



Contribution ID: 59

Type: Talk

## Recent results on strangeness enhancement in small collision systems with ALICE

Monday 2 September 2024 12:00 (20 minutes)

The strangeness enhancement, defined as the increased relative production of strange hadrons in heavy-ion collisions with respect to the production rate in pp interactions, was originally proposed as a signature of the quark-gluon plasma formation. At the LHC, the ALICE experiment observed that the yield ratios of strange hadrons to charged pions increase with the charged-particle multiplicity at mid-rapidity independently of  $\sqrt{s}$  and of the collision systems, starting from pp where it was unexpected, passing by p-Pb and reaching Pb-Pb.

More insightful information about the strangeness production mechanisms could be provided by measuring the (multi-)strange particle multiplicity distribution,  $P(n_S)$ , using a novel method based on counting the number of strange particles event-by-event. In this contribution, ALICE results on  $K_S^0$ ,  $\Lambda$ ,  $\Xi$  and  $\Omega$  multiplicity distributions in pp collisions at  $\sqrt{s} = 5.02$  TeV as a function of the charged particle multiplicity, together with the average probability for the production multiplets are presented. This measurement extends the study of strangeness production beyond its average and represents a new test bench for production mechanisms, probing events with a large imbalance between strange and non-strange content.

In addition, a multi-differential approach has been exploited in pp collisions at  $\sqrt{s} = 13$  TeV measuring the production of (multi-)strange hadrons as a function of the very forward energy measured by the ALICE Zero-Degree Calorimeters. This study allows to correlate the production of strangeness with the energy deposited at forward rapidity, that is correlated to the mid-rapidity activity only in the early stages of the collision. Another multi-differential approach has been utilized to measure the light-flavor particle production as a function of the transverse sphericity ( $S_0^{pT=1}$ ) in pp collisions at  $\sqrt{s} = 13$  TeV. This 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 results are compared to state-of-the-art phenomenological models implemented in commonly-used Monte Carlo event generators, drastically enhancing the sensitivity to the different processes implemented in each approach.

### Internet talk

No

### Is this an abstract from experimental collaboration?

Yes

### Name of experiment and experimental site

ALICE (<https://alice-collaboration.web.cern.ch/>)

### Is the speaker for that presentation defined?

Yes

### Details

Sara Pucillo  
PhD Student  
Università & INFN Torino  
Italy

**Primary author:** PUCILLO, Sara (Universita e INFN Torino (IT))

**Presenter:** PUCILLO, Sara (Universita e INFN Torino (IT))

**Session Classification:** High Energy Particle Physics

**Track Classification:** Main topics: High Energy Particle Physics