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Measurement of $^{+}_{c}/D^{0}$ as a function of event multiplicity in pp and p–Pb collisions $\sqrt{s_{NN}} = 5.02$ TeV with the ALICE experiment

Tuesday 5 September 2023 17:30 (2h 10m)

Measurements of charm baryon and meson production in pp and p–Pb minimum bias collisions and as a function of multiplicity, help to investigate hadronization processes and to study their modification across the collision systems from pp to Pb–Pb, and from low to high multiplicities.
Recent measurements of the fragmentation fractions of charm hadrons in pp and p–Pb challenge the universality of fragmentation in the presence of a hadronic medium. In addition, the ratio of p_{T} spectra of $^{+}_{c}/D^{0}$ in pp collisions, shows a separation between the highest and the lowest multiplicity classes within 5.3σ, with the maximum discrepancy occurring for $2\ \mathrm{GeV}/c < p_{T} < 6\ \mathrm{GeV}/c$, suggesting that additional mechanisms, such as coalescence, might play a role in heavy quark hadronization. In p–Pb collisions, the p_{T} behavior is similar to that observed in pp collisions but no strong multiplicity dependence is observed. In PYTHIA, the formation of hadrons is described by fragmentation of strings tuned from $e^{+}e^{-}$ and ep collision measurements, and color reconnection mechanisms are necessary to capture the observed baryon to meson enhancement. By including additional states, predicted by the relativistic quark model, statistical hadronization models can reproduce as well the $^{+}_{c}/D^{0}$ yield ratio. This poster reviews the details of $^{+}_{c}/D^{0}$ analysis in pp and p–Pb collisions, and the comparison of data and models predictions. The implementation of machine learning tools improves the possibility of selecting the candidates based on their decay topology, allowing for an efficient suppression of the large combinatorial background.

Category

Experiment

Collaboration (if applicable)

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