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Neutral Pion-Hadron Correlations in Pb-Pb Collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV at the LHC with ALICE

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A longstanding interest in the heavy-ion physics community has been the measurement of jets associated with high p_{T} photons. At leading order, these photons are produced back-to-back with a jet (usually a quark jet), with balanced transverse momentum, during the early stages of the collision. As photons do not interact strongly with the quark-gluon medium, they do not lose energy and thus hard scattering interactions producing them are not subject to a surface bias effect. As a result of these facts, high p_{T} photons provide an unbiased measurement of the transverse momentum of the recoiling jet.

Neutral pions provide the greatest experimental challenge to these ideal measurements, as their decay photons dominate the background to direct photons, and they become increasingly indistinguishable from single photons when measured at higher momenta due to the decreasing opening angle between the decay photons and the finite angular resolution of calorimeters. One solution to this problem is to take measurements with identified π^0 triggers and subtract them from identical measurements using inclusive electromagnetic trigger, after scaling for the ratio between decay photons and inclusive photons, another important measurement in this area. This analysis provides a foundation for such a project by measuring π^0-hadron correlations with high p_{T} π^0s using the ALICE Electromagnetic Calorimeter (EMCal, which also served as an event trigger) and charged particles measured with the ALICE central barrel trackers. These correlations can be analyzed with varying trigger momenta and event centralities. Additionally, the correlations are measured in separate bins of trigger angle with respect to the event plane, both in order to apply the Reaction Plane Fit method for background subtraction and in order to measure path-length dependent modification of jets.

Collaboration (if applicable)

ALICE

Track

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