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Insights on strange quark hadronization measuring (multi)strange hadron production in small collision systems with ALICE

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Among the most iconic results of Run 1 and Run 2 of the LHC is the observation of enhanced production of (multi-)strange to non-strange particles, gradually rising from low-multiplicity to high-multiplicity pp or p-Pb collisions and reaching values close to those measured in peripheral Pb-Pb collisions. More insightful information about the production mechanism could be provided by measuring the full Probability Density Function (PDF) for the production of each strange particle specie and investigating if any deviation from pure uncorrelated statistical behavior is observed. Using this novel method, we can determine whether strangeness enhancement is connected to the high-multiplicity tail of the PDF or to a progressive increase in the number of events with few strange particles produced. In this contribution, we present new results on the full PDF for the production of K^0_S, Λ, Ξ, and Ω in pp collisions at $\sqrt{s}$ = 5.02 TeV as a function of the multiplicity as well as single and pair production of the ϕ meson in pp collisions at 13 TeV. In addition, we present new results on the transverse momentum spectra of Σ+ and its charge conjugate anti-particle, in both minimum bias and high-multiplicity triggered pp collisions at $\sqrt{s}$=13 TeV, including prospects and performance of the reconstruction of Σ baryons in Run 3. The results are compared to state-of-the-art phenomenological models implemented in commonly-used Monte Carlo event generators, drastically enhancing the sensitivity to the different processes implemented in each approach.

Category

Experiment

Collaboration (if applicable)

ALICE

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