An Investigation of Flavor Dependence of Jet Shape Modifications in Au+Au Collisions at $\sqrt{s_{NN}} = 200$ GeV

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1 Abstract

Partons (quarks/gluons) generated in large energy transfer processes during a heavy ion collision offer a way to experimentally probe the Quark Gluon Plasma (QGP). Once produced, these partons traverse the QGP medium, before fragmenting into collimated sets of particles called jets. Partons interact strongly with the QGP, and hence have their energy and shower structure modified compared to those in vacuum, e.g., those produced in proton-proton collisions. Theoretical calculations also predict that radiative energy loss, which is the dominant mode of energy loss for gluons and light quarks in the QGP, is suppressed for heavy quarks (such as charm and bottom) at low transverse momenta. We will report preliminary results on the $p_{\mathrm{T,jet}}$ (transverse momenta) spectra and radial distribution of $D^0(c\bar{u})$ mesons for anti-k_{T} jets of radius $R = 0.4$ tagged with $D^0(c\bar{u})$ mesons in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV, collected by the STAR experiment. We will also report the nuclear modification factor R_{CP} for these charm-meson tagged jets, and comparisons to PYTHIA-8 predictions at $\sqrt{s} = 200$ GeV. Such measurements are expected to shed light on parton flavor and mass dependencies of jet quenching, and constrain theoretical models.