

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

Wednesday 25 September 2024 10:00 (20 minutes)

Effects such as medium-induced radiation and medium response could contribute to the enhancement of low- p_T particles. The low p_T particles are shown to be essential in the energy-momentum balance of dijet and photon/Z-jets. 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. Identification of muons does not require an isolation requirement and thus does not introduce bias into the underlying event distribution. 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 as well as track-track correlation 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 quark-gluon plasma and other potential novel effects.

Category

Experiment

Collaboration

CMS

Author: LEE, Yen-Jie (Massachusetts Inst. of Technology (US))

Presenter: LEE, Yen-Jie (Massachusetts Inst. of Technology (US))

Session Classification: Parallel 28: hard EM

Track Classification: 4. Electromagnetic and electroweak probes