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# Longitudinal momentum fraction of heavy flavor meson in jets in high-energy nuclear collisions

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Heavy flavor jets are powerful tools to gain insight into the in-medium partonic energy loss mechanisms and the transport properties of the quark-gluon plasma (QGP) in high-energy nuclear collisions. In this work, we present the first theoretical study of the longitudinal momentum fraction $z_{||}$ carried by $\mathrm{D}^0$ meson in jets in Pb+Pb collisions at $\sqrt{s_{\mathrm{NN}}}$ = 5.02 TeV. The p+p baseline is provided by POWHEG+PYTHIA8 which matches the next-to-leading order hard processes with the parton shower. The in-medium evolution of heavy quark jets is employed by a Monte Carlo transport model which takes into account the collsional and radiative partonic energy loss in the expanding QGP. We observe steeper $z_{||}$ distributions of $\mathrm{B}^0$-jet compared to that of $\mathrm{D}^0$-jet at the same kinematics region in p+p collisions, which may be a hint of the harder jet fragmentation function of b-jet compared to c-jet in vacuum. In A+A collisions, it is shown that the jet quenching effect would in general decrease the values of $z_{||}$. In addition, we predict visibly stronger nuclear modifications of $\mathrm{B}^0$-jet $z_{||}$ distributions compared to $\mathrm{D}^0$-jet within the same $p_{\mathrm{T}}$ windows, as a result of the much steeper initial $z_{||}$ distribution of $\mathrm{B}^0$-jet in vacuum.

## Experiment/Theory

Theory/Phenomenology

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