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Heavy flavor hadrons inside jets at sPHENIX

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The sPHENIX experiment at RHIC will begin commissioning with Au+Au data in Spring 2023. The Monolithic Active Pixel Sensor (MAPS) based Vertex Detector (MVTX), the Intermediate Silicon Tracker (INTT) and the Time Projection Chamber (TPC) at sPHENIX can provide high precision primary/displaced vertex and track reconstruction in the pseudorapidity region of $|\eta| \leq 1.1$. The sPHENIX ElectroMagnetic Calorimeter (EMCal) and Hadronic Calorimeter (HCal), used for the first time at RHIC, will provide good energy measurements for full jet reconstruction. sPHENIX will enable an unprecedented series of high precision heavy flavor hadron and jet measurements at sPHENIX in 200 GeV p+p, p+Au and Au+Au collisions. In particular, the heavy flavor hadron inside jet production can provide vital information about the heavy quark hadronization process and how such process gets modified in a nuclear medium. Less recombination contribution to the hadron production is expected at RHIC compared to the Large Hadron Collider (LHC) measurements, which makes these measurements an unique approach to explore the universality of heavy quark fragmentation functions in different nuclear environments. We will present the performance projection of the D-meson inside jet reconstruction, the hadron-jet relative kinematic variable distributions, and projections in 200 GeV p+p and Au+Au simulations with realistic sPHENIX detector performance. We will also report on the status of the heavy flavor physics analyses.

Category

Experiment

Collaboration (if applicable)

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