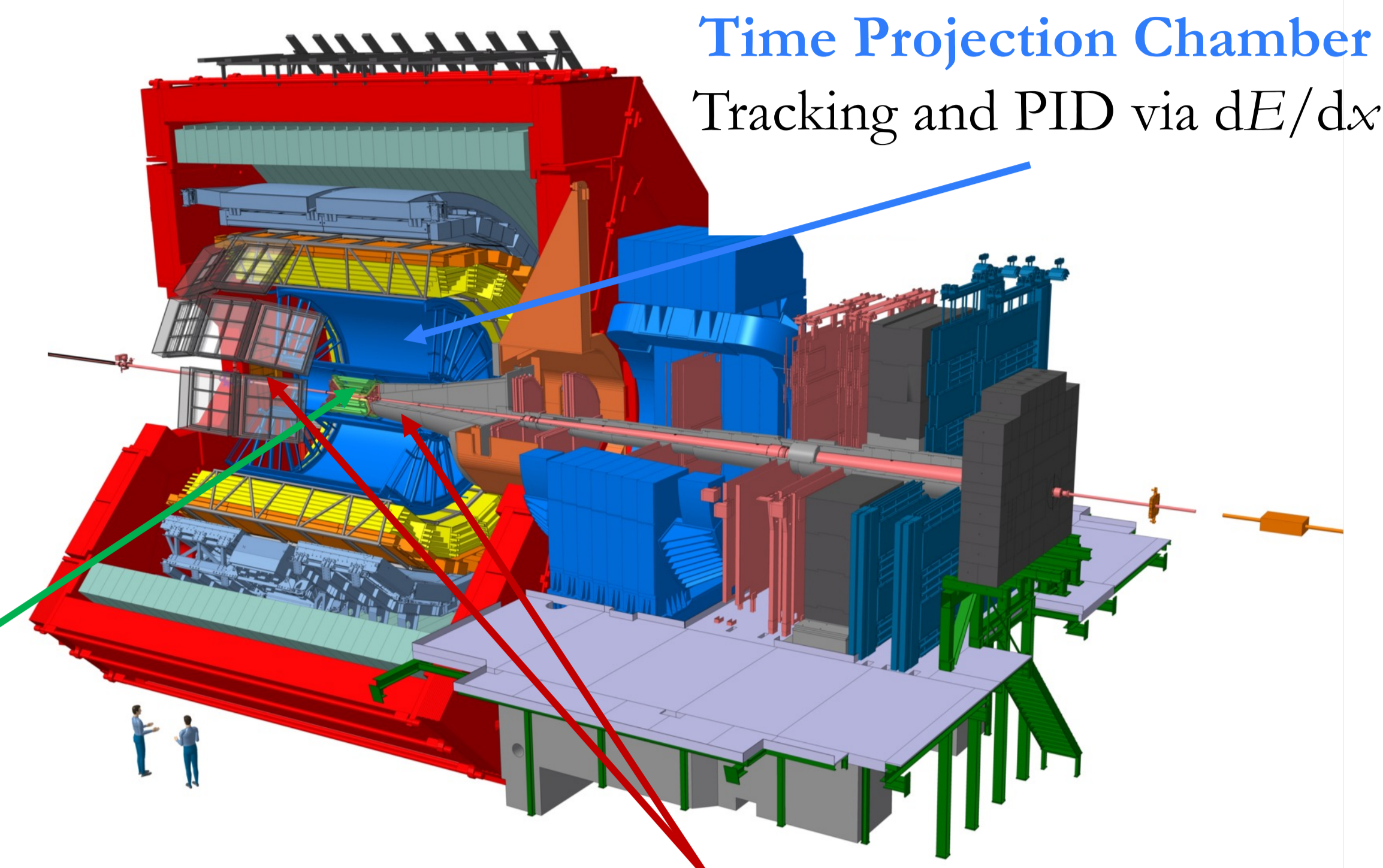


PHYSICS MOTIVATION

The microscopic origin of **strangeness enhancement** in high-multiplicity pp collisions with respect to minimum bias ones is still an open issue^[1]

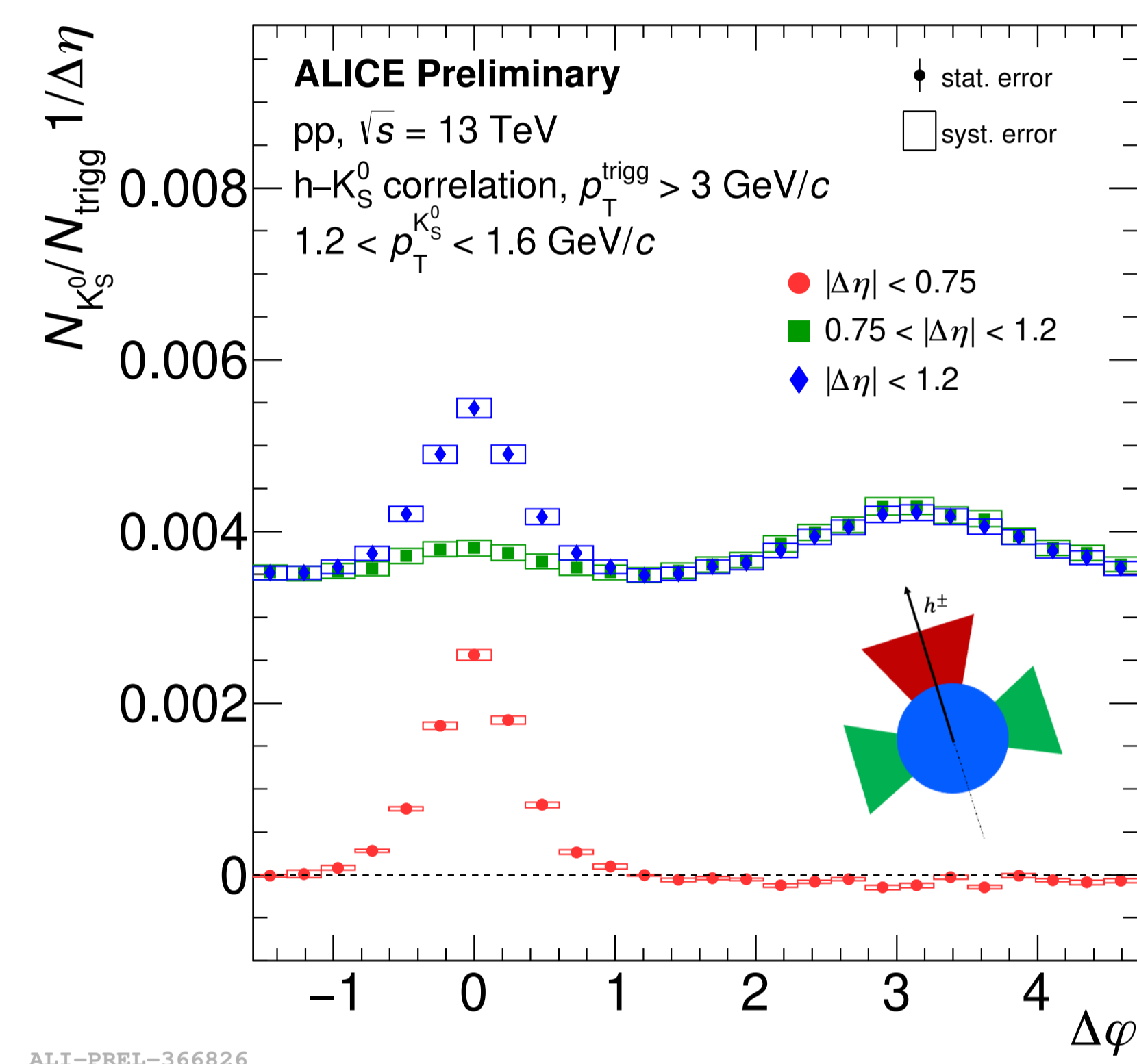
Is strangeness enhancement in pp collisions associated with **hard scattering processes** or with the **underlying event**?

THE ALICE DETECTOR^[2] IN RUN 2



V0A and V0C

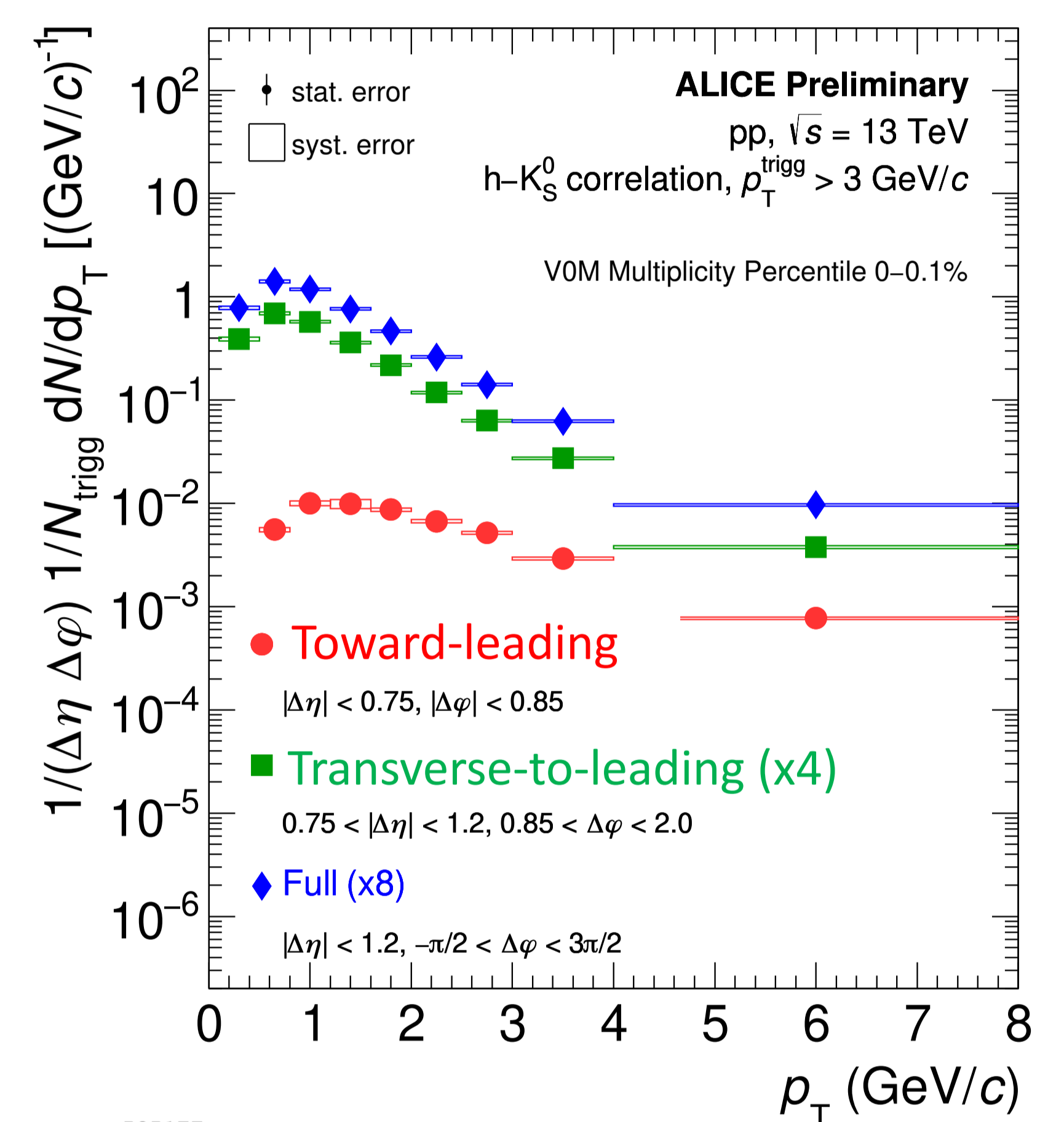
Arrays of scintillators at forward rapidity
Triggering and multiplicity estimation



THE ANGULAR CORRELATION METHOD

1. Selection of the **trigger particle** (\sim jet axis): the charged primary particle with the highest p_T and $p_T > 3$ GeV/c
2. Identification of associated particles: K_S^0 ($|\mathcal{S}| = 1$) and Ξ^\pm ($|\mathcal{S}| = 2$)
3. Calculation of the angular correlation ($\Delta\eta, \Delta\phi$) between trigger and associated particles

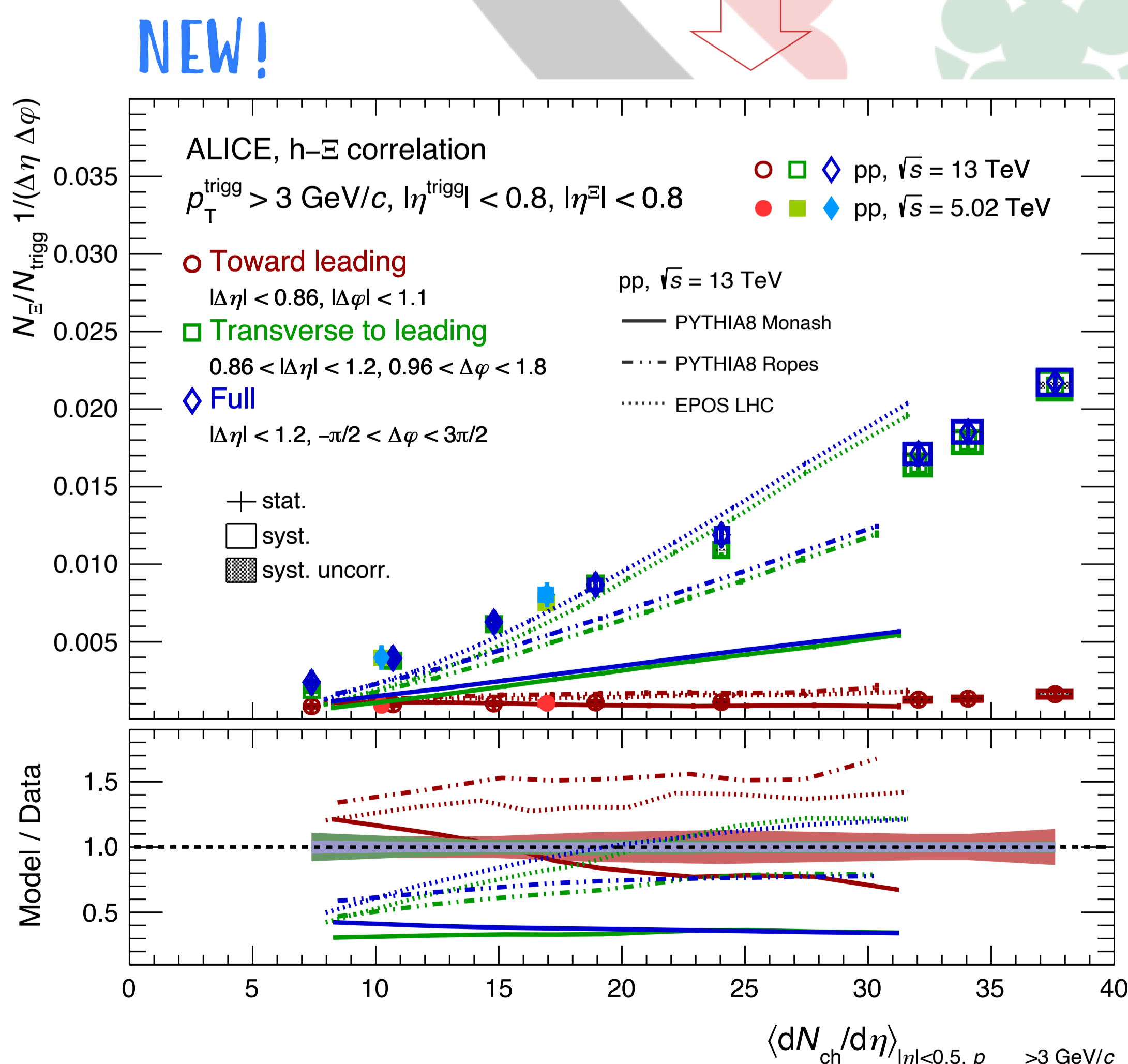
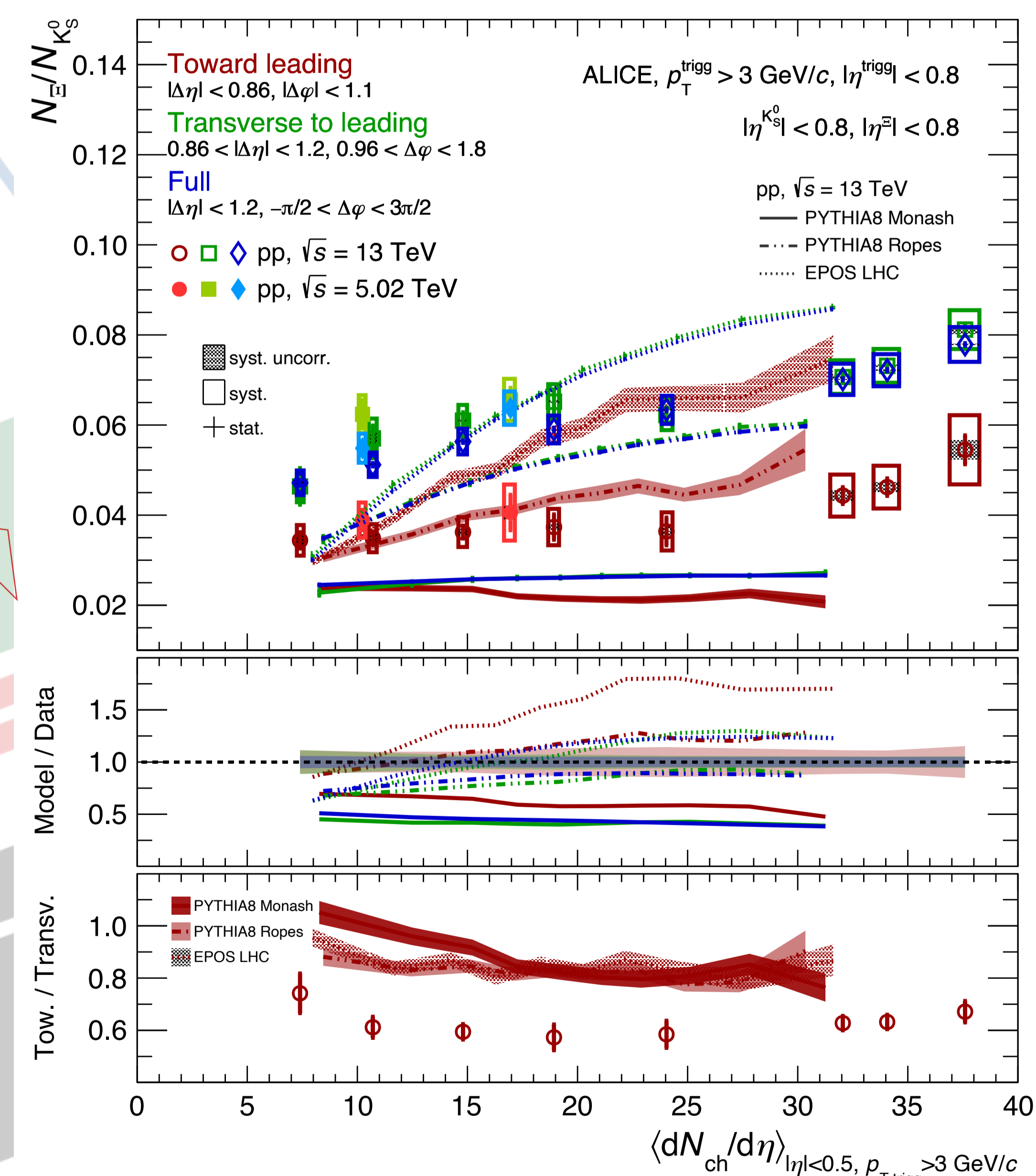
Toward-leading (TL) spectra of K_S^0 (Ξ^\pm) are harder than **transverse-to-leading (TR)** spectra of K_S^0 (Ξ^\pm)



TOWARD AND TRANSVERSE-TO-LEADING YIELDS VS MULTIPLICITY^[3]

- **Full** and **TR** yields **increase with multiplicity** faster than **TL** yields
→ the contribution of **TR** wrt **TL** production increases with multiplicity
- **PYTHIA8** models **underestimate** the **full** and **TR** yields of K_S^0 and Ξ^\pm , **EPOS LHC overestimates** their increase with multiplicity. The **deviation** of the models is **larger** for Ξ^\pm than for K_S^0 .
- **PYTHIA8 Ropes** and **EPOS LHC** **qualitatively reproduce** the **TL** increase of Ξ^\pm with multiplicity, but do not reproduce the **TL** increase with multiplicity of K_S^0

NEW!



STRANGENESS ENHANCEMENT

- Strangeness enhancement in Ξ/K_S^0 ratio of **full** yields is attributed to the larger strangeness content of Ξ^\pm wrt K_S^0
- The **TR** and **TL** yield ratios **increase with multiplicity** in a compatible way
- **TR > TL** ratio → production of Ξ^\pm wrt K_S^0 is **favoured in TR** processes

SUMMARY AND OUTLOOK

- **Underlying event** processes give the **dominant contribution** to strange particle production in pp collisions
- **Strangeness enhancement** with multiplicity observed both in **TL** and **TR** regions
- **None** of the considered models **quantitatively describe** strange hadron production in **hard scattering** processes or in the **underlying event**
- Further studies to be performed by exploiting the full **Run 3 data sample** (e.g. $> 10^3$ increase of Ω^\pm at the end of Run 3)

REFERENCES

- [1] Nature Phys. 13, 535–539
- [2] Int. J. Mod. Phys. A 29, 1430044
- [3] arXiv: 2405.14511