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Revealing the medium-recoil effect with high- p_T Z boson tagged underlying event distribution in PbPb collisions at CMS (remote)

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Extensive studies of dijet momentum balance, inclusive jet shapes, and photon-tagged jet fragmentation functions have revealed a significant contribution of low transverse momentum (p_T) particles to the energy momentum balance of dijet and photon-jets. Effects such as medium-induced radiation and medium response could contribute to the enhancement of low- p_T particles. In this presentation, we utilize the Z boson reconstructed within the dimuon channel, which does not interact with the quark-gluon plasma (QGP) throughout the decay chain before interacting with the detector. Moreover, Z bosons are high precision probes, and their reconstruction does not introduce bias into the underlying event distribution near them, unlike the isolation requirement of photons. This feature enables the selection of a single quark-enriched high- p_T parton and study the modification of the underlying events associated with this probe. We present the first measurement of the Z boson-tagged underlying event spectra over a large acceptance with respect to the Z boson, using lead-lead data recorded by the CMS detector at 5.02 TeV. This new result can provide an unambiguous signal of the medium-recoil effect, and it could be sensitive to the equation of state and the speed of sound of the QGP.

Category

Experiment

Collaboration (if applicable)

CMS

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