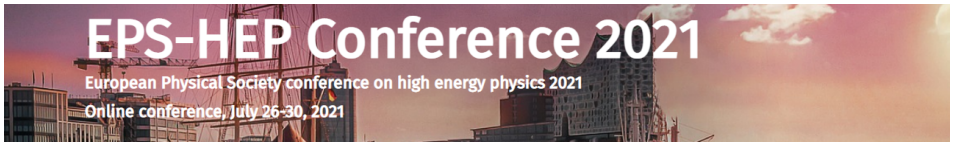

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Impact of the initial electromagnetic and glasma fields on heavy quarks and leptons from Z0 decay

Monday 26 July 2021 17:30 (15 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. Ultra-relativistic heavy ion collisions are expected to generate a huge electromagnetic (e.m.) field that is expected to generate a splitting of the directed flow of charged particles and anti-particles. In this talk we will discuss how the strong initial e.m. field can lead to a large directed flow v1 of neutral particles/anti-particles D0 and anti-D0 of few percent much larger compared to the observed light charged particles v1 and how it can be considered as a possible probe of the formation of the quark-gluon plasma phase.
Moreover, we have found a general formula for all possible charge dependent flow observables that can be generated by the strong electromagnetic fields in non-central relativistic heavy ion collisions. The formula has a very simple form at pT larger than several GeV/c, which can be treated as the signature of charged dependent flow observables induced by e.m. fields. Furthermore, we found that the v1 splitting depends critically on the time evolution of the magnetic field. Based on this study, we finally discuss why the measurement of of leptons from Z0 decay and its correlation to the charmed mesons are better in probing e.m. fields and thus opening a new way to constrain the EM field.
The second topic we want to discuss is the evolution of HQ distribution in the initial glasma fields w.r.t. the standard HQs interaction with the QGP. 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 the modification on the relation between the elliptic flow v2 and RAA of charmed mesons after the interaction with the QGP.
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Collaboration / Activity

Heavy quark dynamics

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