

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

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October 27, 2021

1 Abstract

Partons (quarks/gluons) 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 (p_T). A measurement of the $D^0(c\bar{u})$ meson radial profile in jets from the CMS experiment hints at a low p_T modification in the medium at LHC energies, that is qualitatively different from that of the light flavor hadrons.

We will report the first measurements of the $p_{T,\text{jet}}$ (transverse momenta) spectra and $D^0(c\bar{u})$ meson radial profile in anti- k_T jets from Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV at RHIC, collected by the STAR experiment in 2014. We will also report the nuclear modification factor R_{CP} for these D^0 -meson tagged jets, and comparisons to PYTHIA-8 predictions at $\sqrt{s} = 200$ GeV. The precise tracking by the Heavy Flavor Tracker detector at STAR yields high statistics of D^0 mesons, especially at low p_T , making the STAR experiment ideal for these measurements. Such measurements are expected to shed light on parton flavor and mass dependencies of jet quenching, and constrain theoretical models.