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Predicting QCD phase diagram with chiral relativistic mean field model fitted to $\mu_B = 0$ lattice data

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The SU(3) flavor parity-doublet quark-hadron model is used to investigate the phase diagram of QCD matter. The quark sector of the model is tuned to the $\mu_B = 0$ lattice QCD data on trace anomaly. The structure of the baryon number susceptibilities in the temperature/chemical potential plane is studied in some detail.
The model predicts three phase transitions - nuclear first-order liquid-gas phase transition, chiral symmetry restoration, and deconfinement transition.
At $\mu_B = 0$, a good agreement with the corresponding lattice data is obtained.
The deviations from the free hadron gas baseline in the crossover temperature region at $\mu_B = 0$ are mainly attributed to the leftover of the liquid-gas transition in nuclear matter, the chiral phase transition determines the baryon fluctuations at much higher μ_B, and at even higher baryon densities the behavior of fluctuations is controlled by deconfinement transition.

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