



Contribution ID: 975

Type: Oral

First evidence of the medium response to hard probes with Z -hadron correlations in PbPb and pp collisions at $\sqrt{s_{NN}} = 5.02$ TeV

Wednesday 9 April 2025 10:00 (20 minutes)

The first measurement of low transverse momentum (p_T) charged hadron pseudorapidity and azimuthal angle distributions relative to Z bosons in PbPb collisions at nucleon-nucleon center-of-mass energy $\sqrt{s_{NN}} = 5.02$ TeV is presented. This study utilizes PbPb collision data recorded in 2018 with an integrated luminosity of $1.67 \pm 0.03 \text{ nb}^{-1}$, as well as pp collision data acquired in 2017 with an integrated luminosity of $301 \pm 6 \text{ pb}^{-1}$. For the first time in PbPb collisions, the azimuthal angle and pseudorapidity distributions of charged hadrons relative to Z bosons are measured in bins of charged hadron p_T to search for in-medium parton shower modifications and medium recoil effects. The analysis focuses on events containing at least one Z boson with $40 < p_T < 350$ GeV. A significant modification in the azimuthal angle and pseudorapidity distributions for charged hadrons in the low p_T range, around 1 to 2 GeV, is observed compared to reference measurements from pp collisions. The results are consistent with expectations from phenomenological models, including medium recoil and the medium response to hard probes traversing the quark-gluon plasma. The data provide significant new information about the correlation between hard and soft particles in heavy ion collisions, which can be used to test predictions of various jet quenching models. In PbPb data comparisons with pp reference and theoretical models, the first evidence for medium recoil and hole effects caused by a hard probe is found.

Category

Experiment

Collaboration (if applicable)

CMS

Author: LEE, Yen-Jie (Massachusetts Inst. of Technology (US))**Presenter:** LEE, Yen-Jie (Massachusetts Inst. of Technology (US))**Session Classification:** Parallel session 28**Track Classification:** Jets