

Open quantum systems for quarkonium dynamics

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In recent years, a lot of work has been done towards a dynamical description of quarkonia inside the QGP, using the open quantum systems formalism. In this framework, one can get a real-time description of a quantum system (here the quarkonium) in interaction with a thermal bath (the QGP) by studying the system reduced density matrix.

The first part of the talk will be devoted to a review of the use of open quantum systems to describe the evolution of heavy quarkonia in the QGP.

In the second part, I will investigate the real-time dynamics of a correlated heavy quark-antiquark pair inside the QGP using a quantum master equation previously derived from first QCD principles in [1]. The novel feature of our approach is to numerically solve the full equation, avoiding to perform semi-classical approximations as was done in [1] to solve them. The resolution is performed in 1D to lessen the computational cost, nonetheless it is sufficient to gain insight on the dynamics.

[1]-J. P. Blaizot and M. A. Escobedo, Quantum and classical dynamics of heavy quarks in a quark-gluon plasma, J. High Energy Phys. 06 (2018) 034.

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Session Classification: Day 5 (mostly HIC, nPDFs & tools)

Track Classification: Reactions with 2 nuclei & tools for Quark-Gluon Plasma,...