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Evaluation of a baseline for the study of azimuthal correlations of charmed mesons in heavy-ion collisions at RHIC using PYTHIA and Herwig++

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Measurements of azimuthal correlations of charmed mesons in high-energy heavy-ion collisions can shed light on the transport properties of the Qaurk-Gluon Plasma. The STAR experiment at the Relativistic Heavy Ion Collider (RHIC) collected in 2014 and 2016 a large sample of Au+Au reactions at $\sqrt{s_{NN}}$ = 200 GeV making such a study possible. The sPHENIX experiment will also offer a similar opportunity in the next few years. However, such a measurement in p+p collisions at the same energy has not been feasible so far.

To provide a baseline for the heavy-ion measurements, we report studies of the azimuthal correlations between charmed mesons in p+p reactions using two Monte Carlo event generators, PYTHIA 8 and Herwig++. We validate the models against the available data from the STAR and CDF experiments, and compare their predictions to deliver a reliable p+p baseline for heavy-ion collision studies. Finally, we discuss prospects for performing such measurements in p+p collisions at RHIC.

Category

Theory

Collaboration (if applicable)

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