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Neutral Pion and Eta Meson Reconstruction with the sPHENIX Detector

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sPHENIX is a new detector at the Relativistic Heavy-Ion Collider (RHIC) designed to make precision jet and upilon measurements in 200 GeV p + p, p + Au, and Au + Au collisions and will begin taking data in 2023. In addition to having the first hadronic calorimeter (HCal) at mid-rapidity at RHIC, sPHENIX also contains a tungsten-scintillator based Electromagnetic Calorimeter (EMCal) for measuring the energy of photons and electrons. Before physics analyses can take place using the EMCal, however, it must be calibrated to the electromagnetic energy scale, and this will be done by calibrating the EMCal's response relative the neutral pion's (π^0) invariant mass. π^0 's are reconstructed from pairs of EMCal clusters that were produced by decay photons from π^0 's. However, due to cluster merging effects, this procedure is not practical at high momentum. Thus, as a high-energy cross-check on the energy scale calibration, the calorimeter's response relative to η mesons, whose heavier mass allows for reconstruction without merging to much higher momenta, will also be measured. The EMCal's successful calibration will enable measurements with the π^0 and η mesons, which will take advantage of both sPHENIX's large acceptance and the high luminosity 200 GeV Au + Au data set currently being recorded. This poster will show the status of the sPHENIX EMCal's energy scale calibration and the status of sPHENIX's first neutral meson analyses

Category

Experiment

Collaboration (if applicable)

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