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New results on the multiplicity and centre-of-mass energy dependence of identified particle production in pp collisions with ALICE

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The study of identified particle production as a function of the proton-proton (pp) collision energy and multiplicity is a key tool for understanding similarities and differences between small and large interacting systems. We report on new measurements of the production of unidentified charged hadrons as well as of pions, kaons, protons, K^0_S, Λ, Ξ, Ω, K^{*0} and ϕ measured in pp collisions for $\sqrt{s}$ ranging from 0.9 to 13 TeV. The multiplicity dependence of identified particle spectra and yields is presented for $\sqrt{s}$ = 5, 7 and 13 TeV and compared to results obtained in proton-lead (p-Pb) and lead-lead (Pb-Pb) collisions. The results unveil intriguing similarities among systems and energies. While spectral shapes at high transverse momenta ($p_{\rm T} \geq 10$ GeV/c) do not evidence a significant dependence on event multiplicity, a strong evolution at low and intermediate $p_{\rm T}$ is observed. The production rates of strange hadrons are found to increase more than those of non-strange particles, showing an enhancement pattern with multiplicity which does not depend on the collision energy. Even if the multiplicity dependence of spectral shapes can be qualitatively described by commonly-used Monte Carlo event generators, the evolution of integrated yield ratios is poorly described by these models.

Experimental Collaboration

ALICE

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