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Measurements of open bottom and charm hadron production through multiple decay channels in p+p, p+Au and Au+Au collisions with the STAR experiment

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Heavy flavor quarks have been suggested as excellent probes to study the Quark-Gluon Plasma (QGP) created in ultra-relativistic heavy-ion collisions. Significant suppression of open heavy flavor production at large tranverse momentum has been observed in Au+Au collisions relative to p+p collisions at $\sqrt{s_{NN}}$ = 200 GeV at RHIC. Such a suppression can be attributed to the energy losses of heavy flavor quarks due to their interactions with the QGP, which are expected to be different for bottom and charm quarks because of their different masses. In order to fully understand the parton-QGP interactions and thus the QGP properties, it is essential to measure open bottom and charm hadron suppressions separately in Au+Au collisions. Moreover, Cold Nuclear Matter (CNM) effects due to the different initial states in p+p and Au+Au collisions also need to be taken into account when interpreting these results.

In this talk, we will report measurements of open bottom and charm hadron production through multiple decay channels in p+p, p+Au and Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV with the STAR experiment. We will show the first results on open bottom hadron production in Au+Au collisions, where electrons, D^0 and J/ψ from open bottom hadron decays are topologically identified utilizing the STAR Heavy Flavor Tracker. These results will be compared to those of open charm hadron production to study the mass dependence of parton interactions with the QGP at RHIC energies. Nuclear modification factor R_{pA} for electrons from inclusive open heavy flavor hadron decays will also be shown to quantify the CNM effects on open heavy flavor production.

Preferred Track

Open Heavy Flavors

Collaboration

STAR

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