QUARKONIUM AT FINITE TEMPERATURE *

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I discuss quarkonium spectral functions at finite temperature reconstructed using the Maximum Entropy Method. I show in particular that the $J/\psi$ survives in the deconfined phase up to $1.5 T_c$.

The study of quarkonium system at finite temperature has been a subject of considerable interest since the work of Matusi and Satz 1, but a first principle calculation of quarkonium properties at non-zero temperature was missing. It was shown, however, that the application of the Maximum Entropy Method (MEM) can make such calculation possible 2. The method have been successfully applied at zero 2 as well as at finite temperature 3.

I am going to discuss charmonium spectral function calculated with MEM on $48^3 \times N_t$ lattices at lattice spacing $a^{-1} = 4.86 \text{GeV}$ and $N_t = 24, 16$ and 12 corresponding to temperatures $0.75 T_c, 1.12 T_c$ and $1.5 T_c$ ($T_c$ being the deconfinement temperature). The results for the vector channel are shown in the Figure. As one can see the $J/\psi$ seems to survive up to temperatures $1.5 T_c$. Similar calculation have been performed in the scalar and axial vector channels which correspond to the $P$-state charmonia, but no peak was found there.

References

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