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Particle production and entropy measurement in ALICE

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One of the main goals in the study of hadronic interactions at LHC energies is the attempt to characterize the mechanisms involved in particle production in different regimes. The charged-particle multiplicity is one of the most interesting observables in these kind of studies. On the one hand, the pseudorapidity dependence of charged-particle production provides information on the partonic structure of the colliding hadrons and is sensitive to non-linear QCD evolution in the initial state. Measurements of charged-particle pseudorapidity densities in pp collisions at $\sqrt{s}$ = 13.6 TeV and in Pb-Pb collisions at $\sqrt{s_{\mathrm{NN}}}$= 5.36 TeV will be presented, for the first time with the wider pseudorapidity coverage achieved by ALICE in Run 3 thanks to newly installed central and forward trackers. On the other hand to understand the thermal-like behavior and the particle yields in pp collisions, a possible approach is to address the principles of quantum states and their entanglement in the produced system. The entanglement in the initial state has a measurable effect on the evolution of the system and is the driving mechanism behind the thermal-like behavior and particle yields observed. We will show equivalence in a calculation of the initial state entropy (calculated using PDF's) and the final state entropy (calculated using multiplicity distributions) studying primary charged particles produced in pp collisions at 13 TeV.

Category

Experiment

Collaboration (if applicable)

ALICE

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