

Modelling Finite Volume Effects in the QCD Phase Diagram

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We investigate the impact of finite volume effects on the QCD phase diagram, particularly in the context of ultrarelativistic heavy ion collisions. Utilizing the Nambu-Jona-Lasinio (NJL) model, we analyze the chiral transition line in the (T, μ_B) plane with MIT boundary condition, simulating confinement within a fireball of limited dimensions. Our findings reveal that the transition temperature, number density, and its susceptibilities exhibit significant dependence on system volume. Notably, while the shift in the crossover transition line is modest, the first-order transition region displays pronounced volume sensitivity, particularly affecting the location of the critical point. These results underscore the necessity of accounting for finite size effects when interpreting experimental signatures of the QCD phase diagram, especially in light of ongoing and future low-energy experiments exploring regions of high baryonic density.

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