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Flavor dependence of jet quenching in heavy-ion collisions from a Bayesian analysis

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We investigate the flavor dependence of jet quenching, by performing a systematic analysis of medium modifications on the inclusive jet, γ+jet, and b-jet in Pb+Pb collisions at the LHC. Our results from MadGraph+PYTHIA exhibit excellent agreement with experimental measurements of the inclusive jet, γ+jet and b-jet simultaneously in p+p collisions. We then utilize a Bayesian data-driven method to extract systematically the flavor-dependent jet energy loss distributions from experimental data, where the gluon, light quark and b-quark initiated energy loss distributions are well constrained and satisfy the predicted flavor hierarchy of jet quenching, i.e. $\langle\Delta E_g\rangle > \langle\Delta E_q\rangle > \langle\Delta E_b\rangle$. It is shown that the quark-initiated jet energy loss distribution shows weaker centrality and $p_{\rm T}$ dependence than the gluon-initiated one. We demonstrate the impacts of the slope of initial spectra, color-charge as well as parton mass dependent jet energy attenuation on the γ/b-jet suppression observed in heavy-ion collisions.

Category

Theory

Collaboration

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