

Possible enhancement of dilepton production and transport coefficients due to the QCD phase transitions at high density

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We study how the dilepton production rate (DPR) and the associated transport coefficients, the electric conductivity and relaxation time, are affected by the soft modes of the QCD critical point (CP) and the color superconducting (CSC) phase transition. We examine the modification of the photon self-energy by the so-called Aslamazov-Larkin, Maki-Thompson, and Density of States terms on the basis of the two-flavor NJL model. We find that the DPR is significantly enhanced in the low invariant mass region around the QCD CP and CSC phase transition, which can be promising observables to reveal the existence of the respective phase transitions by heavy-ion collision experiments. Moreover, it is shown that electric conductivity and relaxation time are divergent at the respective critical temperatures with different exponents and the physical origin of the difference is clarified in terms of the characteristics of the respective soft modes.

Theory / experiment

Theory

Group or collaboration name

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