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Impact of the initial glasma and electromagnetic fields on HQs

Tuesday, June 2, 2020 11:40 AM (20 minutes)

Heavy quarks are excellent probes to study the initial stages of heavy ion collisions since they are generated in the early times around 0.1 fm/c together with a thermalization time that is comparable to the lifetime of the QGP phase. In this talk we want to focus on two novel aspects of the HQs dynamics related with the very early stage of their evolution (t< 0.5-1 fm/c). The first is the evolution of HQ distribution in the initial glasma fields w.r.t. the standard HQs interaction with the quark and gluon particles. The second is the impact of the initial strong magnetic field and large vorticity. From the interaction between glasma field and HQs, we find that the field can lead to an initial enhancement of RAA of charm quarks contrary to the pattern of the standard particle interaction; this furthermore leads to a larger elliptic flow v2 after the interaction with the QGP.
In the second part it will be discussed how the strong initial EM field and vorticity can lead to a large directed flow v1 of D0 and anti-D0 and a splitting that depends critically on the time evolution of the magnetic field. In particular, if the large and positive sign of v1 splitting of D mesons measured by Alice Collaboration is due to EM field, then we should expect that the lifetime of EM field at that energy is around 0.4 fm/c. Finally, we propose a study of the effects of EM field on v1 of the leptons from Z0 boson decay and its correlation to the D meson one. We will discuss how this can be exploited to probe if the large directed flow splitting of D meson is truly due to EM field, thus opening a new way to constrain the EM field.
[1] Y. Sun, G. Coci, S. K. Das, S. Plumari, M. Ruggieri and V. Greco, Phys. Lett. B 798, 134933 (2019).
[2] M. Ruggieri and S. K. Das, Phys. Rev. D 98, 094024 (2018).
[3] Y. Sun, V. Greco, S. Plumari, in preparation.

Collaboration (if applicable)

Track

Heavy Flavor and Quarkonia

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