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Angualr correlations of B+jet in high-energy heavy-ion collisions

Angular correlations between heavy quark (HQ) and its tagged jet are potentially new tools to gain insight into the in-medium partonic interactions in relativistic heavy-ion collisions. In this talk, our recent theoretical studies on the radial profiles of B mesons in jets in Pb+Pb collisions at the LHC will be presented. The initial production of bottom quark tagged jet in p+p is computed by SHERPA which matches the next-to-leading order matrix elements with contributions of parton shower, whereas the massive quark traversing the QGP described by a Monte Carlo model SHELL which can simultaneously simulate light and heavy flavor in-medium energy loss within the framework of Langevin evolution. In p+p collisions, we find that at lower p_T^Q the radial profiles of heavy flavors in jets are sensitive to the heavy quark mass. In 0–10% Pb+Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV, we observe an inverse modification pattern of the B mesons radial profiles in jets at 420 GeV region naturally has a narrower initial distribution and consequently leads to a narrower modification pattern of radial profile; however the diffusion nature of the heavy flavor in-medium interactions will give rise to a broader modification pattern of radial profile. These two effects consequently compete and offset with each other, and the b quarks in jets benefit more from the former and suffers less diffusion effect compared to that of c quarks in jets. These findings can be tested in the future experimental measurements at the LHC to gain better understanding of the mass effect of jet quenching.

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