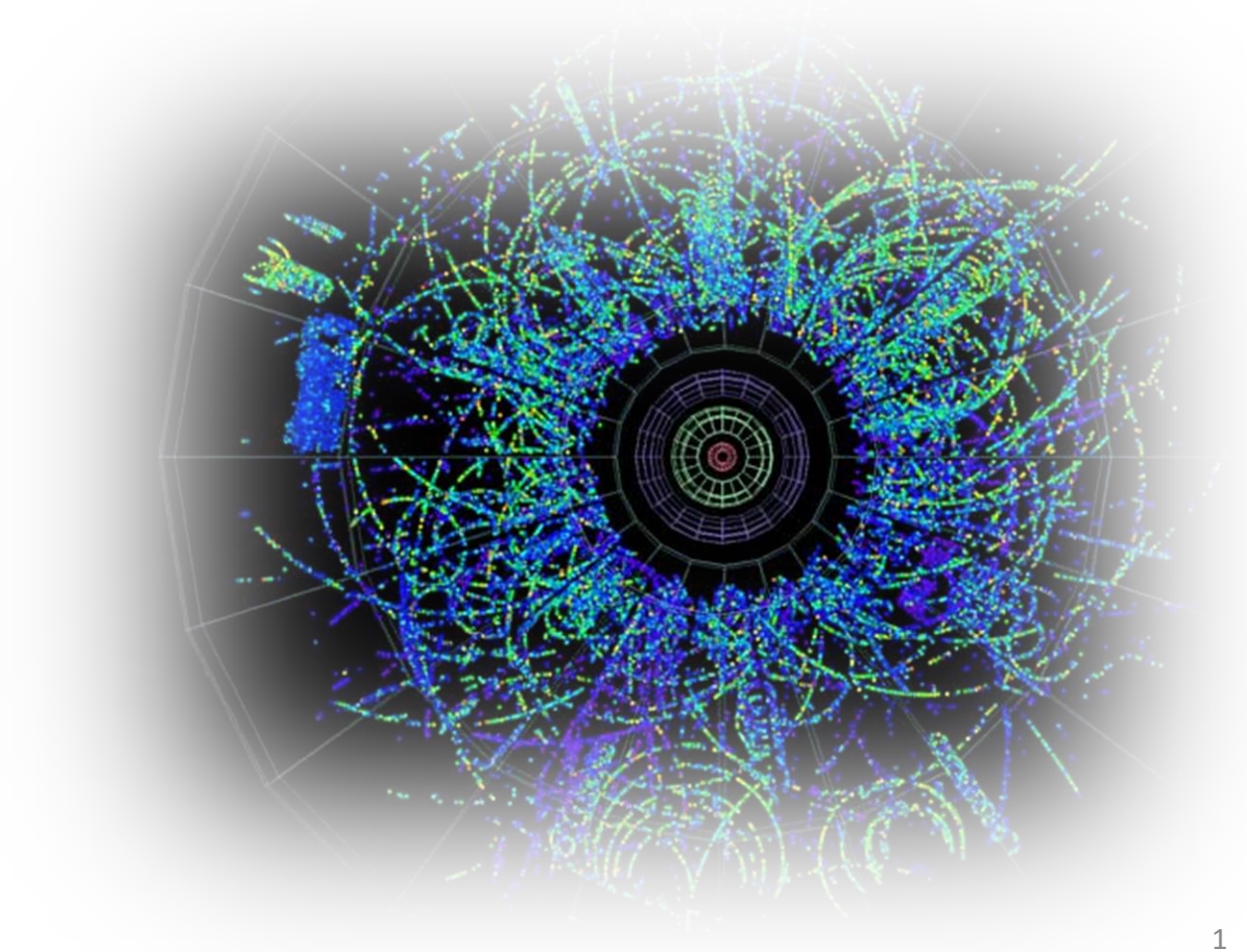
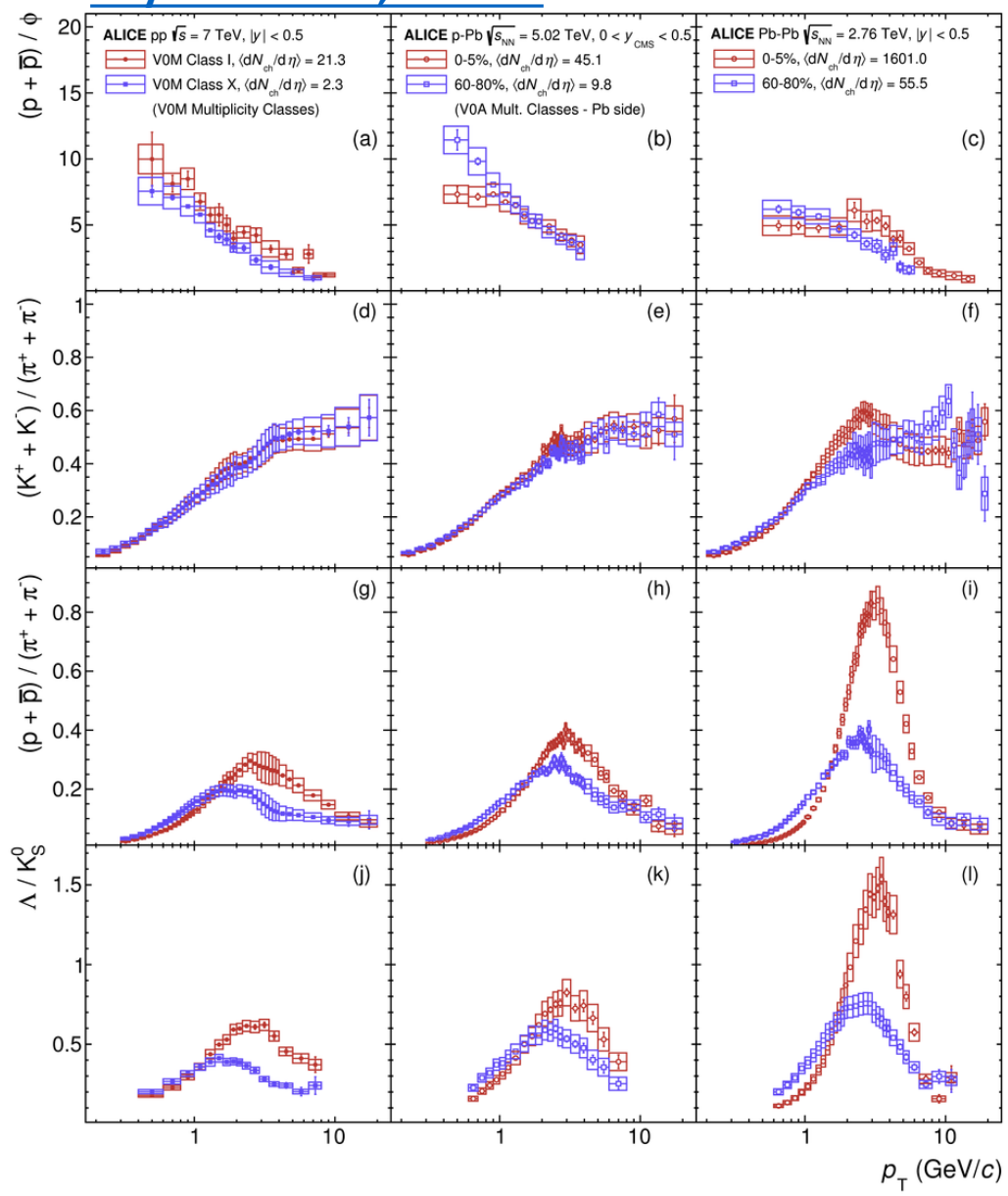
Probing the multiplicity dependence of strangeness enhancement in pp collisions in the regime of low multiplicity and transverse spherocity with ALICE

Adrian Nassirpour, Rutuparna Rath
For the ALICE Collaboration



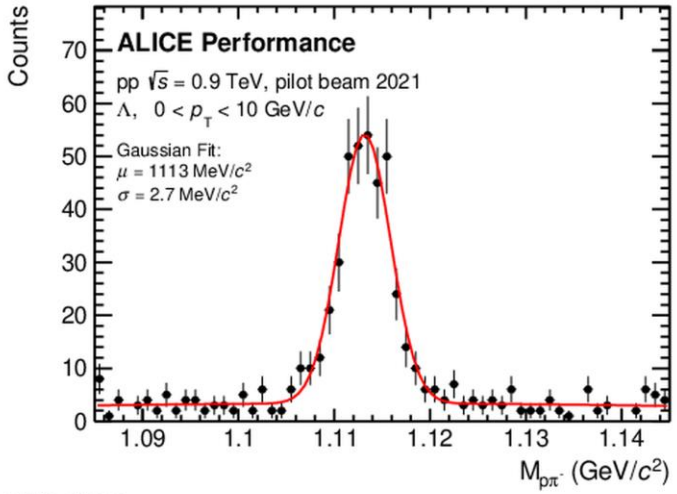
Particle Ratios at the lowest and highest multiplicities

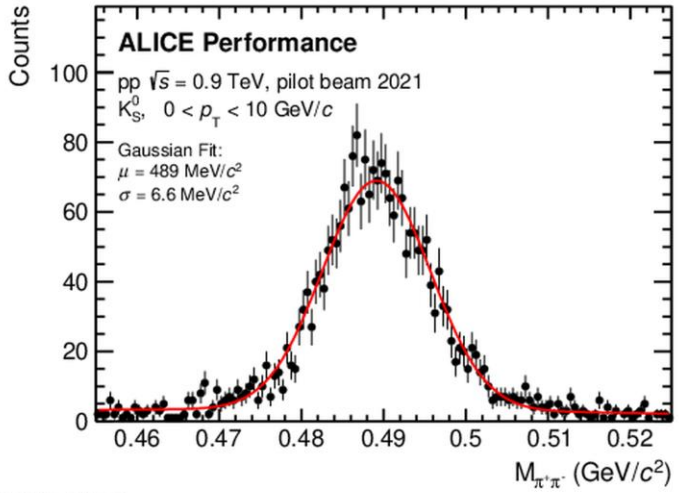
Phys. Rev. C 99, 024906



- p_T-differential particle ratios showcase a clear distinction between behavior at low and high multiplicities.
  - Universal trend across collision systems
- Upcoming analysis of the 900 GeV pilot-beam data for LHC Run 3 will yield new results at even lower multiplicities, complementing the current results.

NEW RESULTS





Strangeness enhancement in pp collisions

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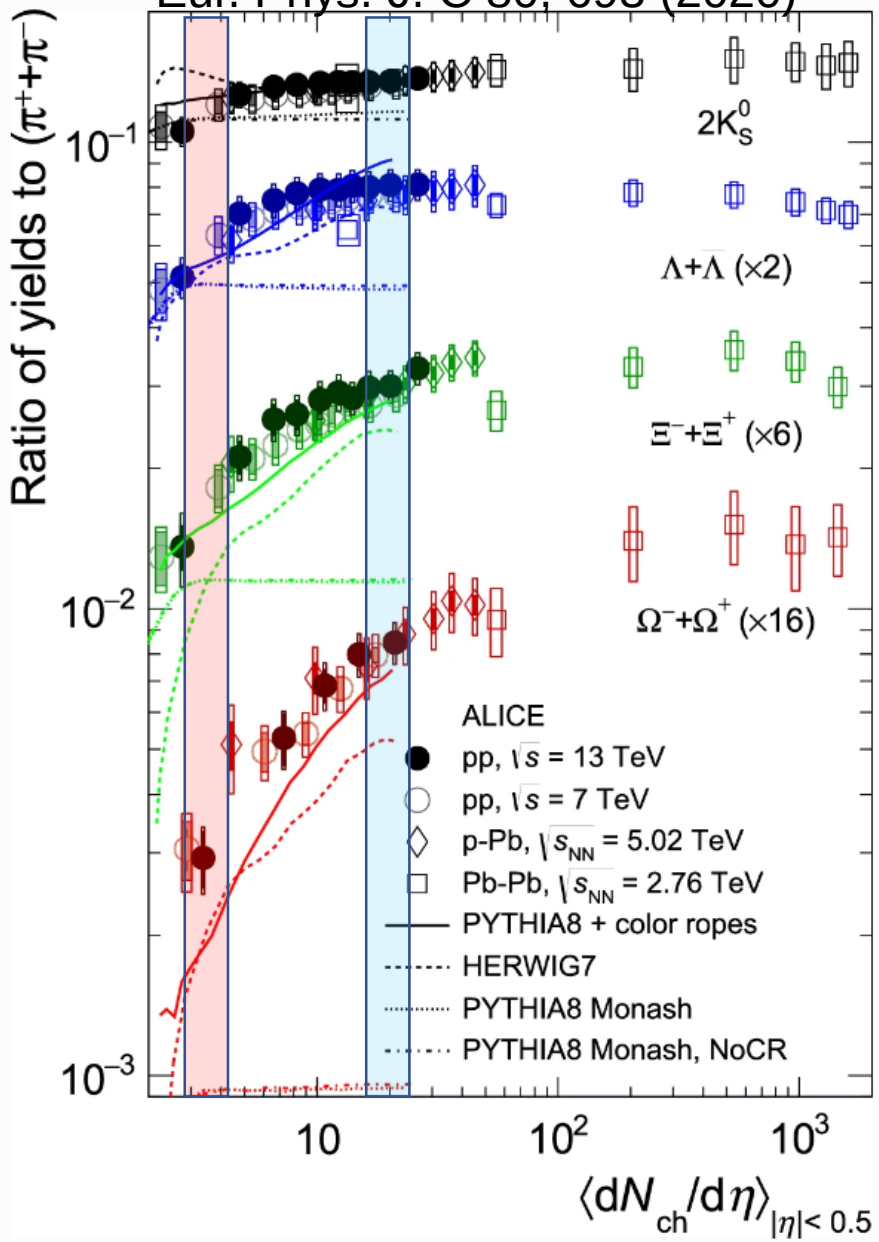
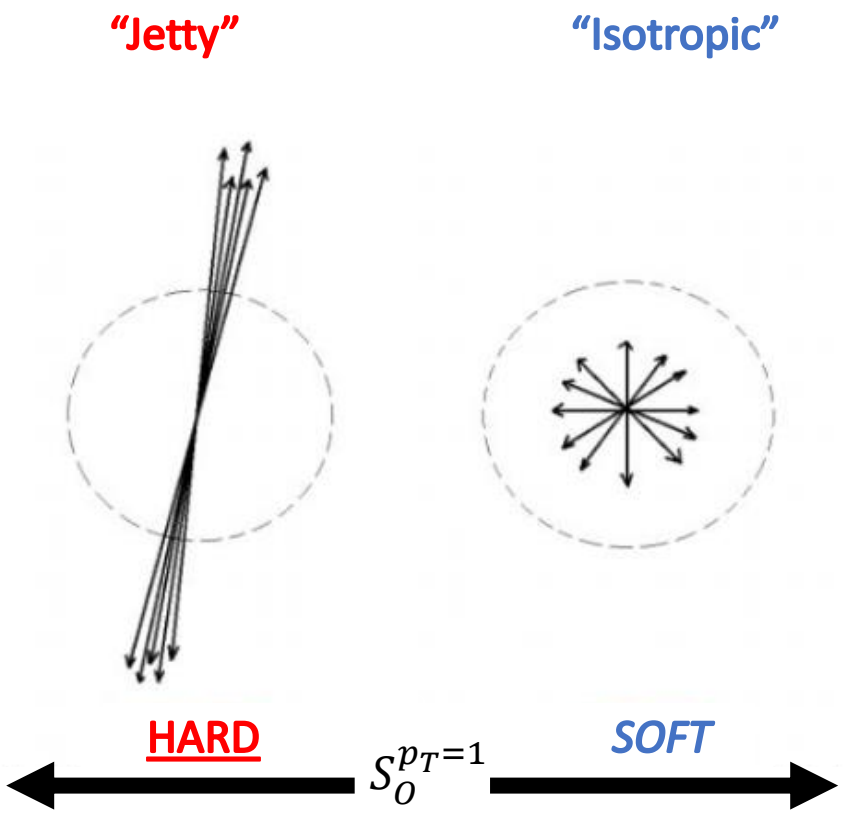


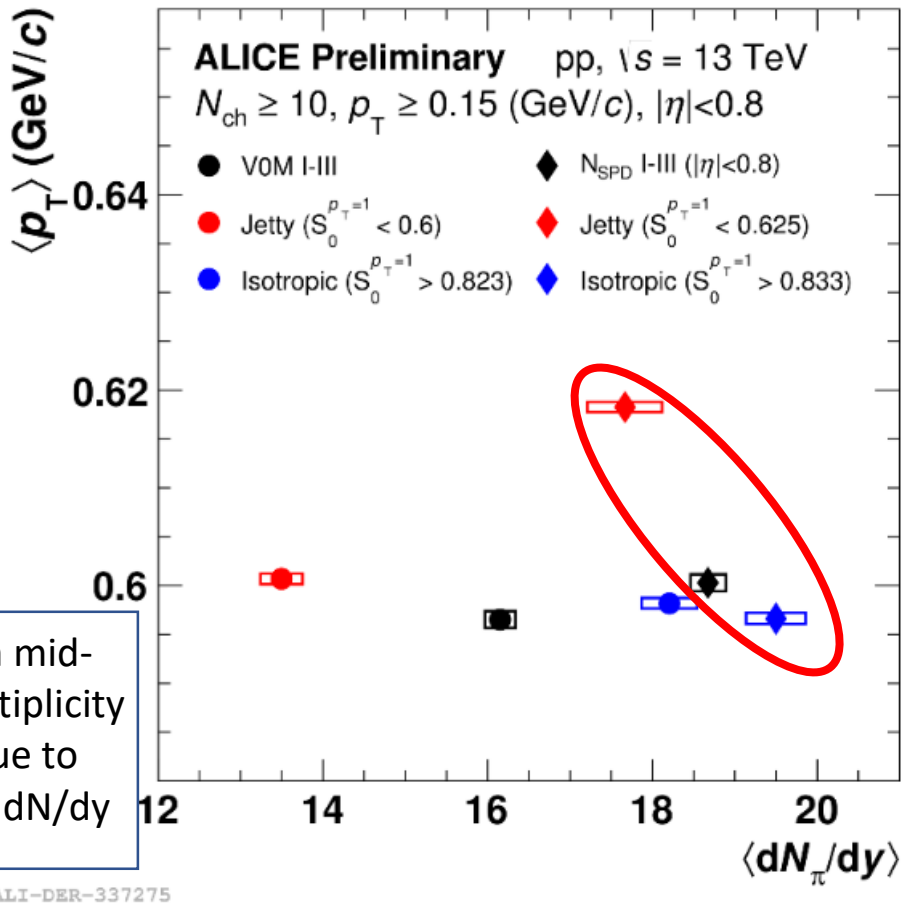
- Strangeness enhancement has been observed in high-multiplicity pp collisions.
- Signature associated with the quark-gluon plasma
  - Unresolved if this also applies to pp collisions.
- Is multiplicity the driving factor behind the strangeness enhancement?
  - Can we find low-multiplicity strange dynamics in high-multiplicity events?

High-multiplicity events Vs Transverse Spherocity

- Transverse Spherocity can be used to categorize events into two types:
  - **Jetty:** Back-to-Back "jet-like" events
    - Particle production mainly driven by hard physics
  - **Isotropic:** Azimuthally isotropic events.
    - Particle production driven by multiple softer collisions.

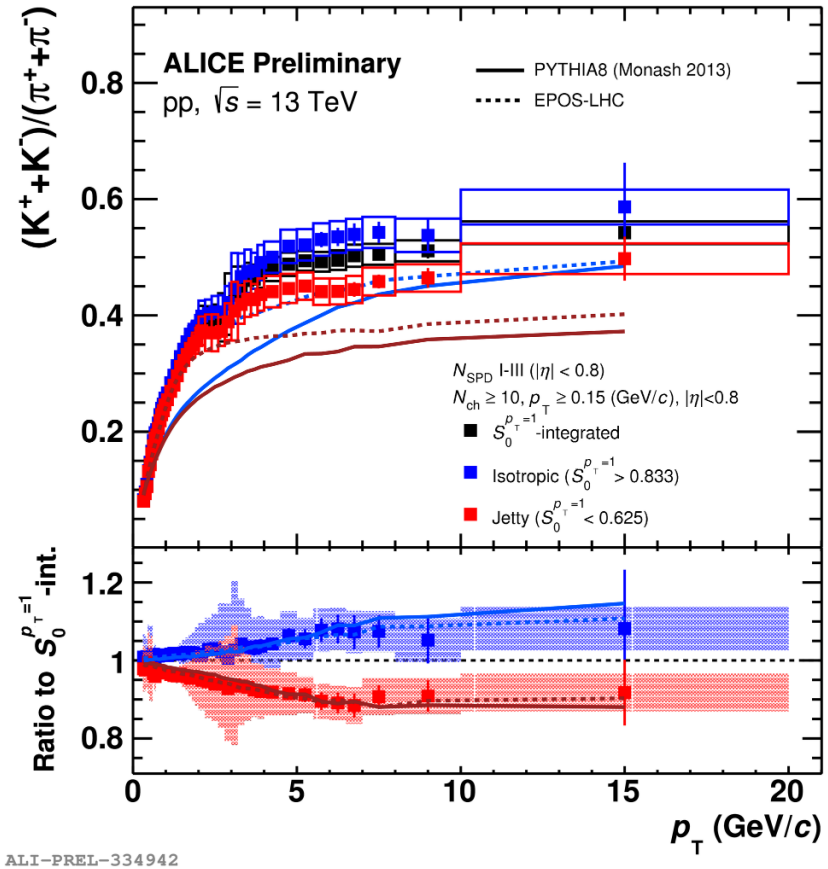
$$S_0^{p_T=1} = \frac{\pi^2}{4} \min_{\hat{n}} \left(\sum_i \frac{|\widehat{p_{T,i}} \times \hat{n}|}{N_{trk}} \right)$$

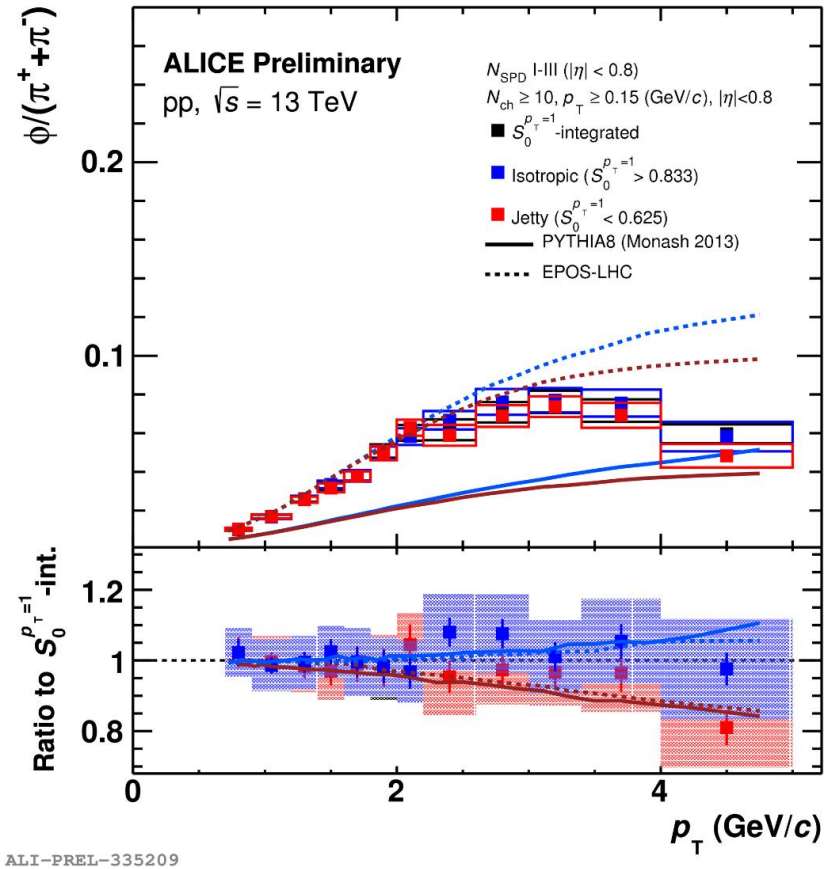


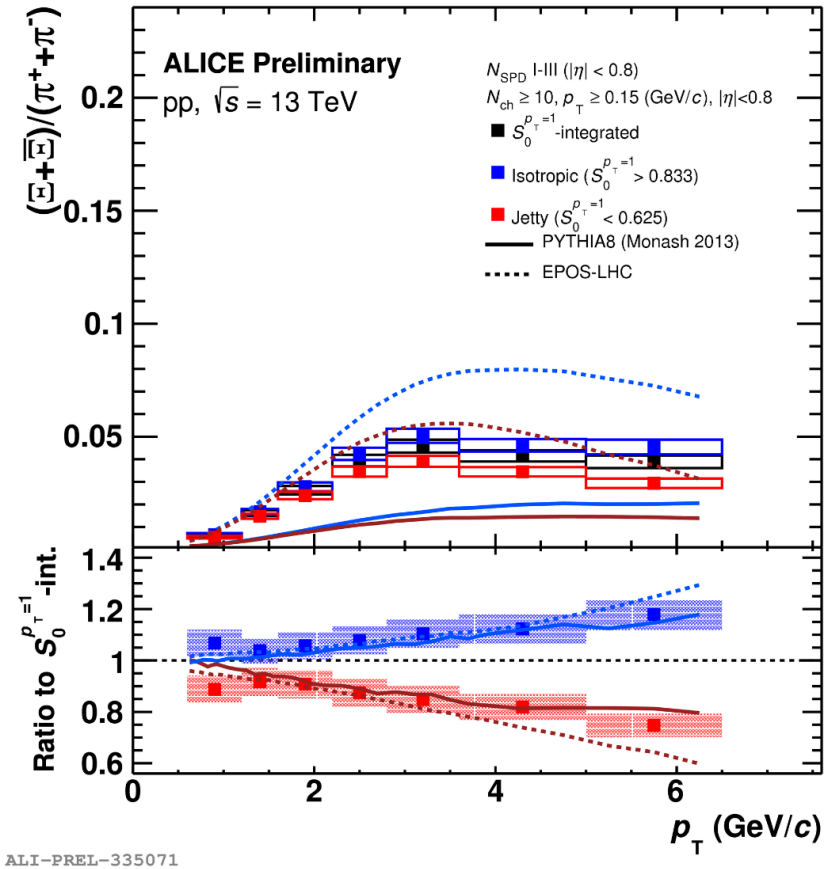


We focus on mid-rapidity multiplicity selection, due to constrained dN/dy

High-multiplicity events Vs Transverse Spherocity







Subtle modification in K-to-π ratio

ϕ-to-π ratio suggests no dependence on Transverse Spherocity.

Ξ-to-π ratio highlights significant modification, with clear enhancement/suppression in Isotropic/Jetty events.

Paper is in preparation for full showcase of light-flavor particles as a function of $S_O^{p_T=1}$

Results suggest that strangeness enhancement is prevalent in events with Isotropic shapes