

Measurements of electron production from heavy flavor decays in p+p and Au+Au collisions at $\sqrt{s_{\text{NN}}} = 200$ GeV at STAR

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Abstract

Measurements of nuclear modification factors ($R_{\text{AA}}, R_{\text{CP}}$) and elliptic flow (v_2) for open heavy flavor hadrons are essential probes of quark-gluon plasma (QGP) produced in heavy-ion collisions. Single electrons from open heavy flavor hadron decays (Heavy Flavor decayed Electron, HFE) are an excellent channel to study open heavy flavor hadrons due to their large branching fractions and triggering capabilities. The STAR Heavy Flavor Tracker provides excellent track pointing resolution which allows to separate electrons originating from open charm and bottom hadron decays based on their measured distance of closest approach to the primary vertex. Measurements of the HFE can be combined with measurements of the open bottom decayed electron fraction in HFE to investigate the mass hierarchy of parton energy loss in the QGP and access the flow of bottom- and charm-decayed electrons.

In this talk, we will present the new results of HFE production in p+p collisions at $\sqrt{s_{\text{NN}}} = 200$ GeV from the STAR experiment with significantly improved precision compared to the previous measurements. We will also report measurements of R_{AA} for HFE production in Au+Au collisions at $\sqrt{s_{\text{NN}}} = 200$ GeV. Additionally, improved measurements of R_{AA} of bottom- and charm-decayed electrons and a new measurement of the double ratio of R_{CP} between bottom- and charm-decayed electrons will be presented. Finally, we will report the first STAR measurements of v_2 of bottom-decayed electrons as a function of transverse momentum, in Au+Au collisions at $\sqrt{s_{\text{NN}}} = 200$ GeV. Our results will be compared to theoretical models and implications will be discussed.