Measurement of D^0 Meson-Tagged Jet Generalized Angularities in Au+Au Collisions at $\sqrt{s_{\mathrm{NN}}} = 200$ GeV at STAR

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Abstract

The Quark-Gluon Plasma (QGP) produced in heavy-ion collisions can be studied using hard probes, such as D^0 meson-tagged jets created at early stage of the collision. The jet yield and its substructure are modified by interactions with the medium, compared to vacuum propagation. This phenomenon is known as jet quenching.

The generalized angularities λ_α^κ characterize the jet substructure, and they can distinguish jets initiated by light and heavy quarks, and gluons, where the different choice of κ and α parameters tunes the discriminating power of the observable. Measurements of the nuclear modification factor R_{CP} of D^0 jets as a function of the generalized angularities in heavy-ion collisions open ways to investigate modifications of heavy quark fragmentation function and jet substructure in the QGP.

In this contribution, we report the measurement of D^0 meson-tagged jets in Au+Au collisions at $\sqrt{s_{\mathrm{NN}}} = 200\,\mathrm{GeV}$ by the STAR experiment at RHIC. We present for the first time distributions of different angularities, such as girth λ_1^1, thrust λ_2^1, momentum dispersion $\sqrt{\lambda_0^2}$, or Les Houches Angularity $\lambda_{0.5}^1$. We also show the nuclear modification factor R_{CP} as a function of these generalized angularities to explore potential modifications of heavy-flavor jets in the medium. These results could help distinguish between different models of jet quenching and in-medium energy loss of heavy flavor quarks.