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CLASH project – Probing strangeness production in small systems through new multi-differential measurements with ALICE at the LHC

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ALICE has observed that strangeness production increases with multiplicity in
small collision systems (proton-proton and proton-lead collisions) at LHC energies.
This means that proton-proton collisions cannot be seen as
incoherent sums of parton-parton collisions, an idea that has been central in
most proton-proton generators, for example PYTHIA. To accommodate the new ALICE results, different models introduce final state effects of very different phenomenological origin.
Multi-differential strange particle production studies can be used as key tool to discriminate among different final state effects at play

I will focus on new results from ALICE concerning π, K, ϕ, p, and Ξ production at mid-rapidity ($|\eta| < 0.8$) as a function of event shape and underlying event activity in proton-proton collisions at $\sqrt{s_{NN}}$ = 13 TeV. Transverse Spherocity (S_O) is an observable that allows to perform a topological selection of events that are "isotropic" (dominated by multiple soft processes) and "jetty" (where a single hard process is responsible for a significant part of the multiplicity). The underlying event activity is estimated by measuring the Transverse Charged Particle Multiplicity (R_{T}).
Furthermore, the two-particle correlation function is used to study the relative production of multi-strange baryons and non-strange/strange mesons. This measurement can shed light on whether the associated strangeness production can best be described by microcanonical or grand canonical hadronization models.

Finally, I will report on how these new multi-differential measurements compare to several state-of-the-art event generators.

Abstract Track

LHC

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