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Heavy vs. light hadron production and medium modification at RHIC and LHC

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Hard hadrons, including heavy flavor and high p_T light flavor hadrons, are ideal probes of the transport properties of the QGP matter created in relativistic heavy-ion collisions. We have established a Linearized Boltzmann Transport (LBT) model coupled with hydrodynamical background to study the in-medium evolution of hard partons, in which both elastic and inelastic processes are included and the interactions of heavy and light flavor partons with the QGP are treated in the same footing. Our LBT model naturally incorporates the temperature and energy dependences of parton-medium interaction, and therefore simultaneously describe heavy and light flavor hadron suppression for all centrality bins and all collision energies as observed from RHIC to LHC experiments. Within this framework, we have quantitatively extracted the temperature and momentum dependences of the jet transport coefficient \hat{q} which are consistent with the range previously constrained by the JET Collaboration. In addition, the following flavor hierarchies of jet quenching have been demonstrated based on our calculation: $R_{AA}^g < R_{AA}^q < R_{AA}^c$ for partons and $R_{AA}^{h(g)} < R_{AA}^{h(g+q)} < R_{AA}^D < R_{AA}^{h(q)}$ for hadrons.

Summary

Presentation type

Oral

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