

Open quantum systems approach to the study of quarkonium suppression

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Heavy quarkonium related observables are very useful to obtain information about the medium created in relativistic heavy ion collisions. In recent years the theoretical description of quarkonium in a medium has moved towards a more dynamical picture in which decay and recombination processes are very important. In this talk we will discuss the equations that describe the evolution of the heavy quarks reduced density matrix in different approximations, highlighting the color dynamics that is absent in the Abelian case. Non-relativistic effective field theories are useful tools to study this problem. Using them we will derive the master equation that describes the evolution of quarkonium inside the medium in the case $1/r \gg T$ and we will analyse a specific temperature regime in which all the information needed from the medium can be encoded in two non-perturbative parameters.

We will also discuss the relation with classical equations (Langevin and Boltzmann) and how they can help reducing the computational cost of solving the master equation.

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