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. The differential jet shape, ρ, defined as the distribution of fractional momenta in a jet, has been shown to undergo modification in the presence of QGP at LHC energies. Theoretical calculations show 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. In this talk, we will present preliminary measurements of ρ 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 in 2014, and compare them to PYTHIA-8 predictions. Such measurements are expected to shed light on parton flavor and mass dependencies of jet quenching, and constrain theoretical models.