XXIV QUARK MATTER DARMSTADT 2014

Contribution ID: **78** Type: **Poster**

Charm Quark Medium Modification within a Linearized Boltzmann Approach

Tuesday, 20 May 2014 16:30 (2 hours)

Heavy-flavour probes of the quark-gluon plasma (QGP) have yielded a number of surprising results. Due to their large mass and the temperature scale of the collision,
it was anticipated that the charm and bottom quarks would interact weakly with the produced medium. It therefore came as a surprise when experimental results for D mesons indicated
charm quarks with small R_{AA} and large elliptic flow v_n. This suggests that heavy-flavour probes are sensitive to the collective dynamics of the QGP medium which are now
well described by viscous hydrodynamics.

What is, however, not so well understood is the value of the coupling of the heavy quarks to the QGP medium. In this study, we couple the evolution of open charm quarks to
viscous hydrodynamics using a linearized Boltzmann equation [1] with pQCD based matrix elements for the heavy-quarks interacting with the QGP medium.

We compare the elastic energy loss transport coefficients $\hat{e}$ and $\hat{q}$ in this scheme for an infinite medium at finite temperature against those extracted using a Langevin equation
which describes the kinematics of the Boltzmann equation in the limit of small momentum transfer. We also examine the charm response to a thermal medium with fixed velocity profile, and present
first results for charm elastic energy loss in a realistic medium described by viscous hydrodynamics coupled to a hadronic afterburner [2].

[1] J. Auvinen, K. J. Eskola and T. Renk, Phys. Rev. C **82**, 024906 (2010).

[2] H. Song, S. A. Bass and U. Heinz, Phys. Rev. C **83**, 024912 (2011).

Primary authors: MORELAND, J. Scott (Duke University); Prof. BASS, Steffen A. (Duke University)

Presenter: MORELAND, J. Scott (Duke University)

Session Classification: Poster session

Track Classification: Open Heavy Flavour and Quarkonia