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Meson dissociation in hot, dense matter within the Beth-Uhlenbeck approach

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Collaboration

Abstract content

We investigate the meson dissociation in dense matter at finite temperature within the Polyakov-loop improved NJL model. To this end we first consider quark-antiquark correlations in the pion channel within a Beth-Uhlenbeck approach that treats bound states and scattering continuum on the same footing and encodes the Mott dissociation in the behaviour of the in-medium phase shifts [1]. The Mott transition is triggered by the melting of the chiral condensate which entails a drop reduction of the dynamical quark masses and thus a downwards shift of the scattering continuum which eventually "eats up" the bound state, transforming it to a resonance in the continuum. In [2] it has been demonstrated how the backreaction of the pion gas on the chiral condensate can be taken into account within the Beth-Uhlenbeck approach by adopting a simplified model of the medium-dependent phase shifts where the scattering continuum was replaced by an antibound state at the continuum threshold. In the present work [3], we relax this assumption and improve the ansatz for the continuum phase shift. We also include further low-lying meson states (kaons, ρ-mesons) and study their influence on the pseudocritical temperature of the chiral transition.
[1] D. Blaschke et al. Ann. Phys. 348 (2014) 228.
[2] D. Blaschke, A. Dubinin, D. Ebert and A. Friesen, Phys. Part. Nucl.Lett. 15 (2018) 230.
[3] I. Soudi, D. Blaschke, in preparation (2018).

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