Contribution ID: **973** Type: **Oral presentation**

Heavy quarkonium dynamics in the QGP with a quantum master equation approach

Thursday, 7 April 2022 12:30 (20 minutes)

In recent years, a significant theoretical effort has been made towards a dynamical description of quarkonia inside the Quark-Gluon Plasma (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 integrating out the bath degrees of freedom and studying the system reduced density matrix.

We investigate the real-time dynamics of a correlated heavy quark-antiquark pair inside the QGP using novel coupled quantum master equations derived from first QCD principles and based on the work of Blaizot & Escobedo [1]. The equations are solved numerically in 1D to lessen computing costs and are used for the first time to gain insight on the dynamics in both a static and evolving medium following a Björken-like temperature evolution. Several initial conditions will be explored and a first feasability analysis of a semi-classical treatment will be presented, in order to see if this approach can be used to treat multiple charm-anticharm pairs at the same time.

[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.

Primary authors: DELORME, Stéphane; Prof. GOUSSET, Thierry (University of Nantes/Subatech); KATZ, Roland (Subatech, Nantes); GOSSIAUX, Pol-Bernard

Presenter: DELORME, Stéphane

Session Classification: Parallel Session T11: Heavy flavors, quarkonia, and strangeness production

Track Classification: Heavy flavors, quarkonia, and strangeness production