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Multi-strange hadron production at the LHC with ALICE

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A strongly interacting state of matter known as the Quark-Gluon Plasma (QGP) is formed in the high temperature and energy density conditions reached in ultra-relativistic heavy-ion collisions. One of the key measurements for the understanding of the thermal properties of the fireball created in these collisions is the study of the production of strange and particularly multi-strange hadrons in the final state. The ALICE detector is ideally suited to study identified particle production rates. The excellent tracking and particle identification capabilities allow the reconstruction of multi-strange baryons (Ξ^-, $\bar{\Xi}^+$, Ω^- and $\bar{\Omega}^+$) via their weak decay channels over a large range in transverse momentum (p_{T}). In this work, we report on the p_{T} spectra and total yield of such hadrons at central rapidity in Pb-Pb collisions measured by ALICE at the unprecedented energy of $\sqrt{s_{NN}}$ = 5.02 TeV in several centrality classes. The yields are normalized by the corresponding measurement of pion production in the same centrality class in order to study the enhancement of multi-strange hadrons. Comparison of hyperon-to-pion ratio between different systems, such as pp, p-Pb and Pb-Pb collisions shows that production of multi-strange baryons relative to pions follows a continuously increasing trend from low multiplicity pp to central Pb-Pb collisions. Predictions of thermal models and QCD-inspired generators for the small system are compared to the results. Furthermore, comparison of hyperon-to-pion ratios in Pb-Pb collisions at two different energies ($\sqrt{s_{NN}}$ = 2.76 TeV and 5.02 TeV) are presented and discussed.

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