

Study of modified near-side jet peak structure in a longitudinally boosted flowing medium in PbPb collisions with CMS

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In two-particle angular correlation measurements, jets give rise to a near-side peak formed by particles associated with a higher p_T trigger particle. Measurements of these correlations as a function of pseudorapidity and azimuthal differences are used to extract the centrality and p_T dependence of the shape of the near-side peak in the p_T range $3 < p_{T, \text{trig}} < 16$ GeV and $1.5 < p_{T, \text{asso}} < 8$ GeV in lead-lead (PbPb) and proton-proton collisions at $\sqrt{s_{NN}} = 5.02$ TeV. A combined fit of the near-side peak and long-range correlations is applied to the data. By disentangling short-range correlations from long-range contributions, we quantify the variance of the near-side peak, which exhibits significant broadening in the longitudinal direction from peripheral to central PbPb collisions, particularly pronounced for low- p_T particles. This broadening phenomenon diminishes above $p_{T, \text{trig}} = 4$ GeV. In contrast, the width of the peak in the azimuthal direction remains nearly constant across centrality. Additionally, we observe a side peak, which increases towards forward rapidity compared to midrapidity, attributed to jet-medium interactions in PbPb collisions at $\sqrt{s_{NN}} = 5.02$ TeV, and low $p_{T, \text{asso}}$ between 1.5–4.0 GeV.

Category

Experiment

Collaboration

CMS

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