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D^0 meson production in Cu+Au collisions at $\sqrt{s_{NN}} = 200$ GeV measured by the STAR experiment

Heavy quarks are mainly produced by hard processes during the early stage of heavy-ion collisions and before the formation of the quark-gluon plasma (QGP). As most of the heavy quarks are expected to propagate through the medium during its evaluation, they can encode information on different stages of the medium. The D^0 meson is the lightest meson containing a charm quark. Measurement of modifications to D^0 production in heavy-ion collisions relative to proton-proton collisions can be used to study properties of the nuclear medium.

In addition, asymmetric collisions of ions create systems with asymmetric density distribution, pressure gradient and magnetic field, which provide a good opportunity to study the influence of the asymmetry on particle production. In 2012, the STAR experiment at RHIC recorded Cu+Au collisions at the center-of-mass energy per nucleon pair of $\sqrt{s_{NN}} = 200$ GeV. The average number of binary collisions in 0-80% central Cu+Au collisions corresponds to the semi-central Au+Au collisions with centrality of 40-50%. Measuring D^0 production in asymmetric Cu+Au collisions allows to probe charm quark production in a system with different geometry than that of Au+Au collisions.

In this poster, D^0 mesons are reconstructed via the hadronic decay channel ($D^0 \rightarrow K^-\pi^+$) in Cu+Au collisions. The invariant yield and the nuclear modification factor for D^0 meson will be shown as a function of transverse momentum. These results will be compared with existing results from Au+Au collisions at the same collision energy and corresponding centrality.

Preferred Track

Open Heavy Flavors

Collaboration

STAR

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