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In-Situ Calibration of the sPHENIX Hadronic Calorimeter using Isolated Single Hadrons

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A first goal from early running of the sPHENIX detector, which has begun data-taking this year, is to ensure an accurate calibration of its calorimeters and a complete understanding of the uncertainties associated with these calibrations. Both of these steps are necessary for successfully achieving the physics goals of sPHENIX, especially in conducting various high-precision jet measurements with sPHENIX having the first hadronic calorimeter at mid rapidity at RHIC. This study explores measurements of the calorimetric response to single hadrons in the sPHENIX calorimeter system, which is comprised of an electro magnetic calorimeter, followed by an inner and outer hadronic calorimeter made of aluminum and steel absorber, respectively. In this study, the momentum p of isolated tracks, those separated by a minimum distance from the nearest other tracks, are found utilizing the sPHENIX charged-particle tracking systems and are matched to calorimeter energy deposits with energy E ; E/p distributions are then constructed for use in precise data-to-MC comparisons. The methodology regarding the minimization of background energy from neutral particles within the track isolation area will also be presented. These measurements can be used to understand the hadronic response and quantify the uncertainty in the calorimeter hadronic response between data and MC.

Category

Experiment

Collaboration (if applicable)

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