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

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1 Abstract

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 $\sqrt{s_{\mathrm{NN}}} = 200$ GeV at STAR. We report the yields and nuclear modification factors as functions of $p_{\mathrm{T,Jet}}$, fragmentation function ($z = \frac{\vec{p}_{\mathrm{T,D^0}} \cdot \vec{p}_{\mathrm{T,Jet}}}{|\vec{p}_{\mathrm{T,Jet}}|}$), and generalized angularities ($\lambda_\beta^\kappa = \sum_{\mathrm{const} \in \mathrm{Jet}} \left(\frac{p_{\mathrm{T,const}}}{p_{\mathrm{T,Jet}}}\right)^\kappa \Delta r_{\mathrm{const,Jet}}$) 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.