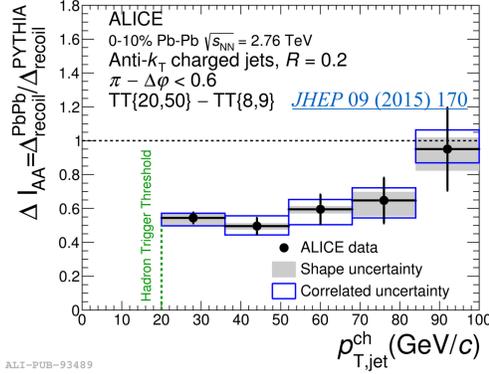


Motivation

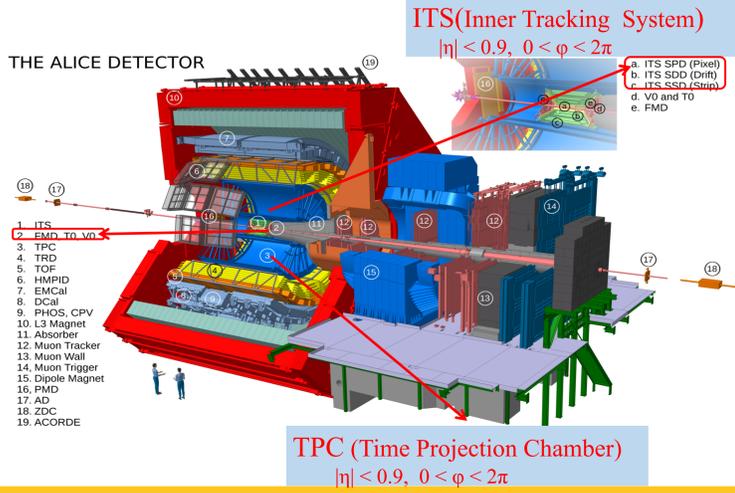
- Jet structure and production provide constraints to pQCD calculations.
- Investigate the splitting function of parton in vacuum: close to original collimation information.



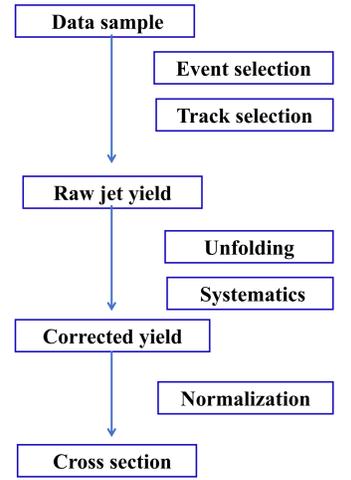
- Study correlation between jet production and event activity.
- Possible extension to semi-inclusive hadron-jet or gamma-jet correlations to constrain jet quenching [1].

ALICE Detector

- Event selection and multiplicity categorization: SPD, V0M
- Track and jet reconstruction: ITS, TPC



Analysis strategy



Analysis details

- Data: pp collisions at $\sqrt{s} = 13$ TeV
- Simulation: PYTHIA8 Monash2013 & POWHEG
- Minimum bias events (MB trigger) $|v_z| < 10$ cm
- The charged tracks measured by ITS + TPC
 $|\eta_{\text{track}}| < 0.9, p_T^{\text{track}} > 0.15$ GeV/c
- Jet reconstruction: Anti- k_T algorithm, background: k_T algorithm
 $p_T^{\text{jet}} > 1.0$ GeV/c $|\eta_{\text{jet}}| < 0.9 - R$ Jet radii $R = 0.2, 0.4$

- UE subtraction:

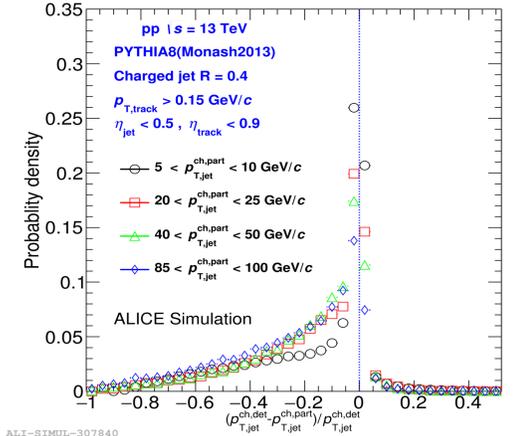
$$p_{T,\text{jet}}^{\text{corr}} = p_{T,\text{jet}}^{\text{raw}} - \rho * A_{\text{jet}}$$

$$\rho = \text{median} \left\{ \frac{p_{T,\text{jet}}^{k_T}}{A_{\text{jet}}} \right\} A_{\text{jet}} : \text{Jet area}$$

- Corrections: SVD unfolding to correct for jet energy scale and jet energy resolution
- Normalization

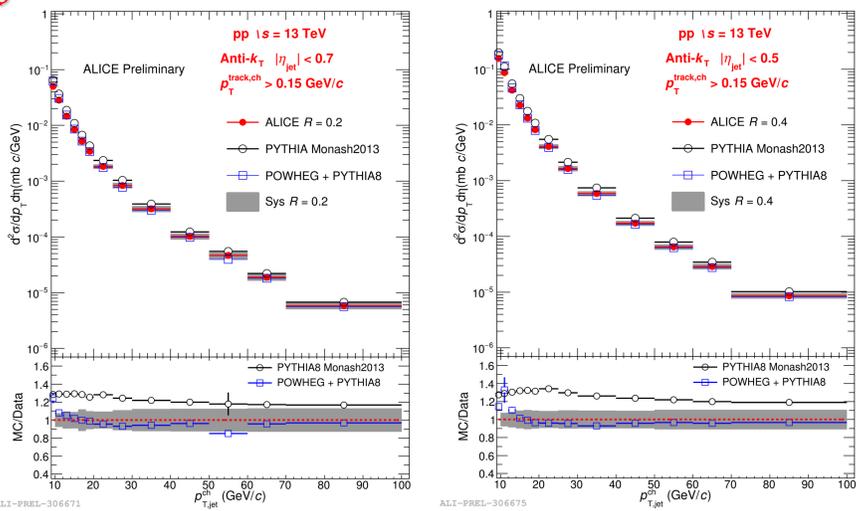
$$\frac{d^2\sigma^{\text{ch,jet}}}{dp_T d\eta} (p_T^{\text{ch,jet}}) = \frac{\sigma_{\text{MB}} \Delta N_{\text{jets}}}{N_{\text{evt}} \Delta p_T \Delta \eta} (p_T^{\text{ch,jet}})$$

$$\sigma_{\text{MB}} = 57.8 \pm 1.32 \text{ mb} [2]$$

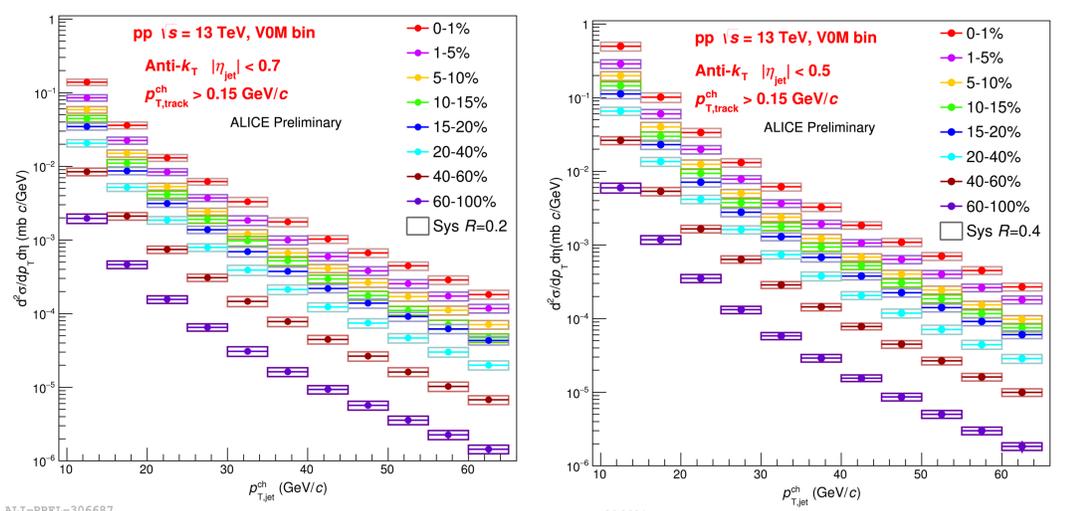


Results

Inclusive charged jet cross section

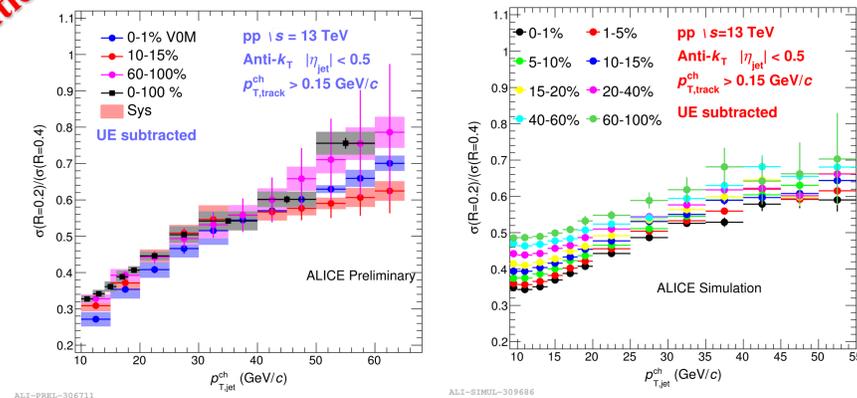


Multiplicity dependent jet production



Outlook

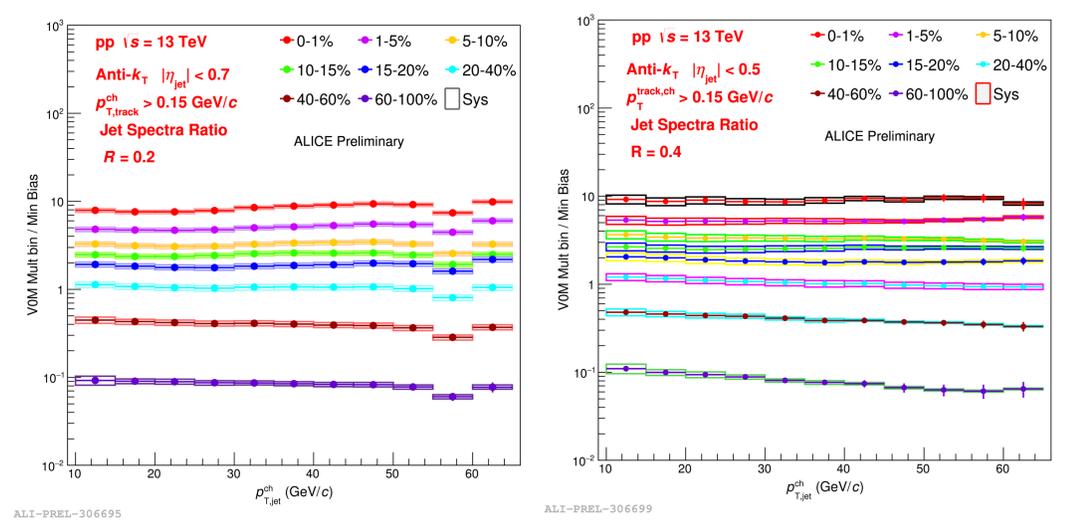
Cross section ratio from data and simulation



- Jet cross section ratio from data shows no centrality dependence while simulation indicates centrality ordering
- Inclusive jet cross section can be reproduced by POWHEG calculation but not the centrality dependent cross section ratio in pp collisions

Open question: Multiplicity differences or UE subtraction effect?

Multiplicity dependent charged jet cross section ratios



Conclusion

- First measurement of charged jet cross section in different multiplicity intervals has been performed in pp collisions at $\sqrt{s} = 13$ TeV with ALICE
- Jet production yield is higher for high multiplicity environment compared to inclusive jet yield
- Multiplicity dependent jet production yield ratio with respect to inclusive one has no significant jet p_T dependence
- Jet cross section ratio for different radii has weak multiplicity dependence in data, while multiplicity ordering was observed in simulation

Reference: [1] ALICE Collaboration, Phys. Lett. B783 (2018) 95-113

[2] <https://cds.cern.ch/record/216017>

