

Measurement of π , K , p production in PbPb collisions at $\sqrt{s_{\text{NN}}} = 5.36$ TeV using RUN 3 data

This work presents a comprehensive investigation into the production of pions, kaons, and protons as a function of transverse momentum and centrality in Pb-Pb collisions at a center-of-mass energy of $\sqrt{s_{\text{NN}}} = 5.36$ TeV. Leveraging the recently acquired pass2 and pass3 data from the LHC23zzh data sample, our study ensures up-to-date coverage. Particle identification (PID) is achieved through the combined utilization of the Time Projection Chamber (TPC) and Time-of-Flight (TOF) detectors across various transverse momentum intervals.

Utilizing fitting models for the respective $n\sigma$ distributions, we determine the integrated yields of pions, kaons, and protons. To validate the matching efficiency, extensive comparisons are conducted with a general-purpose Monte Carlo (MC) simulation. Furthermore, our analysis includes the study and presentation of combined TPC-TOF spectra corrected for secondaries from RUN3.

Additionally, our investigation delves into the ratios of kaons to pions and protons to pions, providing valuable insights into the relative abundance of these particles. Comparative analysis with corresponding results from ALICE RUN2 enables an assessment of the evolution and potential differences between the datasets.

Employing robust analysis procedures, this study aims to deliver precise measurements of particle production, elucidating the intricate interplay between transverse momentum, centrality, and collision energy in Pb-Pb collisions at $\sqrt{s_{\text{NN}}} = 5.36$ TeV.

Primary author: DEB, Rohaan (University of Trento)