

Inspecting the charm hadronization via measurements of charm baryon production in hadronic collisions with the ALICE experiment at the LHC

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The transition from quarks to hadrons is a fundamental process in nature that can be studied at colliders. Given their mass of the GeV scale, charm and beauty quarks are mainly produced in the hard scattering processes occurring in the early stages of the hadronic collisions. Their production at the hadronization time is negligible, differently from light quarks. Thus, heavy quarks are used as markers to study the hadronization processes. Recent results at the LHC showed a significant enhancement of charm baryon production relative to that of charm mesons in pp collisions with respect to that in e^+e^- and e^-p collisions, assessing a possible non-universality of fragmentation functions among collision systems. These results suggest that the presence of surrounding colour charges may significantly influence the charm quark hadronization. Similarly to what expected in the quark-gluon plasma produced in ultra-relativistic heavy-ion collisions, heavy quarks can hadronize by combining with lighter quarks in the nearby, in a process usually called “coalescence” that modifies the hadro-chemistry expected in a pure fragmentation scenario.

In this contribution, the most recent measurements with the ALICE experiment of charm baryon production (Λ_c^+ , $\Sigma_c^{0,+,++}$, $\Xi_c^{0,+}$, Ω_c^0 in pp collisions, and Λ_c^+ in p-Pb and Pb-Pb collisions) are shown and the comparison with model calculations including several modeling for the charm hadronization in the different collision systems is discussed.

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