

Charm Meson Tagged Jets in Au+Au Collisions at $\sqrt{s_{NN}} = 200$ GeV

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Hard-scattered partons produced early in heavy-ion collisions are used to probe the properties of the QGP (Quark-Gluon Plasma). These partons lose energy in the QGP either through elastic collisions, or through medium-induced gluon bremsstrahlung, which is the dominant mode of energy loss for gluons and light quarks. Theoretical calculations predict that at low momentum (p_T), this radiative energy loss is suppressed for heavy quarks (charm, bottom). At RHIC energies, with excellent secondary vertex resolution in the STAR experiment, these low p_T charm-tagged jets are readily accessible.

In this talk, we present several measurements of $D^0(c\bar{u})$ -tagged jets of different resolutions in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV at STAR. We report the yields and nuclear modification factors as functions of $p_{T, \text{Jet}}$, fragmentation function ($z = \frac{\vec{p}_{T, D^0} \cdot \vec{p}_{T, \text{Jet}}}{|\vec{p}_{T, \text{Jet}}|}$), and generalized angularities ($\lambda_\beta^\kappa = \sum_{\text{const} \in \text{Jet}} \left(\frac{p_{T, \text{const}}}{p_{T, \text{Jet}}} \right)^\kappa \Delta r_{\text{const, Jet}}$) for these jets in the QGP. In addition, we present the radial profile of the D^0 mesons in these jets. Together, these measurements can help us put significant constraints on theories predicting parton flavor and mass dependence of energy loss in the medium.

Category

Experiment

Collaboration

STAR

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