



Contribution ID: 881

Type: Poster

Production of Ξ -meson pairs with ALICE at the LHC: a novel probe for strangeness production

Friday, 8 July 2022 20:10 (20 minutes)

Recent measurements in high multiplicity proton-proton collisions have shown the emergence of several features that are reminiscent of QGP phenomenology, one of which is the enhanced production of strange and multi-strange hadrons with respect to non-strange ones. Strange hadron production represents a key probe to study QGP formation in hadronic collisions as well as to understand the microscopic mechanisms behind hadronisation.

In this context, the ϕ meson is certainly a probe of choice for the study of strangeness production and strangeness enhancement altogether. A deeper knowledge of the production probability of single and multiple ϕ mesons can help validate or disqualify the inner workings of a given phenomenological model through comparisons to related Monte Carlo generators.

Multiple ϕ meson production measurement can also be combined with the measurement of the inclusive ϕ -meson yield to allow a number of new insights on the number of ϕ -meson production distribution (the probability of producing N ϕ mesons in one event). Important among these is the fact we can measure the variance of such distributions and determine how it compares to a Poissonian distribution. Furthermore, the 2-Dimensional nature of the yield spectrum of ϕ -meson pairs gives new perspectives for the study of the dynamics of the particle production, notably by measuring the mean p_T of the spectra of a ϕ meson in events where a second ϕ meson is produced with a given p_T . An overview of such results is presented and will be discussed in comparison to Monte Carlo generators.

In-person participation

Yes

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