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Quantifying the underlying event for jet measurements with sPHENIX

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The sPHENIX experiment at the Relativistic Heavy Ion Collider (RHIC) is designed to study the properties of quark-gluon plasma (QGP) created in heavy-ion collisions. sPHENIX is equipped with tracking detectors and calorimetry, which allow for precise measurements of particles produced in the collision. In particular, the electromagnetic and hadronic calorimeters are crucial for reconstructing and determining the energy of jets. High-energy jets produced by hard scatterings in heavy-ion collisions provide valuable insight into how partons interact and lose energy in the QGP. In sPHENIX, jets are reconstructed by clustering energy from all three layers of the calorimeter. However, the presence of the underlying event (UE), which refers to all particles produced from sources other than the hard-scattering process, can lead to the overestimation of jet energy and distortion of jet properties. Therefore, it is crucial to have an accurate quantification and subtraction of UE in jet measurements. This poster will present the status of sPHENIX event-by-event estimation of the UE as a function of event activity throughout the 2023 data-taking period and plans for extracting measurements with underlying event-subtracted reconstructed jets.

Category

Experiment

Collaboration (if applicable)

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