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non adiabatic evolution of quarkonia in the cooling phase of QGP

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Emphasizing the possibility of moderate suppression of heavy quarkonium states, we invite some attention towards the issue of real time evolution of quarkonia during the cooling phase of quark gluon plasma(QGP). In this context, we have used time dependent perturbation theory to show that $\Upsilon(1S)$, $\Upsilon(2S)$, J/Ψ can further be dissociated in the medium at a temperature below their dissociation thresholds even though they survive the Debye screening. We have presented and compared the dissociation probabilities and dissociation rates of these states in real and complex valued potential in this article. In the first case we have dealt with wave functions of the Schroedinger equation corresponding to various quarkonia species where as for the later one, we have considered the stochastic average of the same . A precise comparison of these two aspects has been presented. We realise that our method is an approximate way to analyse the short time behaviour of quarkonium in real valued potential and for long time behaviour one must adopt a non perturbative technique for solving schr\"odinger equation of quarkonium bound states in evolving QGP. On the other hand the perturbation technique seems to be valid enough to deal with the same for a complex valued quark anti-quark potential when it is dealt with the stochastic average of wave functions only.

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