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Towards a Determination of thermal static Potential at Finite Density from Lattice QCD

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The modification of heavy-quark interactions in hot and dense QCD matter plays a central role in understanding the fate of quarkonium in heavy-ion collisions. While lattice QCD studies at zero chemical potential have established the temperature dependence of the static quark–antiquark potential and its spectral properties, the finite baryon density regime remains largely unexplored. In this work, we investigate the potential between static quarks at nonzero baryon chemical potential using Taylor-expanded Wilson line correlators. Simulations are carried out in (2+1)-flavor QCD at physical quark masses with the HISQ action on ensembles generated by the HotQCD collaboration. This study provides first steps toward connecting lattice QCD results for the heavy-quark potential to quarkonium survival probabilities in the QCD phase diagram at finite density, with direct relevance to current and upcoming experiments at RHIC and FAIR.

Parallel Session (for talks only)

QCD at nonzero temperature and density

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