

# Jet Fragmentation in ALICE Run 3



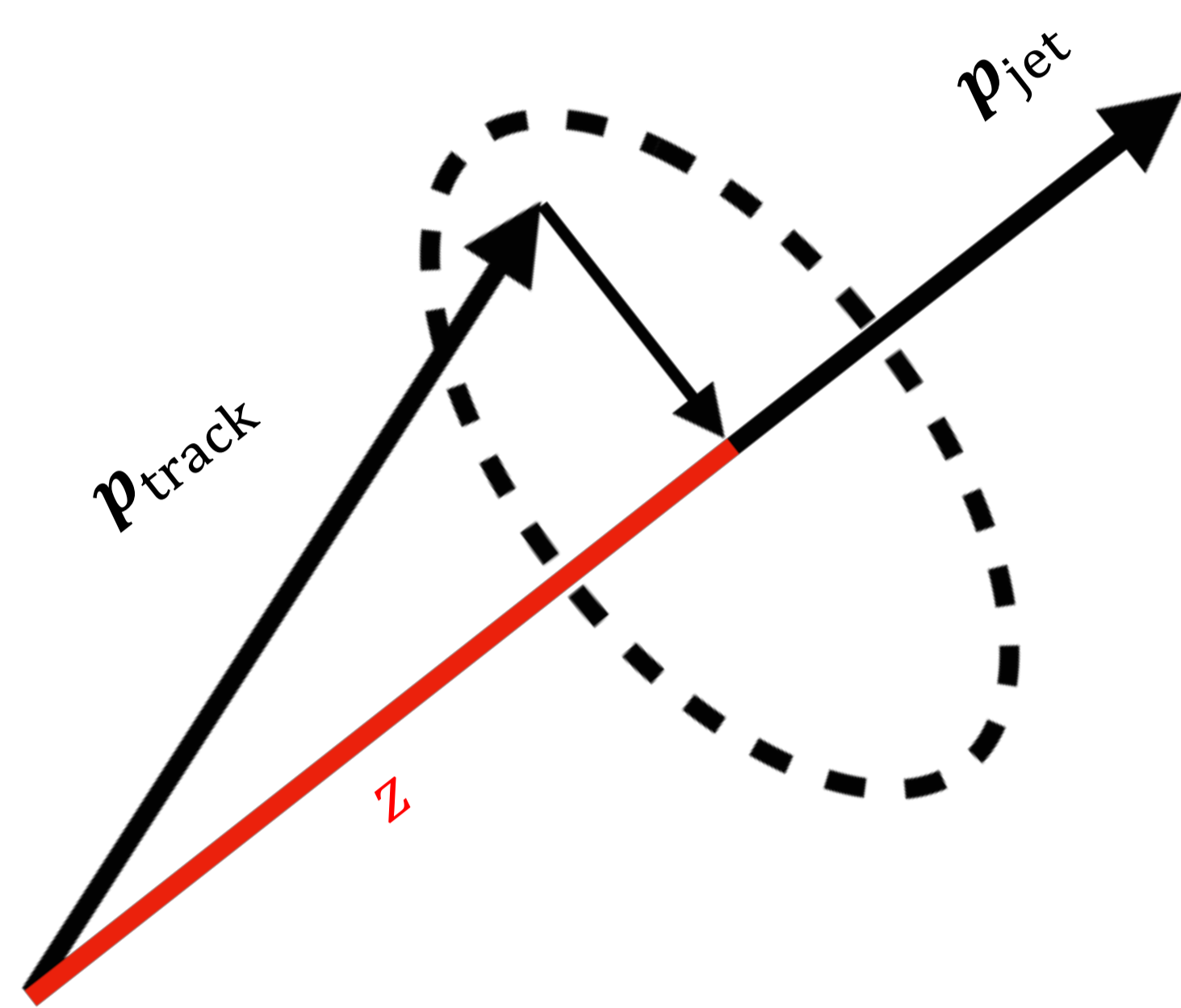
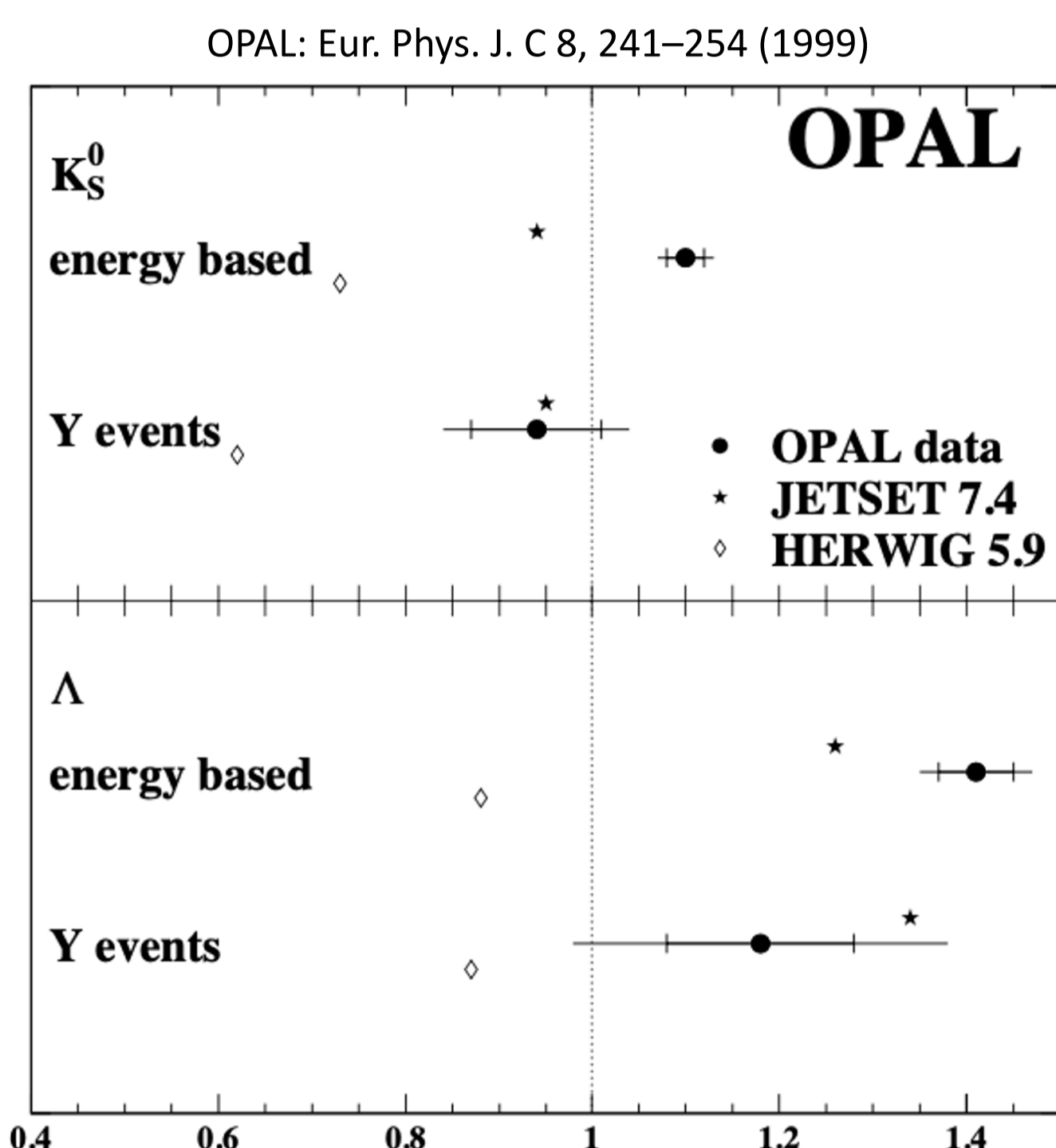
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## Jet Fragmentation

- Longitudinal momentum fraction of tracks in jets

$$z = \frac{\mathbf{p}_{\text{track}} \cdot \mathbf{p}_{\text{jet}}}{p_{\text{jet}}^2}$$

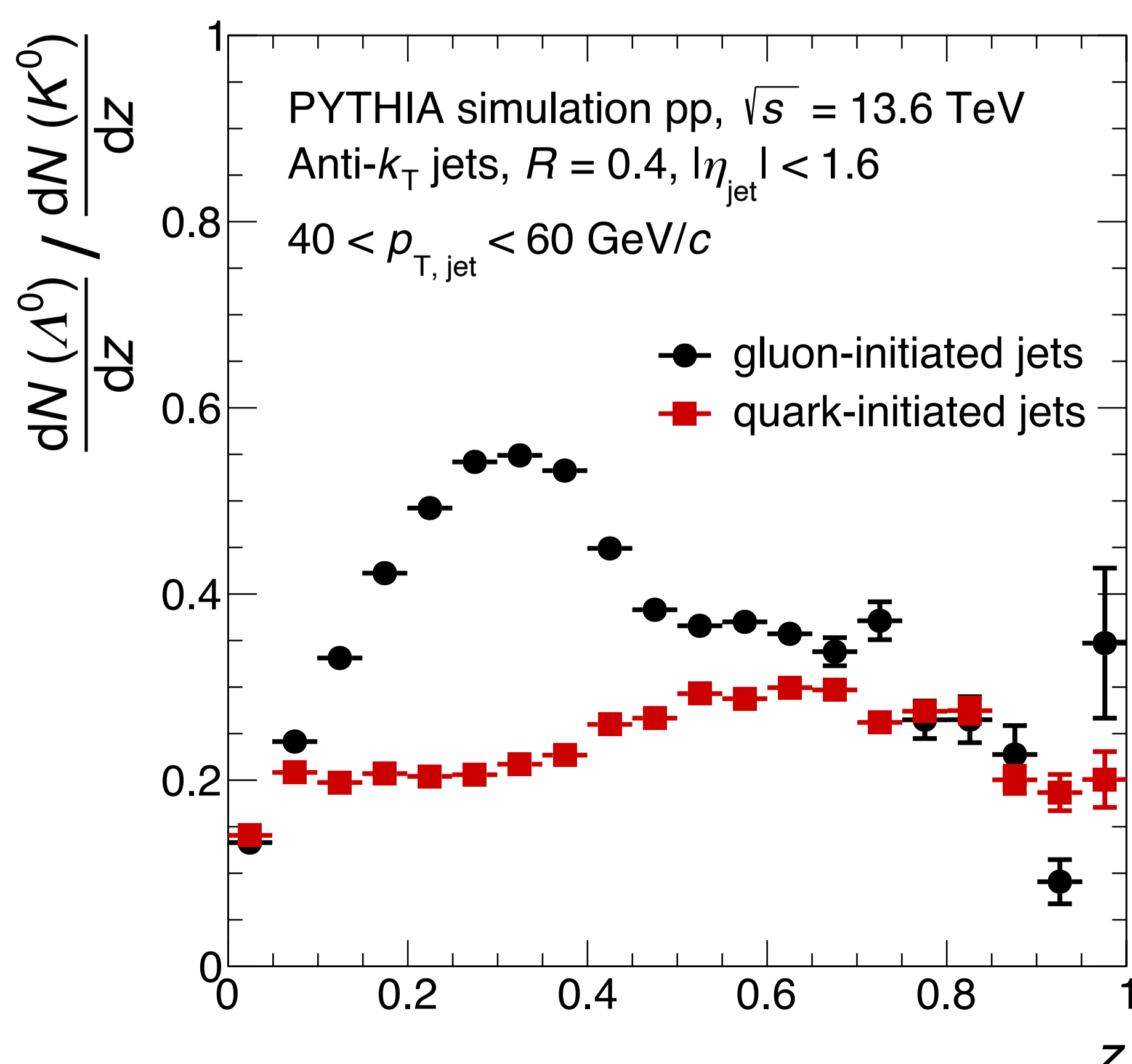
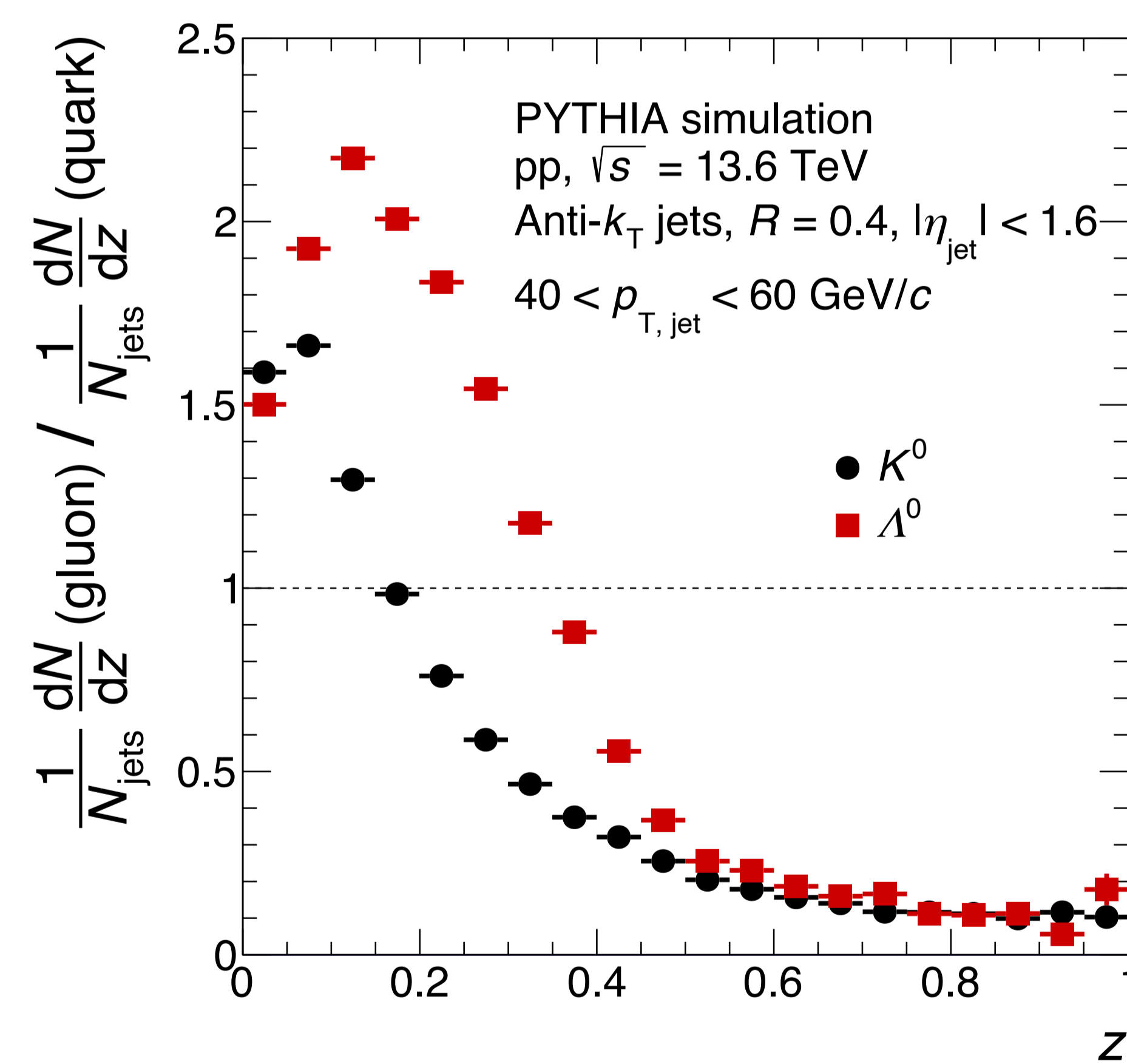


ratio of relative production rates ( $R_g / R_q$ )

- Hints of enhanced baryon production in gluon jets
- Gluon fragmentation functions poorly constrained

## Quark and Gluon Jets

- PYTHIA8: gluon-to-quark ratio of jet fragmentation into  $\Lambda^0$  and  $K^0$
- Gluons have softer fragmentation
- Enhanced  $\Lambda^0$  production in gluon jets at  $z \leq 0.5$



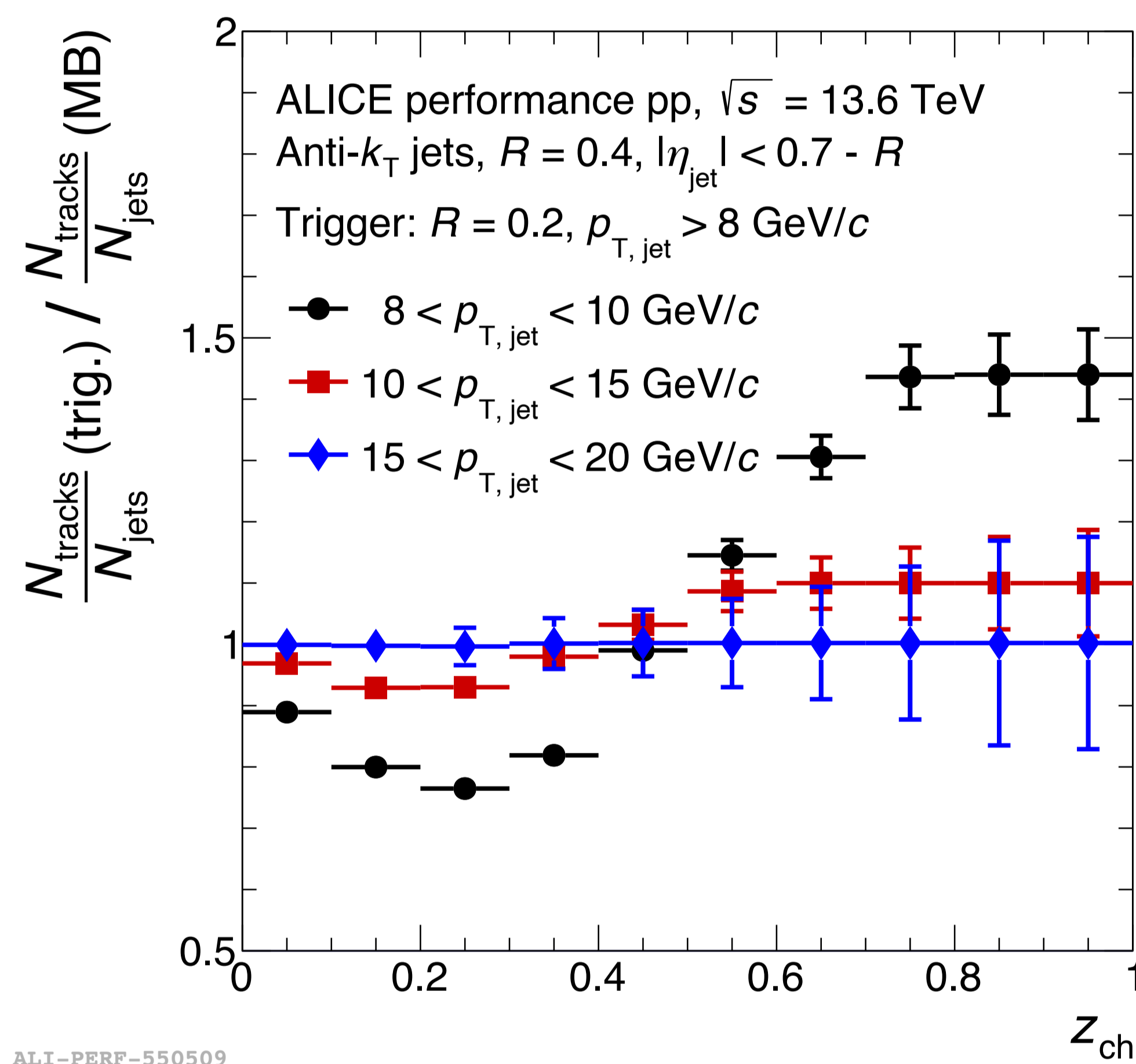
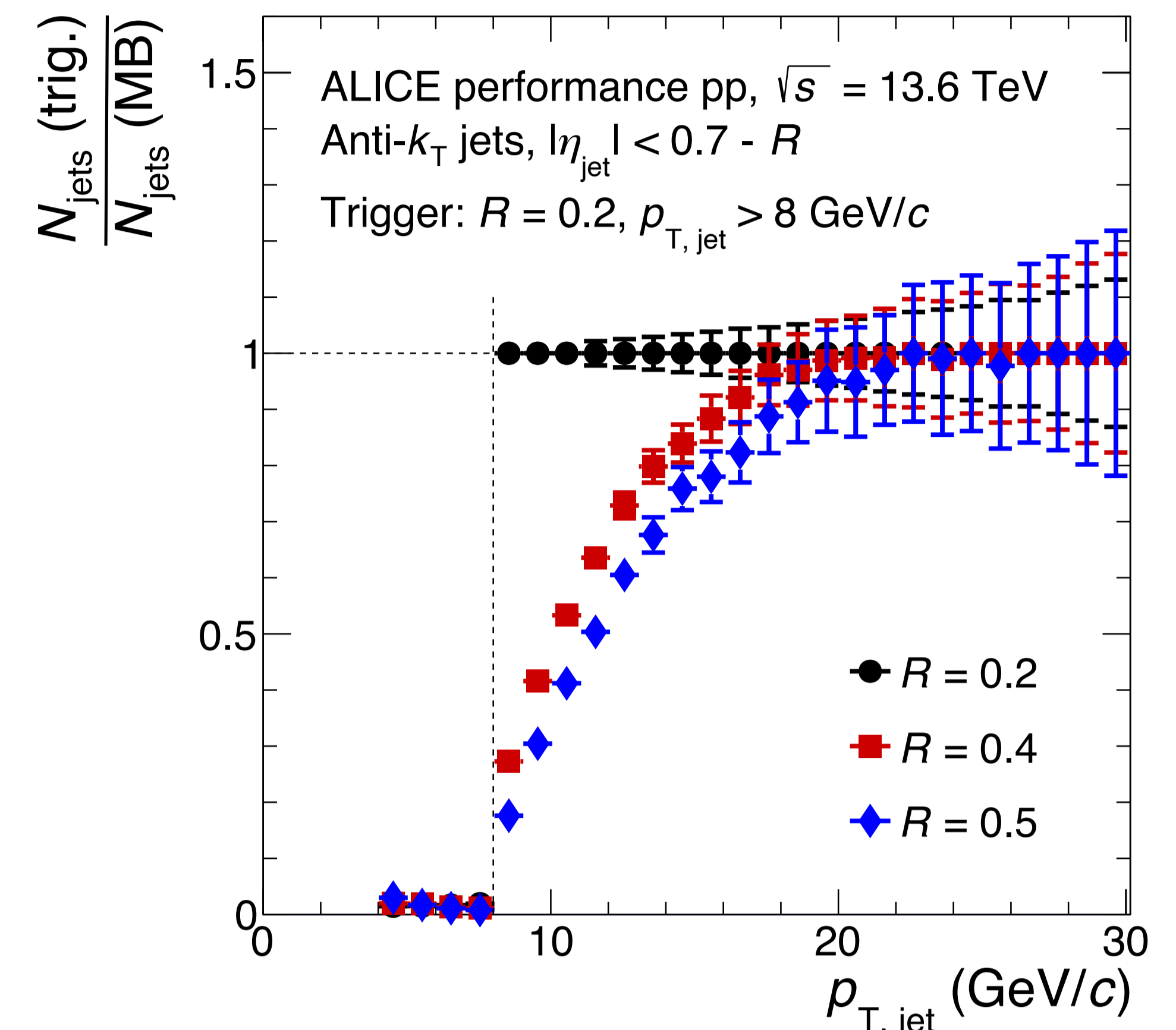
- $\Lambda^0/K^0$  in gluon jets and quark jets
- Approximately independent of  $z$  for quark jets
- Modified significantly in gluon jets

## Jet Trigger 2022 Data

- Trigger:  $R = 0.2$  jet with  $p_{T,\text{jet}} > 8$  GeV/c

- Jet yield modified far above threshold, up to  $\sim 20$  GeV/c

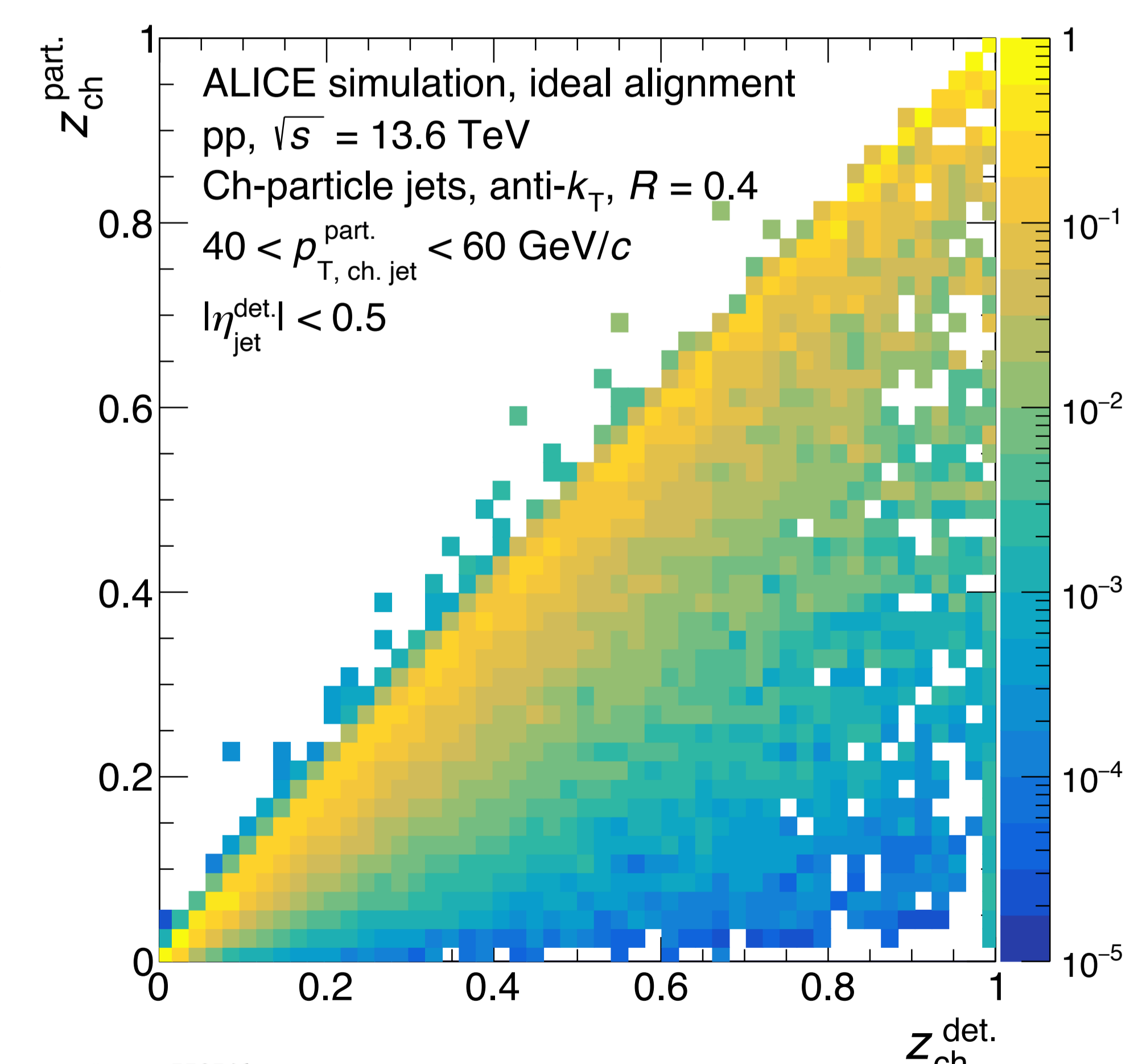
- Trigger leads to depletion of  $R = 0.4$  jets in the triggered sample



- Close to threshold: strong bias towards high  $z$  tracks
- Hard core: reconstructed as  $R = 0.2$  jet

## Detector Response

- Compare PYTHIA at particle-level and detector-level
- Robust to detector effects



## Summary and Outlook

- Promising observable for studying fragmentation
- Robust to detector effects and trigger bias understood
- Next: PID differential measurement with Run 3 ALICE data



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