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Light-flavour particle production as a function of transverse spherocity with ALICE

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Well established measurements of high-multiplicity proton-proton (pp) and proton-lead (p-Pb) collisions at the LHC have revealed that small collision systems show the onset of phenomena typical of heavy-ion collisions. Some of these signatures, such as strangeness enhancement and collective flow, suggest that light-flavor hadron production arises from a set of complex mechanisms whose relative contributions evolve smoothly from low to high multiplicity collisions. This implies that pp collisions cannot be seen as a simple incoherent sum of parton-parton scatterings, an idea that is common to most Monte Carlo event generators, for example, PYTHIA. Moreover, these signatures have historically been attributed to the formation of a strongly interacting medium in heavy-ion collisions. However, a formation of a medium in these smaller collision systems challanges the current theoretical frameworks.
Studies on multi-differential strange particle production in small systems can be utilized to discriminate among the various final state effects at play and represent an important baseline for heavy-ion studies. This talk presents new results from ALICE on light-flavor particle production as a function of the transverse spherocity ($S_{\mathrm{O}}^{p_{\mathrm{T}}=1}$) in pp collisions measured at $\sqrt{s}$ = 13 TeV. Utilizing narrow selections in multiplcity and $S_{\mathrm{O}}^{p_{\mathrm{T}}=1}$, the observable allows for a topological selection of events that are either “isotropic” (dominated by multiple soft processes) or “jet-like” (dominated by one or few hard scatterings). The experimental results are compared with predictions from various Monte Carlo generators.

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