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Thermal photon production rate from 2+1 flavor lattice QCD

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Thermal photons from the QGP provide important information about the interaction among the plasma constituents. The photon production rate from a thermally equilibrated plasma is proportional to the transverse spectral function $\rho_T(\omega=|\vec{k}|, \vec{k})$. Photon production rates can also be calculated from the difference between ρ_T (transverse) and ρ_L (longitudinal) correlator as ρ_L vanishes on the photon point. The IR part of $\rho_T - \rho_L$ dominates, and therefore the corresponding Euclidean correlator receives most of its contribution from the IR region. We calculate the correlator of $\rho_T - \rho_L$ on $f=2+1$ flavor HISQ configurations with $m_l = m_s/5$ at temperatures $\sim 1.15T_c$ and $\sim 1.3T_c$. We have used various ansätze of the spectral function, which are 1) Polynomial ansatz of the spectral function connected to the UV perturbative region and 2) Hydro-inspired spectral function. We have also used the Backus-Gilbert method to estimate the spectral function. We will show the comparison of the photon production rate estimated from all these different methods.

Session

Heavy Ions and QCD

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