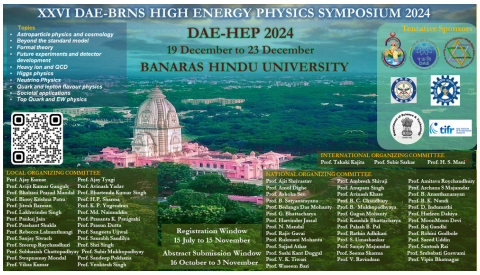

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Lattice QCD study of quarkonia at finite temperature

Quarkonia, the bound states of heavy quark-antiquark pairs, is an imortant probe for studying the quark-gluon plasma (QGP). We investigate the fate of in-medium quarkonia bound states in the QGP by studyng their spectral functions from lattice QCD. Specifically, we study the quarkonia correlators in the pseudoscalar and vector channels at temperatures $1.2T_{pc}$, $1.4T_{pc}$, and $1.6T_{pc}$. To regularize the ill-posed nature of spectral reconstruction, we utilize physics-motivated information. Near the threshold, the spectral function is obtained using a non-perturbatively determined complex potential, while in the ultraviolet (UV) limit, we used the vacuum spectral function. We find that this combination effectively describes the pseudoscalar correlator on the lattice. However, an additional transport contribution is needed in the infrared (IR) region to fully describe the vector correlator. In the bound state region, our results show that the charmonium state has already begun to melt within the temperature range considered, indicated by a large thermal decay width induced by the imaginary part of the complex potential. Conversely, the bottomonium state remains intact, as evidenced by a sharp bound state peak.

Field of contribution

Theory

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