17th International Conference on Strangeness in Quark Matter
Universiteit Utrecht
10-15 July 2017
Utrecht, the Netherlands
Utrecht 2017

Contribution ID: **52** Type: **oral presentation**

Heavy Quark Dynamics Toward Thermalization: R_{AA},v_1,v_2,v_3

Friday 14 July 2017 16:05 (20 minutes)

We describe the propagation of heavy quarks in the quark-gluon plasma (QGP) by means of a Boltzmann transport approach. We take into account the non-perturbative interaction between heavy quarks and light quarks by means of a quasi particle approach in which light partons are dressed with thermal masses. Such a model is able to catch the main features of non-perturbative interaction as the increasing of the interaction in the region of low temperature, which is a fundamental ingredient to reproduce the experimental data for the nuclear suppression factor and the elliptic flow. A main finding is that one predicts both R_{AA} and v_2 with an underlying space-diffusion coefficient that ,within the present uncertainties is in good agreement with present lQCD calculations.
We will also highlight the impact of radiative energy loss contribution implementing in our model a formula for the emitted gluon spectrum calculated in a multiple scattering and higher-twist scheme.
Besides it turns out that charm quarks may be an ideal probe of the initial electromagnetic field. In fact thanks to their short formation time, subdominant thermal production and not very large mass they can be a sensitive probe of the initial electromagnetic field and electric conductivity of the bulk matter.
Realistic simulation shows a charm/anti-charm opposite transverse flow v_1 of the order of a few percent depending on the value of the electric conductivity of the bulk QGP.

[1]S. K. Das, F. Scardina, S. Plumari, V. Greco, Phys.Rev. C90 (2014) 044901.

[2]S. K. Das, F. Scardina, S. Plumari, V. Greco, Phys.Lett. B747 (2015) 260-264.

[3]S. K. Das, S. Plumari, S. Chatterjee, J. Alam, F. Scardina, V. Greco, Phys.Lett. B768 (2017) 260-264.

List of tracks

Heavy-flavour (open and hidden)

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Session Classification: Parallel Heavy flavour

Track Classification: Heavy-flavour (open and hidden)