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Light-flavor and charm quark hadronization in ultra-relativistic pp and pPb collisions

Summary

We show that the experimental data of midrapidity p_T spectra of $\Omega(sss)$ and $\phi(ss\bar{s})$ in high-multiplicity events in pp and pPb at LHC energies has the property of constituent quark number scaling. This is a direct signal of strange quark combination hadronization and provides a convenient tool to extract the quark distribution at hadronization. We find that such a scaling is well established in heavy-ion collisions in a broad collision energy range (11.5-2760 GeV). We show the data of p_T spectra of different light-flavor hadrons such as K^* , ϕ , proton, Λ , Ξ and Ξ^* and Ω in pp and pPb collisions at LHC energies can be well fitted by a simple quark combination model under the equal velocity combination approximation. Furthermore, we show the equal velocity combination of charm quark with light-flavor quarks can well explain the data of p_T spectra of D mesons and Λ_c^+ baryon in range $p_T < 8$ GeV in pp and pPb at LHC. The nontrivial p_T dependence of Λ_c^+/D^0 ratio is well described.

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