Shedding some light and adding confusion to the strangeness production mechanism - Highlights from the last year of my PhD

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The key to answering this: strangeness

Why strangeness?

- QGP $\rightarrow$ deconfinement $\rightarrow$ lower effective s quark mass $\rightarrow$ more $s\bar{s}$ breakings $\rightarrow$ more (multi)strange hadrons

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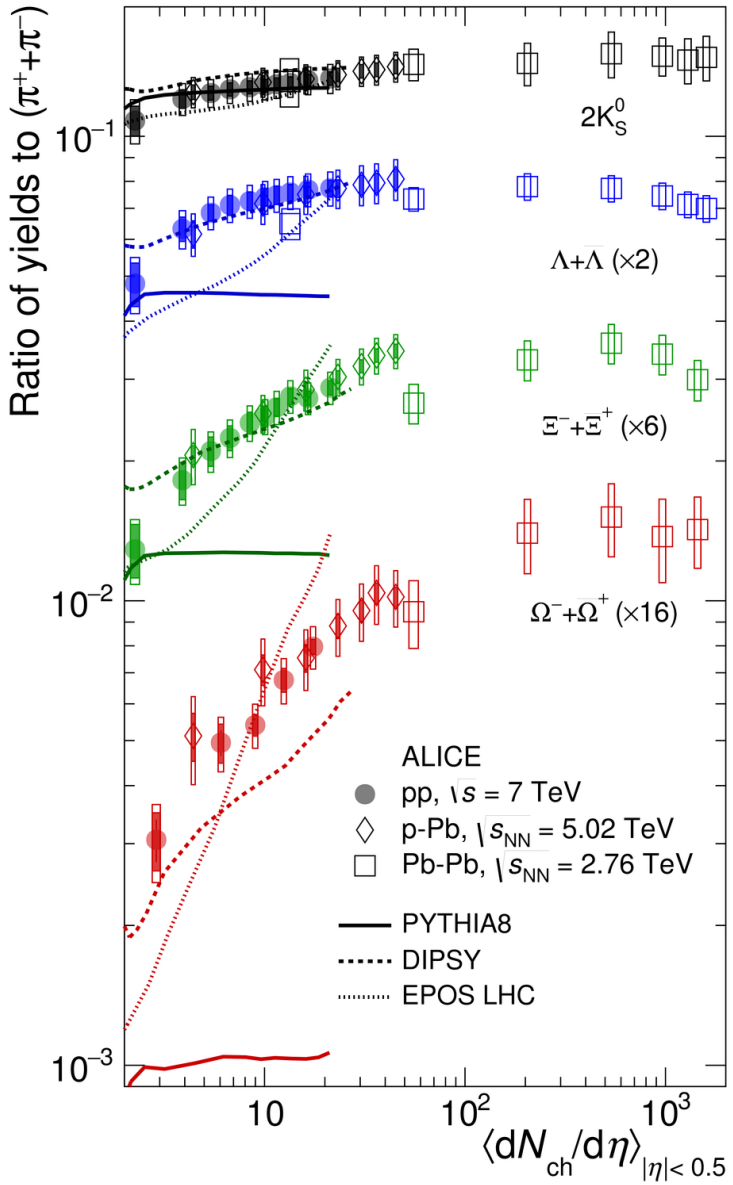
- QGP → deconfinement → lower effective s quark mass → more $s\bar{s}$ breakings → more (multi)strange hadrons
- But strangeness enhancement starts already in pp collisions!
- PYTHIA solution: cluster strings into ropes
- Core-corona approach (EPOS): QGP-like core and dilute corona



The tool: $\Xi(= ssd)-$hadron correlations

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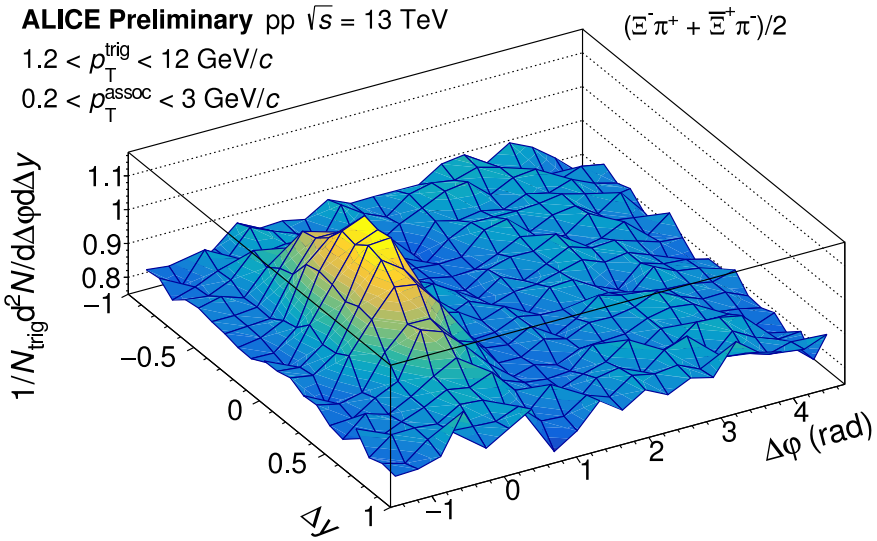
$\Xi - \pi$ correlations:



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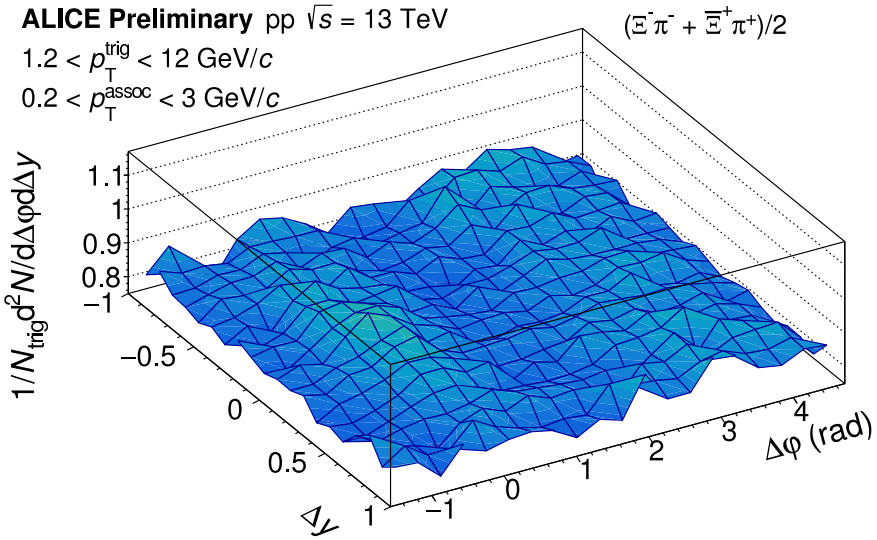

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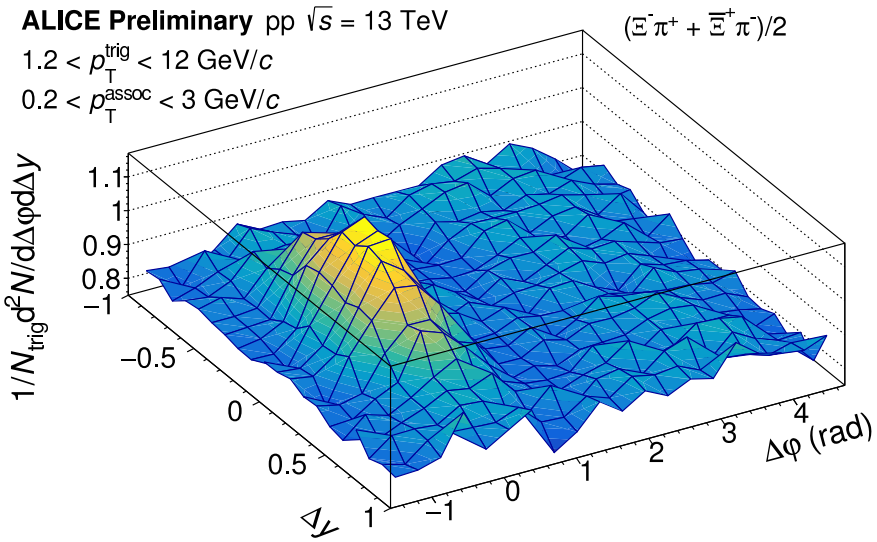

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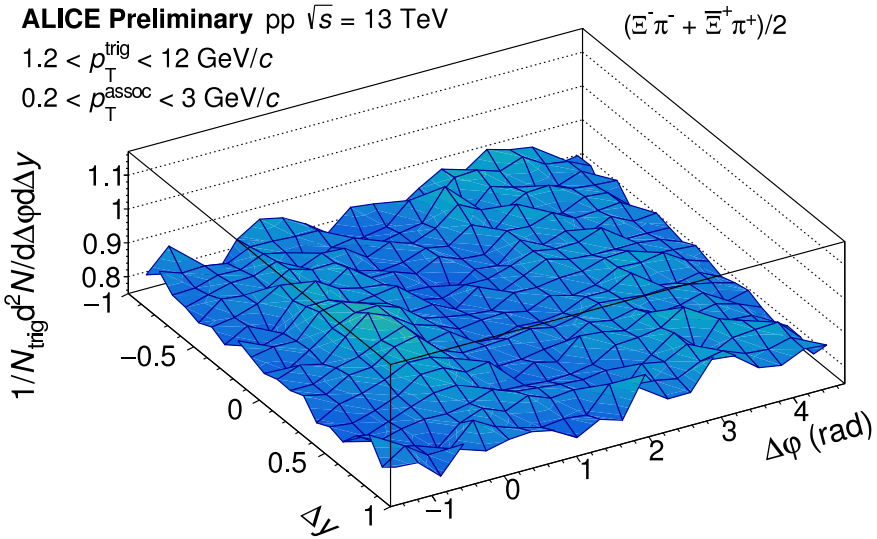

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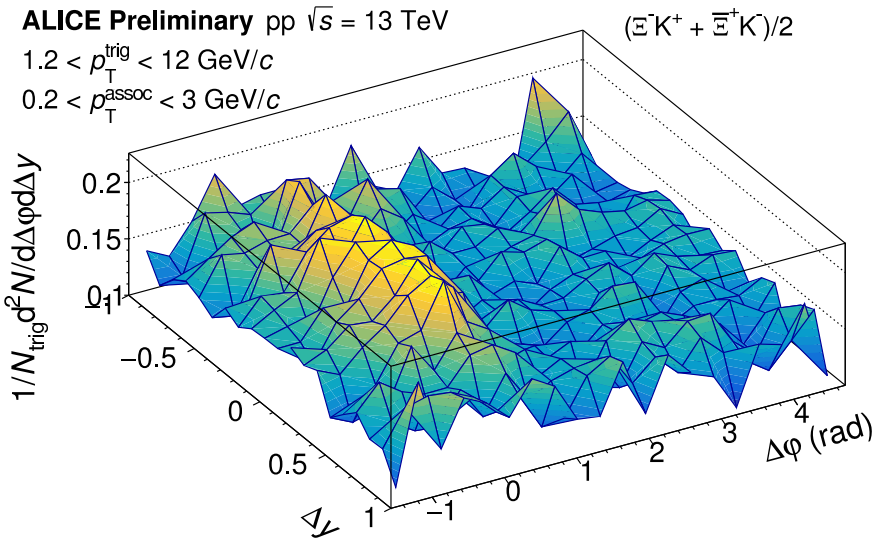
$\Xi - \mathrm{K}$ correlations:



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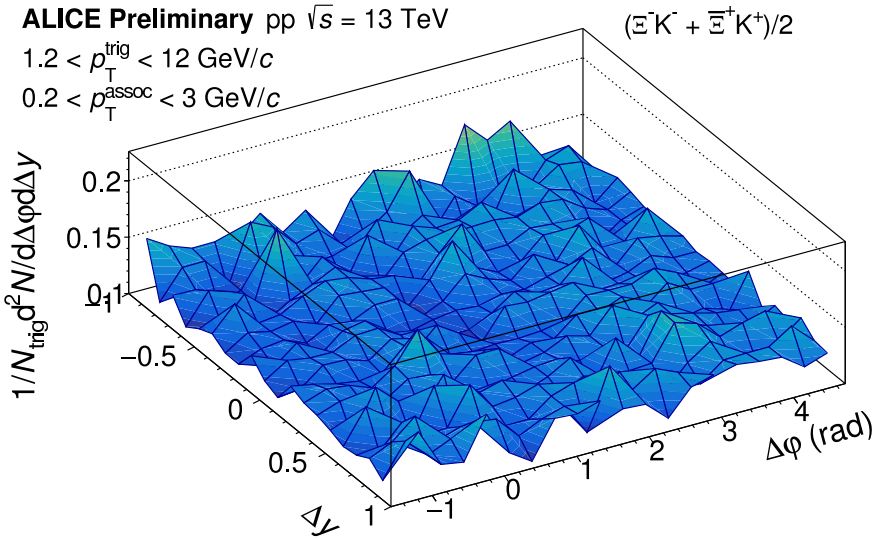

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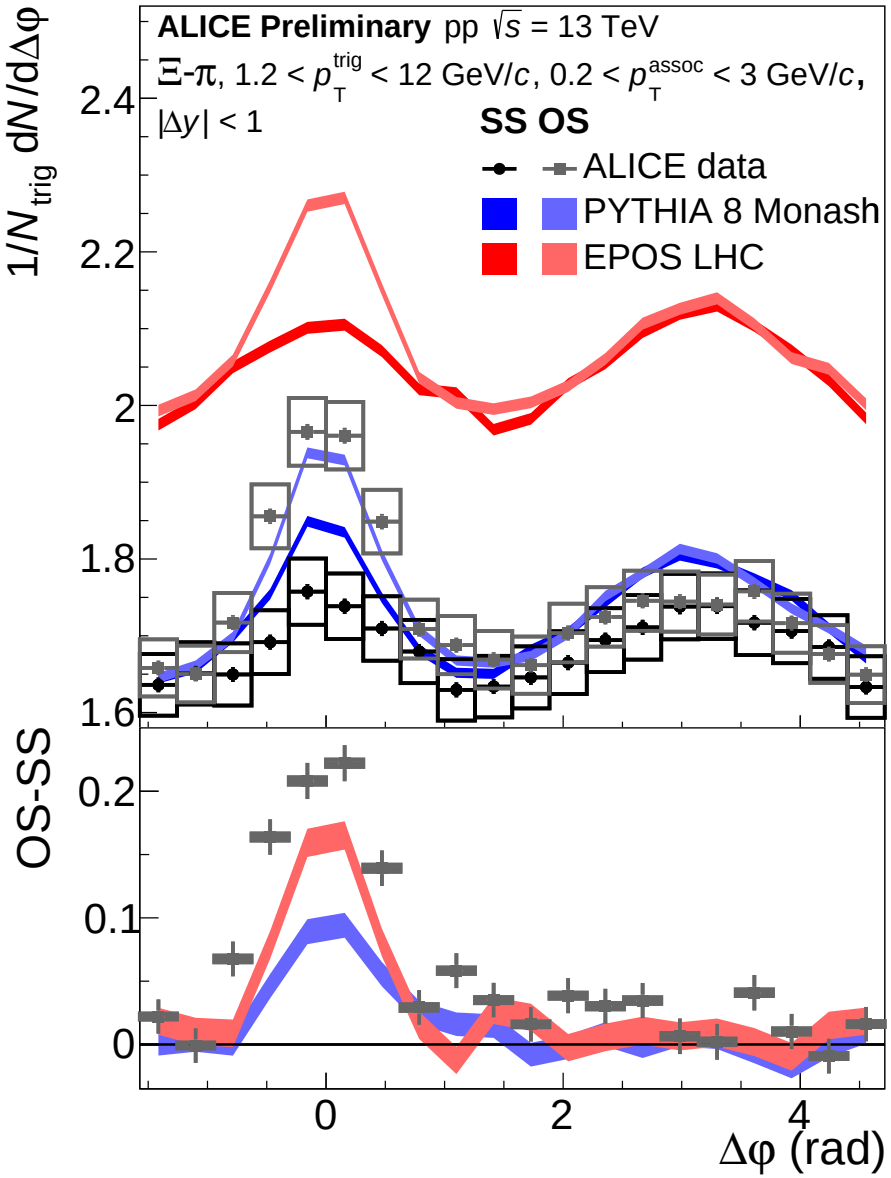
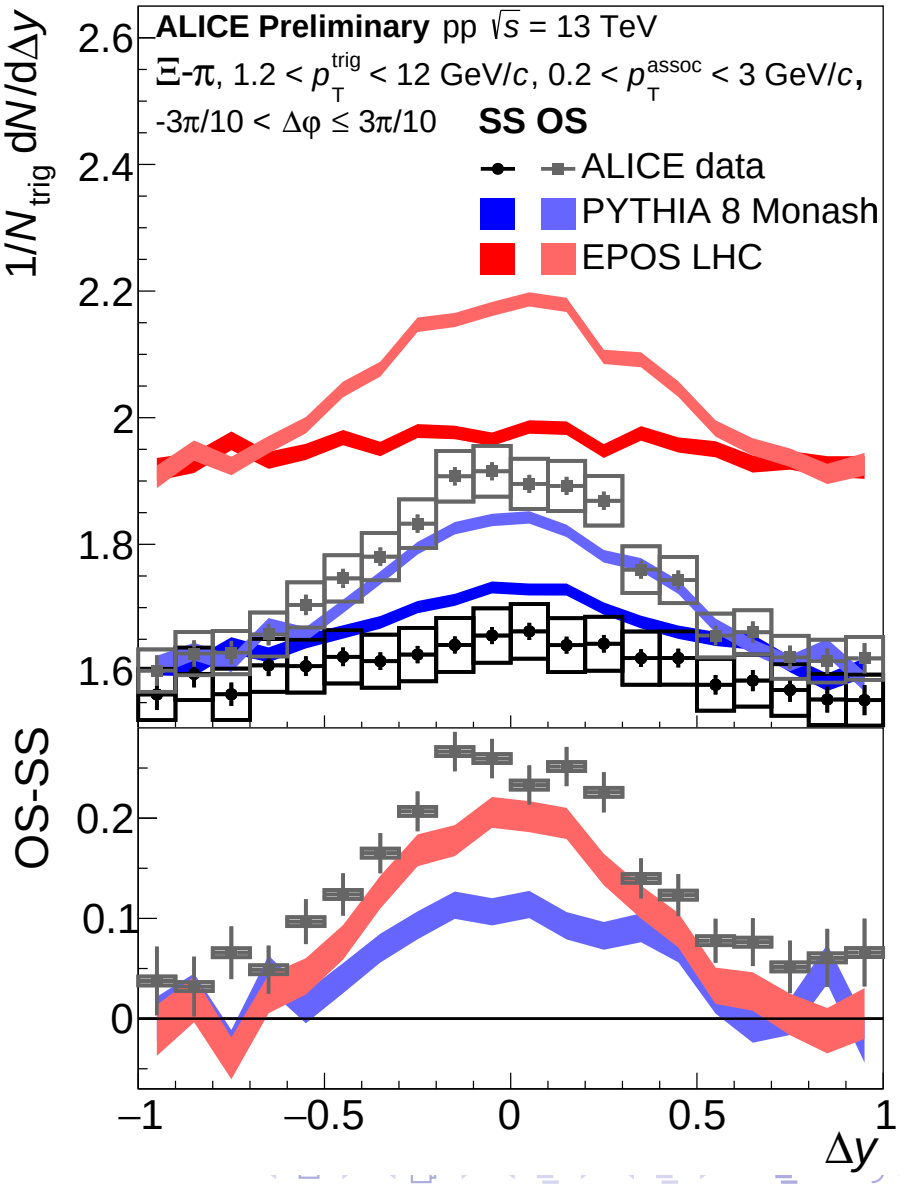
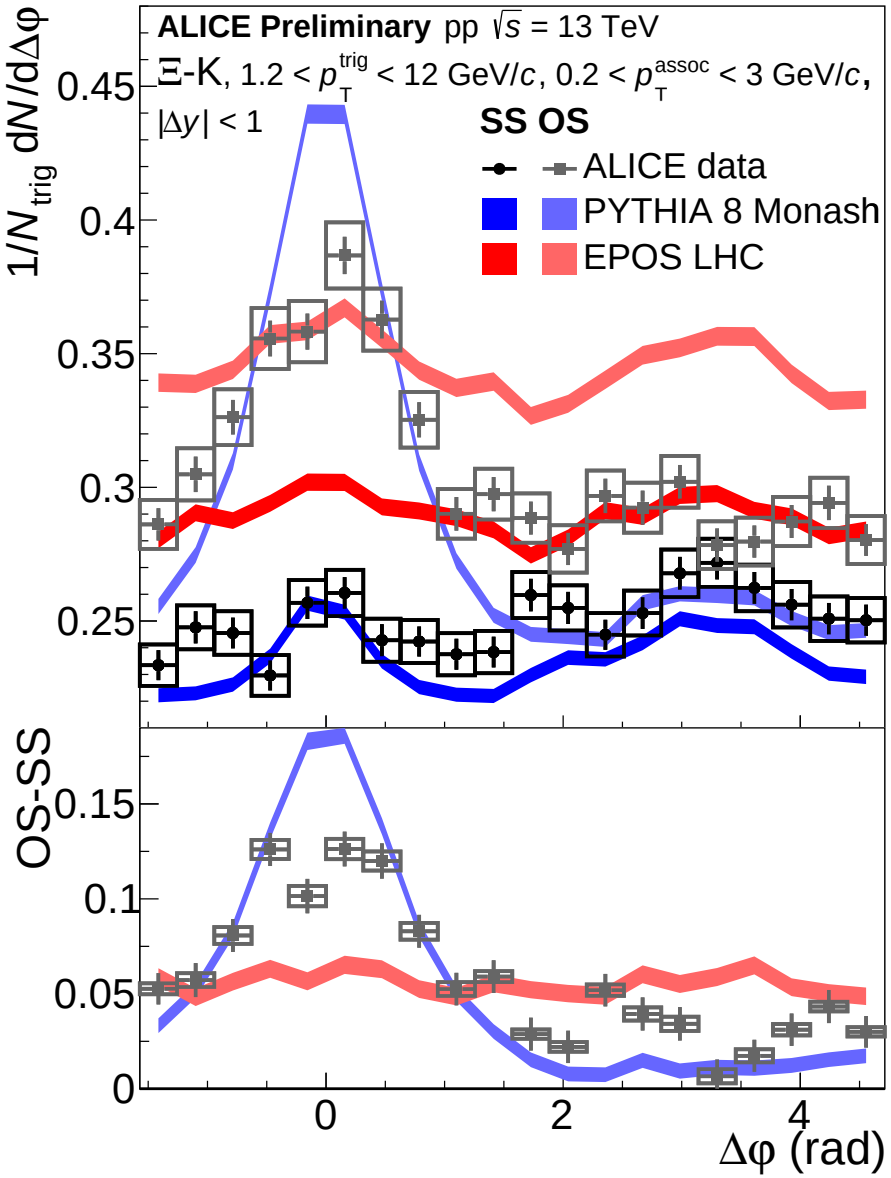
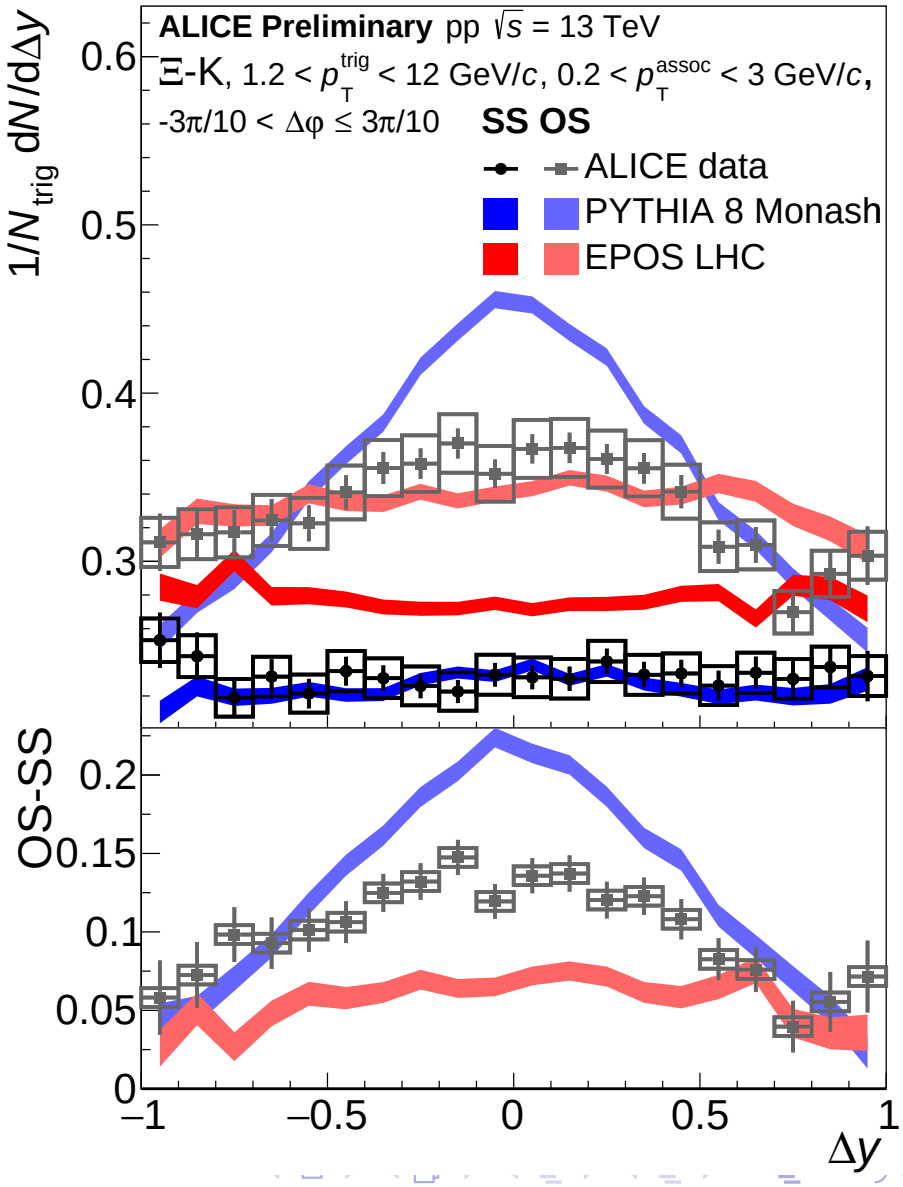
$\Xi - \pi$ correlations: the models do quite well



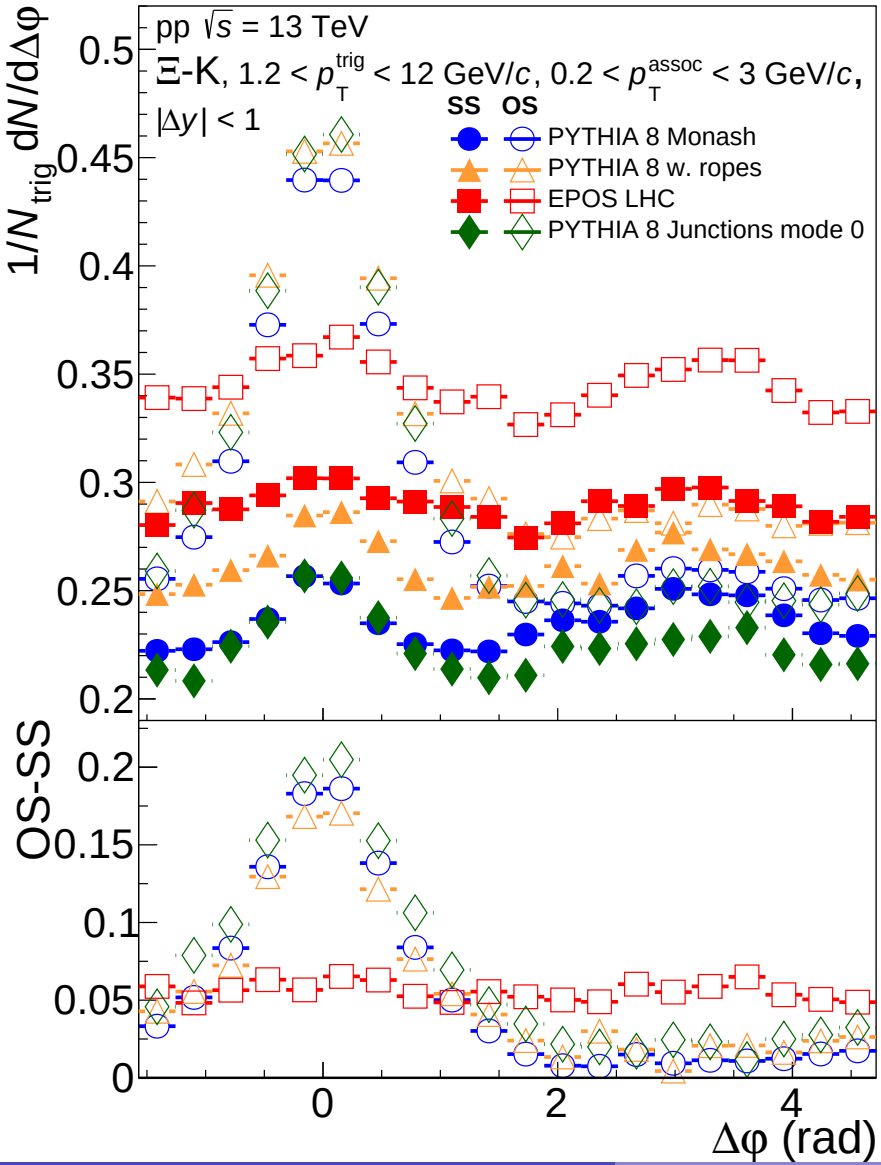


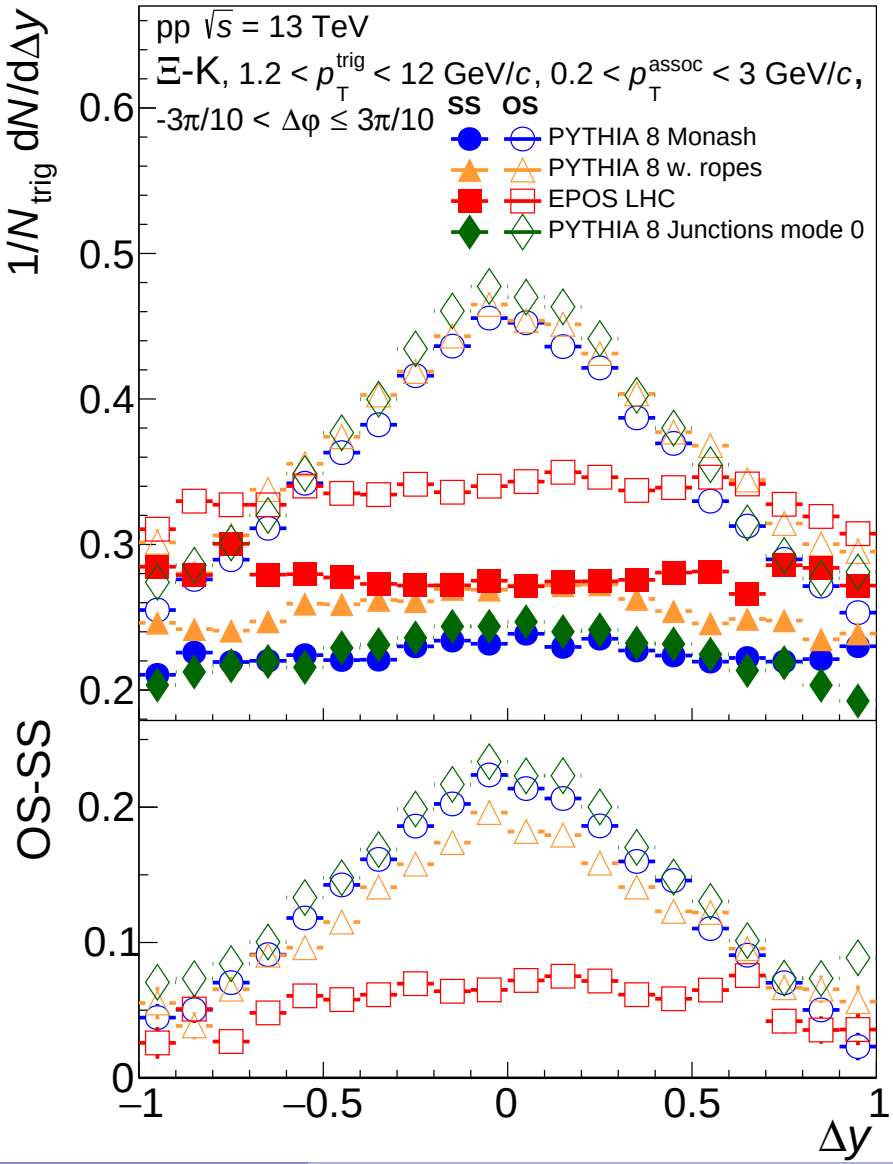
Ξ – K correlations: what is happening here?





What about the ropes?

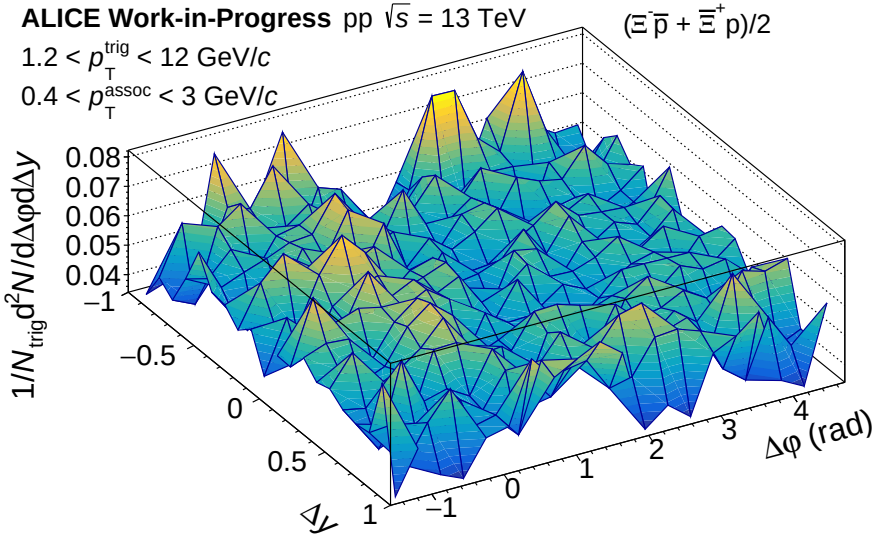




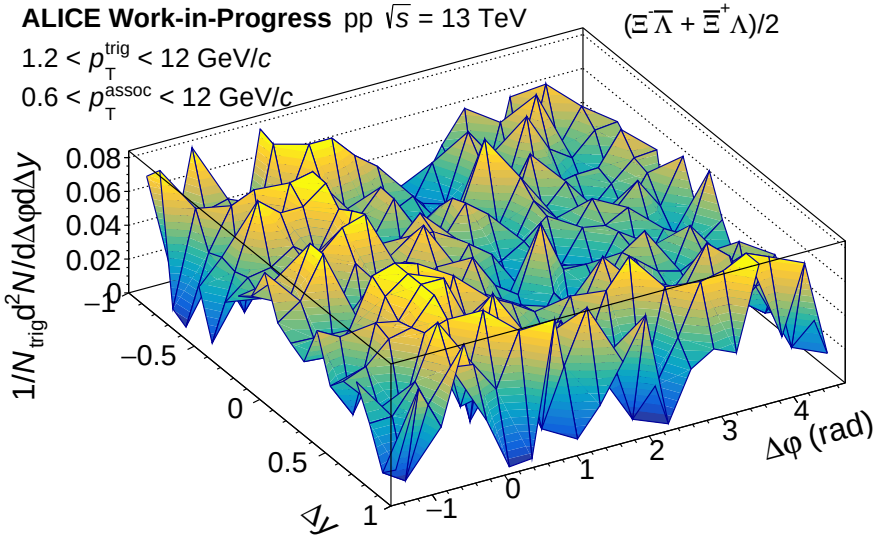
Do I still have time?

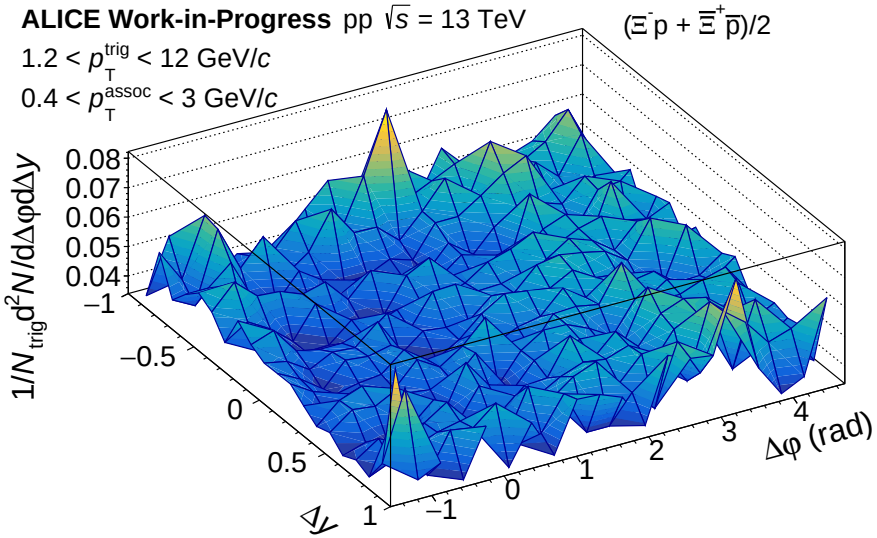
Ξ-baryon correlations

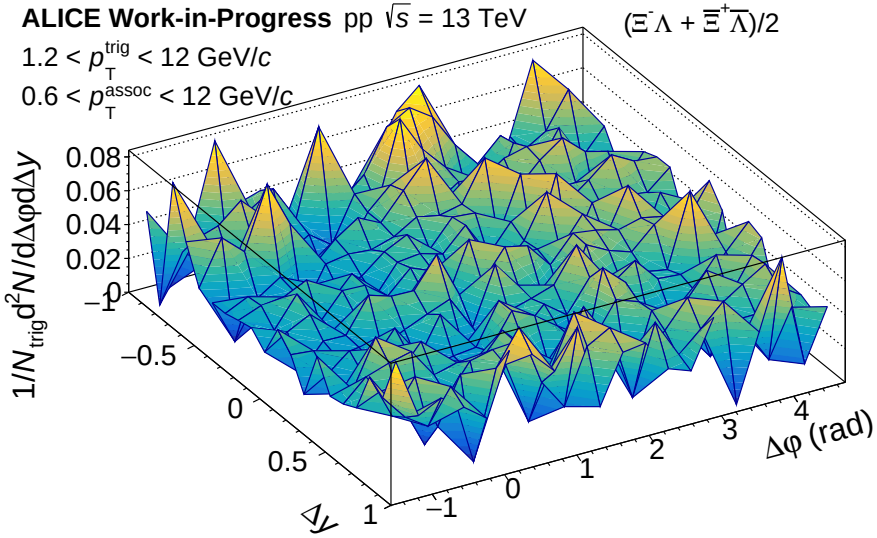
$\Xi - \mathrm{p}$ correlations:



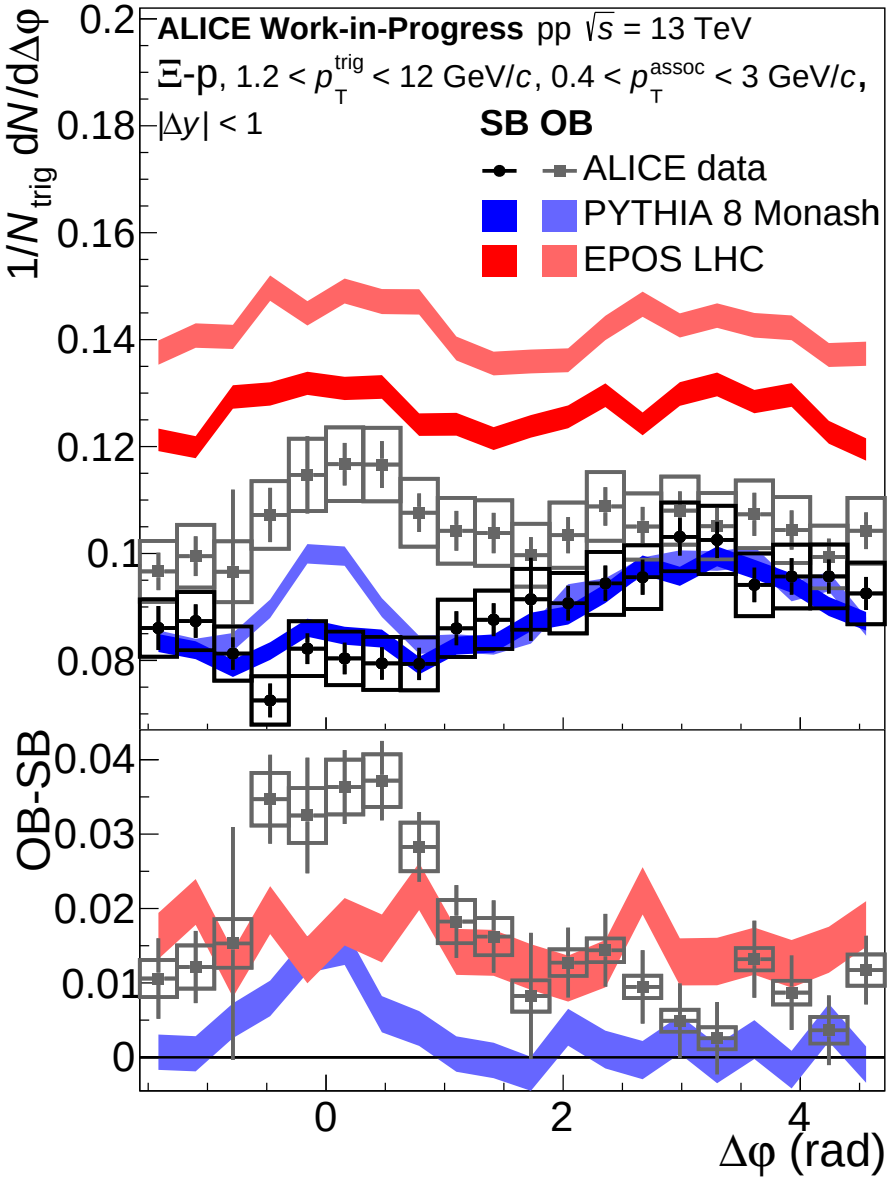
$\Xi - \Lambda$ correlations:

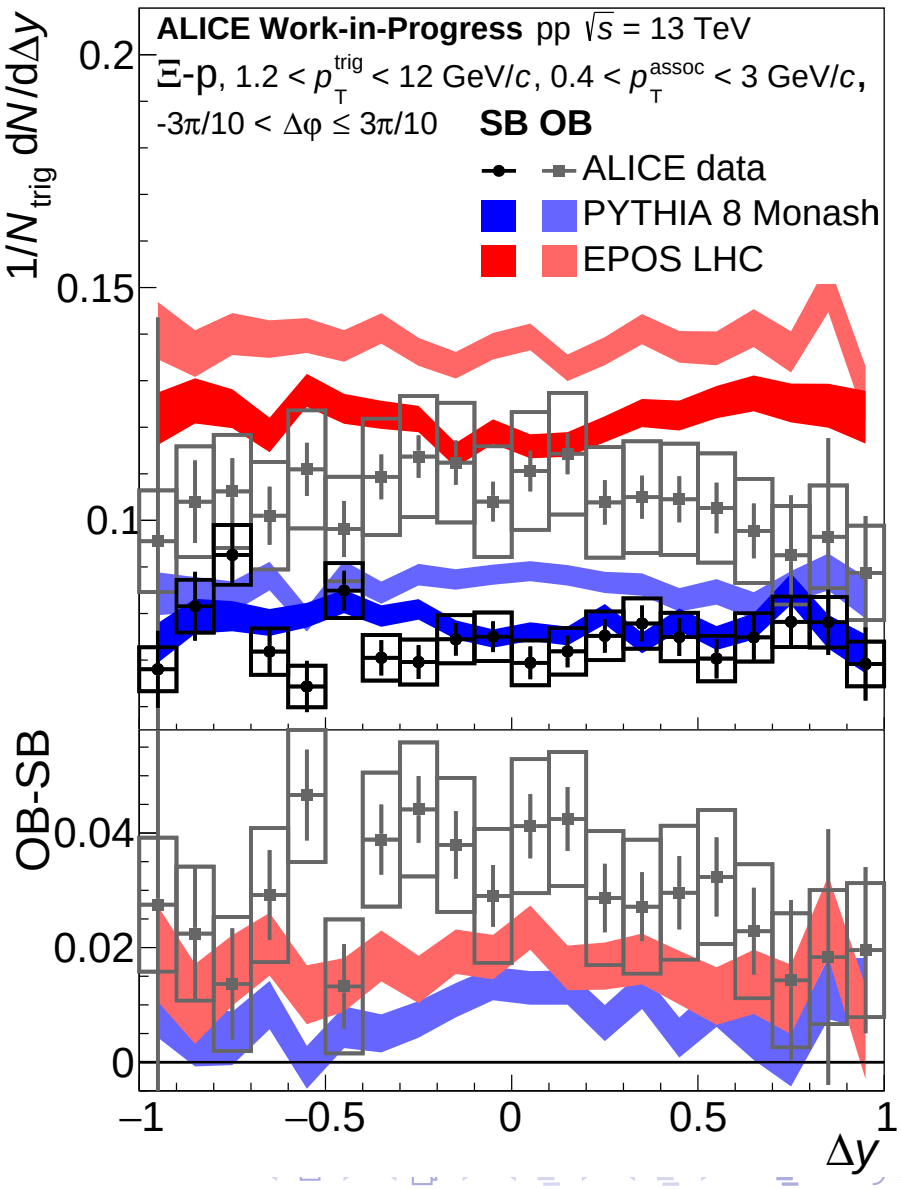




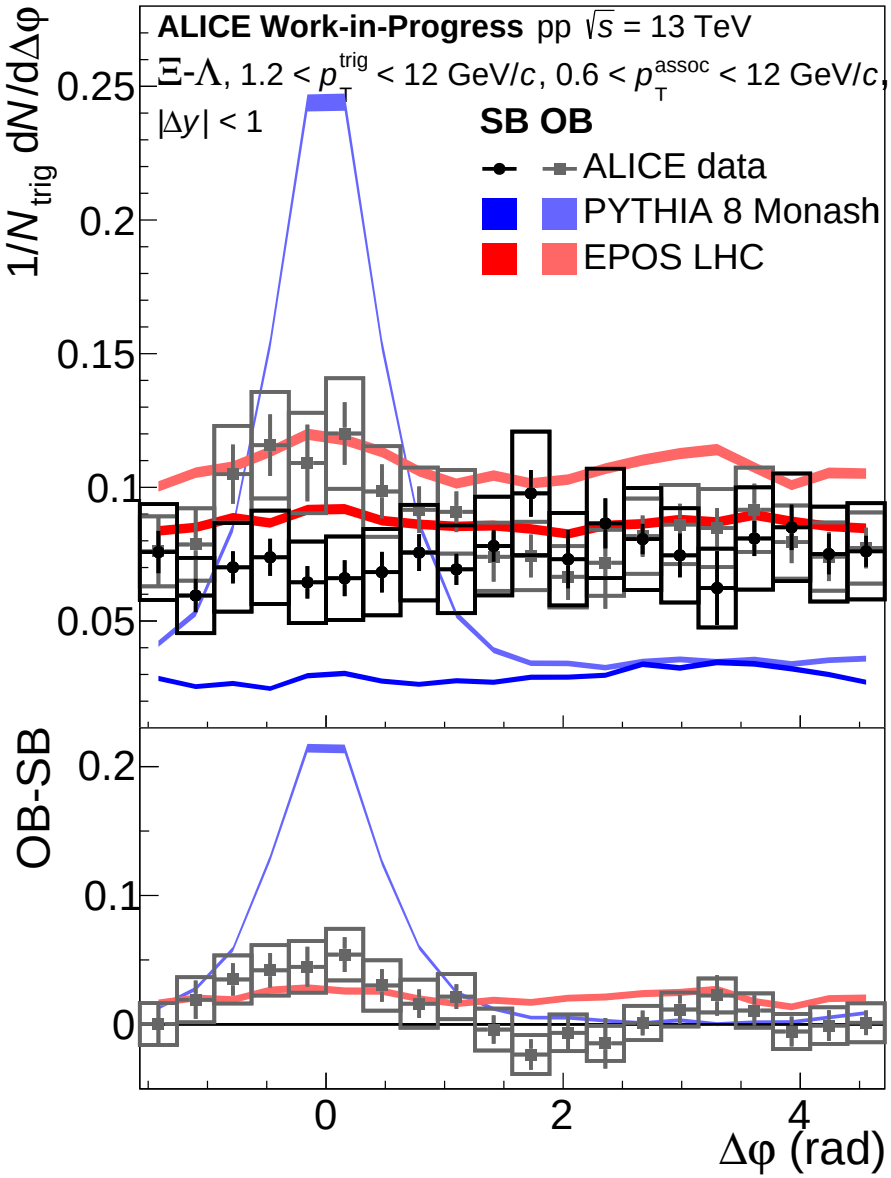


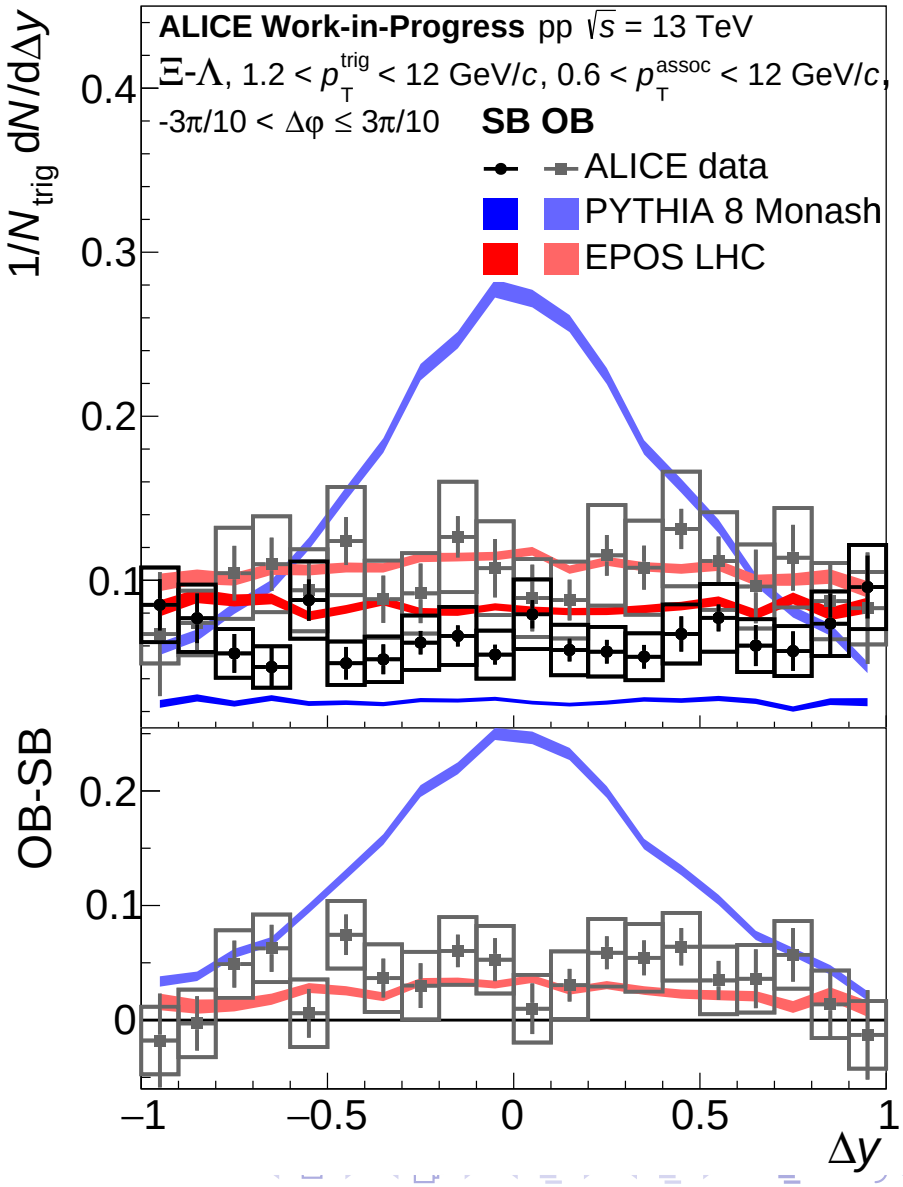
Ξ – p correlations: PYTHIA is not that bad





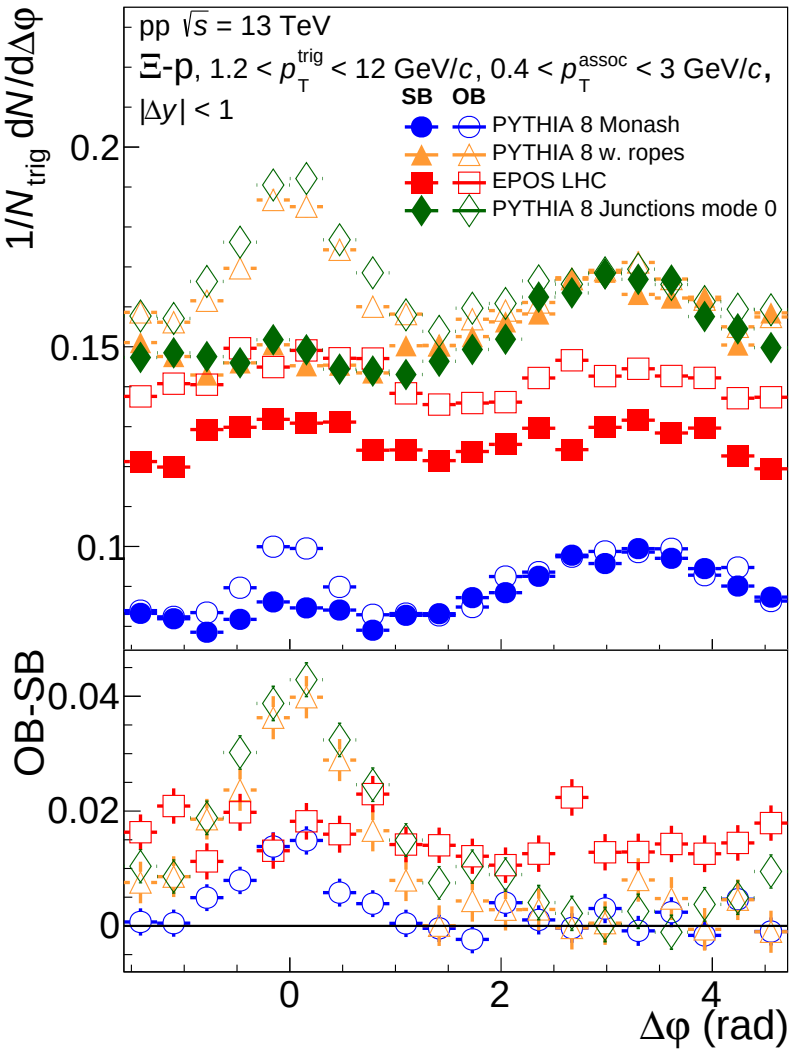
Ξ – Λ correlations: another poor prediction



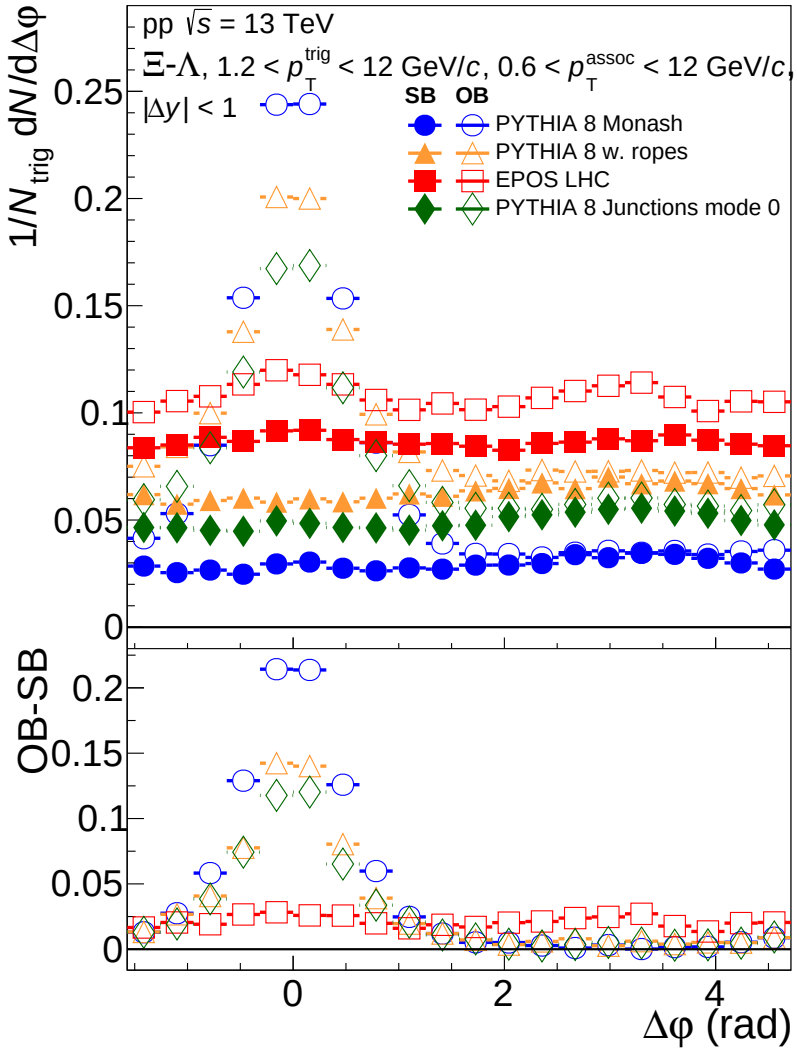


Here ropes help a bit

$\Xi - \mathrm{p}$ correlations:



$\Xi - \Lambda$ correlations:



Conclusions

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- ...for strangeness production, we don't understand what's going on
- PYTHIA predicts too narrow correlation peak $\Longrightarrow$ too localised strangeness production
- EPOS correlations are way too diluted $\Longrightarrow$ if core-corona is right, local conservation laws must be treated differently