Michał Marczenko, ”Net-baryon number fluctuations in the quark-meson-nucleon model at finite baryon density”

Report of Contributions

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One of the most significant aspects of QCD thermodynamics is understanding how the transition from hadrons to their constituents—quarks and gluons—relates to the underlying deconfinement and chiral dynamics. This is of major relevance for heavy-ion collisions, as well as in the study of cold and dense systems, such as compact stars. The latter, however, is often studied exclusively in models of either hadron or quark degrees of freedom. In this talk, we present the mean-field thermodynamics of an effective hybrid quark-meson-nucleon (QMN) model for QCD phase transitions at low temperatures and finite baryon densities. In this framework, the chiral dynamics is described within the linear sigma model, whereas the deconfinement transition is driven by a medium-dependent modification of the particle distribution functions, where an additional scalar field is introduced. The structure of the net-baryon number fluctuations along with its higher order cumulants is discussed as possible probes for the chiral and deconfinement phase transitions. A qualitative comparison of the results obtained in the nucleonic (parity doublet) and quark (NJL) models is also presented.

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