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Comprehensive study of centrality-dependent charged Pion, Kaon, and Proton production in Pb-Pb collisions at $\sqrt{s_{NN}} = 5.36$ TeV with ALICE

This contribution comprehensively presents measurements of charged pions, kaons, and protons produced in Pb-Pb collisions at $\sqrt{s_{NN}} = 5.36$ TeV using the ALICE detector at the Large Hadron Collider (LHC). Particle identification was achieved through a combination of the Time Projection Chamber (TPC) and the Time-of-Flight (TOF) detectors, allowing for a measurement that spans a broad p_{T} range from 100 MeV/c to 4.6 GeV/c, exploring the spectra as a function of collision centrality.

Beyond spectral measurements, we also explore particle production ratios, specifically kaon-to-pion and proton-to-pion ratios, to gain deeper insight into the relative abundances of these hadrons. A comparative analysis with ALICE Run 2 results enables an assessment of particle spectra and ratio evolution across different collision energies and systems.

Through precise measurements of particle production, this work aims to deepen our understanding of the complex relationships between transverse momentum, centrality, and collision dynamics in Pb-Pb interactions at LHC energies. The results contribute to the broader understanding of the quark-gluon plasma and the dynamics of heavy-ion collisions.

Category

Experiment

Collaboration (if applicable)

ALICE

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