



Contribution ID: 498

Type: **Poster**

Heavy Quark dynamics in the Quark-Gluon Plasma and the puzzling relation between R_{AA} and v_2

Tuesday 29 September 2015 16:30 (2 hours)

We review the basic concepts related with the study of the dynamics of the heavy quarks in the quark-gluon plasma created in ultra-relativistic heavy-ion collisions.

We challenge the assumption of brownian motion for charm quarks comparing the dynamical evolution of charm and bottom quarks in a Fokker-Planck approach and in a Transport Boltzmann one [1] as well as investigating the uncertainties inherent to the different realization of the Fluctuation Dissipation Theorem (FDT) [2].

We show that while for bottom the motion appears quite close to a Brownian one, this does not seem to be the case for charm quarks.

We address the difficulties of the present theoretical approaches to have a self-consistent description of the experimental data at both RHIC and LHC.

In particular a puzzling relation between the nuclear modification factor $R_{AA}(p_T)$ and the elliptic flow $v_2(p_T)$ related to heavy quark has been observed which challenged existing models. We discuss how the temperature dependence of the heavy quark drag coefficient can account for a large part of such a puzzle. We point out that for the same $R_{AA}(p_T)$ one can generate 2-3 times more v_2 depending on the temperature dependence of the heavy quark drag coefficient [3].

A non-decreasing drag coefficient as $T \rightarrow T_c$, as in liquids and not in gas, is a major ingredient for a simultaneous description of $R_{AA}(p_T)$ and $v_2(p_T)$ along with hadronization by coalescence.

References

- [1] S. K. Das, F. Scardina, S. Plumari and V. Greco, Phys. Rev. C 90 (2014) 4, 044901.
- [2] F. Scardina, J. I. Bellone, S.K. Das, V. Greco, "Impact of different realization of the Fluctuation Dissipation Theorem on the heavy dynamics in a Langevin approach", to be submitted.
- [3] S. K. Das, F. Scardina, S. Plumari and V. Greco, Phys. Lett. B 747 (2015) 260.

On behalf of collaboration:

NONE

Primary author: GRECO, Vincenzo (University of Catania)

Co-authors: Mrs BELLONE, Jessica Ilaria (University of Catania); Dr PLUMARI, Salvatore (University of Catania, INFN-LNS); DAS, Santosh Kumar (University of Catania, Italy); SCARDINA, francesco (INFN LNS)

Presenters: GRECO, Vincenzo (University of Catania); SCARDINA, francesco (INFN LNS)

Session Classification: Poster Session

Track Classification: Open Heavy Flavors and Strangeness