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Strangeness instabilities in high energy heavy-ion collisions

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One of the very interesting aspects of high energy heavy-ion collisions experiments is a detailed study of the thermodynamical properties of strongly interacting nuclear matter away from the nuclear ground state and many efforts were focused on searching for possible phase transitions in such collisions. In this investigation, we are going to explore the presence of thermodynamic instabilities and the realization of a pure hadronic phase transition at finite temperature and baryon density nuclear matter. The analysis is performed by means of an effective relativistic mean-field model with the inclusion of hyperons, Δ-isobars, and the lightest pseudoscalar and vector meson degrees of freedom. The Gibbs conditions on the global conservation of baryon number and zero net strangeness in symmetric nuclear matter are required. In this context, a phase transition characterized by both mechanical instability (fluctuations on the baryon density) and by chemical-diffusive instability (fluctuations on the strangeness concentration) in asymmetric nuclear matter can take place. In analogy with the liquid-gas nuclear phase transition, hadronic phases with different values of antibaryon-baryon ratios and strangeness content may coexist during the mixed phase. Such a physical regime could be in principle investigated in the high-energy compressed nuclear matter experiments where it is possible to create compressed baryonic matter with a high net baryon density.

In-person participation

Yes

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