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Chiral condensate and chemical freeze-out

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We consider a chemical freeze-out mechanism which is based on a strong medium dependence of the rates for inelastic flavor-equilibrating collisions based on the delocalization of hadronic wave functions and growing hadronic radii when approaching the chiral restoration. We investigate the role of mesonic (pion) and baryonic (nucleon) fluctuations for melting the chiral condensate in the phase diagram in the (T,mu)-plane. We apply the PNJL model beyond mean-field and present an effective generalization of the chiral perturbation theory result which accounts for the medium dependence of the pion decay constant while preserving the GMOR relation. We demonstrate within a schematic resonance gas model consisting of a variable number of pionic and nucleonic degrees of freedom that within the above model a quantitative explanation of the hadonic freeze-out curve and its phenomenological conditions can be given.

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