of the QCD phase diagram, currently explored in lattice simulations and heavy-ion collisions. We will present a theoretical analysis based on Ward Identities for the full scalar/pseudoscalar $U(3)$ meson nonets, which sheds light on these issues. Our results lead to interesting conclusions regarding the behaviour of chiral partners in the limit of exact restoration and provide useful relations for lattice analysis. In addition, partner degeneration is connected with physical interaction vertices and the temperature dependence of lattice screening masses is related to quark condensate combinations. We will also describe the realization of these ideas in meson theories. In particular, a $U(3)$ Chiral Perturbation Theory calculation supports the partner and pattern conclusions from WI. The role of the thermal $f_0(500)$ state, generated in unitarized pion scattering, to describe the scalar susceptibility will also be analyzed, as well as the information provided by the large number of Goldstone Bosons framework.

Tuesday, 16.01.2018, 14:15 Uhr
Place: D6-135