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# Multiplicity dependent π, k and p production in pp collisions at √s= 13.6 TeV using ALICE TPC and TOF detectors

The study of multiplicity-dependent yields ratio of light-flavour particles like kaons, and protons to pions offers valuable insights into mechanisms hadron production. The $K/\pi$ and $p/\pi$ ratios are crucial in understanding how particle production scales with multiplicity across different systems. In particular, these ratios reveal whether strange and baryonic particle production increases smoothly from small to large systems or exhibits sharp transitions, providing hints about collective behaviour and the underlying production mechanisms. With the higher luminosity data of LHC Run 3 and the newly developed online and offline ($O^2$) framework, it becomes possible to reach multiplicities comparable to those in peripheral heavy-ion collisions, providing a unique opportunity to bridge the gap between small and large systems. This study presents the first multiplicity-dependent $\pi$, $K$, and $p$ production results using the ALICE TPC and TOF detectors in pp collisions at $\sqrt{s} = 13.6$ TeV. Furthermore, the results on particle yield ratios evolving with transverse momentum ($p_T$) and charged-particle multiplicity density ($dN_{ch}/d\eta$) will be presented with Run˜3 data and compared with state-of-the-art QCD-inspired models.

## Category

Experiment

## Collaboration (if applicable)

ALICE

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