INTRODUCTION AND PHYSICS MOTIVATIONS

- A-A collisions: evolution and QGP
  Reaching sufficient high energy densities (c ≈ 1 GeV/fm), it becomes possible to create a state of partonic matter, the so-called Quark-Gluon Plasma, where quarks and gluons are not confined in hadrons.

- Strangeness enhancement
  The enhanced production of strangeness in nuclear collisions with respect to hadron collisions was one of the first proposed signatures of QGP formation.

- Importance of pp collisions
  Proton-proton collisions have been extensively used as a reference for the study of interactions of larger colliding systems at the LHC.

THE ALICE EXPERIMENT

Main detectors used in the analyses of strange particles:
- Inner Tracking system (ITS, |η| < 0.9)
- Time Projection Chamber (TPC, |η| < 0.9)
- VZERO [V0A(2.8 < η < 5.1) & V0C(−3.7 < η < −1.7)]
- Tracking and vertexing
- Centrality (Pb-Pb) and multiplicity (pp, p-Pb) class definition

Low material budget in the central region (13% X₀ for ITS+TPC), good momentum resolution (~1.5%) at pT = 0.1 - 20 GeV/c.

[The ALICE Collaboration et. al. 2008 JINST 3 S08002]

PARTICLES RECONSTRUCTION

- Reconstruction of strange and multi-strange particles via decay topology

RESULTS

- Significant enhancement of strange to non-strange particle yields for high-multiplicity pp
- Consistent pattern between pp, p-Pb, and Pb-Pb, with agreement in overlapping multiplicity regions
- Models do not describe experimental observations satisfactorily

- Double-ratio in pp collisions
  (and in p-Pb) evolves smoothly with multiplicity density
- The larger the valence strange quark content, the steeper the slope (dashed lines are linear fits)

- Scaling of strange particle yields
  with multiplicity in pp at √s = 7 and 13 TeV

- The Δ/Λ ratio shows a qualitatively similar dependence on multiplicity for pp, p-Pb, and Pb-Pb collisions

SUMMARY AND OUTLOOK

- The multiplicity dependence of strangeness production is strikingly similar in pp and p-Pb, and approaches values corresponding to central Pb-Pb
- Enhancement of strange and multi-strange hadron production is observed towards high multiplicity pp events
- Several strangeness dependencies and relations among different types and energy collisions indicate discrepancies between experimental data and models
- Will the relative strangeness production in pp saturate? (stay tuned for High-Multi. Trigger in pp@13 TeV)