Abstract

This dissertation focuses on the reconstruction of the spectral function to study the behavior of the quarkonia in the QGP. The estimation of the spectral function requires an ansatz. Since the different regimes of strong interactions (on the basis of energy) are explained by different theories, the spectral function of quarkonia is split into parts. One part is the vacuum part (ρ^{vac}) obtained from the perturbation theory which is valid only well above the threshold while the thermal part (ρ^{therm}) is obtained from NRQCD using real-time static potential and a Schrödinger like equation. It is observed that this thermal part is only valid around the threshold and behaves abnormally at high frequencies. The valid parts of ρ^{vac} and ρ^{therm} are merged and a perturbative spectral function (ρ^{pert}) is obtained. For the verification of the estimated spectral function, it is cross checked against the lattice data obtained from LQCD on lattice of size 96 lattice units in spatial directions and 28 lattice units in temporal direction. It is observed that the estimated spectral function is consistent with the lattice data except for few starting points that could be because of the lattice artifacts. For the bottomonium, a narrow resonance peak at relatively high temperature is observed while for charmonium, no such peak is observed indicating that bottomonium can survive relatively high temperatures as compared to charmonium. Also, thermal mass shift towards high frequency region is observed with increase in temperature.