

Preliminary results for Z+(b-)jets at MC@NLO

- 13 TeV Z+jets SHERPA sample (1/5th of it \rightarrow ~ 20 M events) (thanks to Davide Napoletano)
 - Generation phase space:
 - 1) $p_T(l) > 20$ GeV, $71 \text{ GeV} < m(ll) < 111 \text{ GeV}$, $|y(l)| < 2.4$
 - 2) $p_T(ll) > 20$ GeV
 - \rightarrow avoid jet requirements at generation level
 - \rightarrow 'inclusive' over the choice of algorithm in the analysis
 - Hadron and Parton level
- Rivet analysis: FlavAlgAnalysis
 - Based on CMS_2017_I1499471_flakt + new FastJet flavoured jet implementations
 - Lepton + Jet requirement: $R=0.5$, $p_T(\text{jet}) > 30$ GeV, $|y(\text{jet})| < 2.4$
 - Various jet-algorithms + tagging procedures

Disclaimer: all results/observations are preliminary

Flavoured Jet algorithms

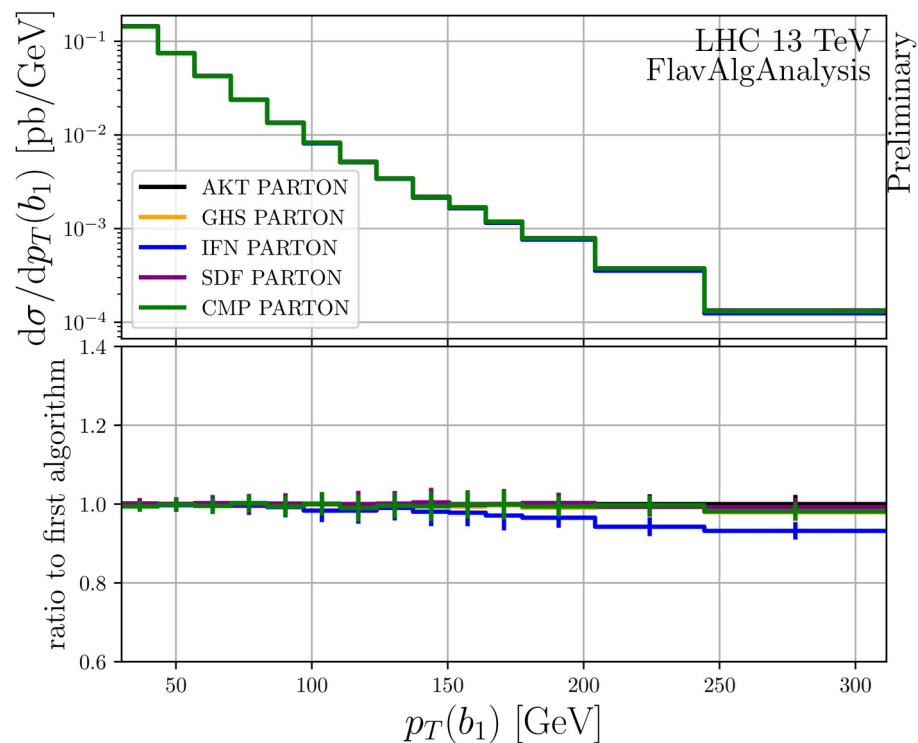
- SDF ($\beta = 1$, $z_{\text{cut}} = 0.1$)
- GHS ($\omega = 2$, $\alpha = 1$, $p_{\text{tcut}} = 15 \text{ GeV}$)
- IFN ($\alpha = 2$, $\omega = 3 - \alpha$)
- CMP ($a = 0.1$)
- All with $|\#b/B| \bmod 2 == 1$ flavour tag

Anti-kT for comparison:

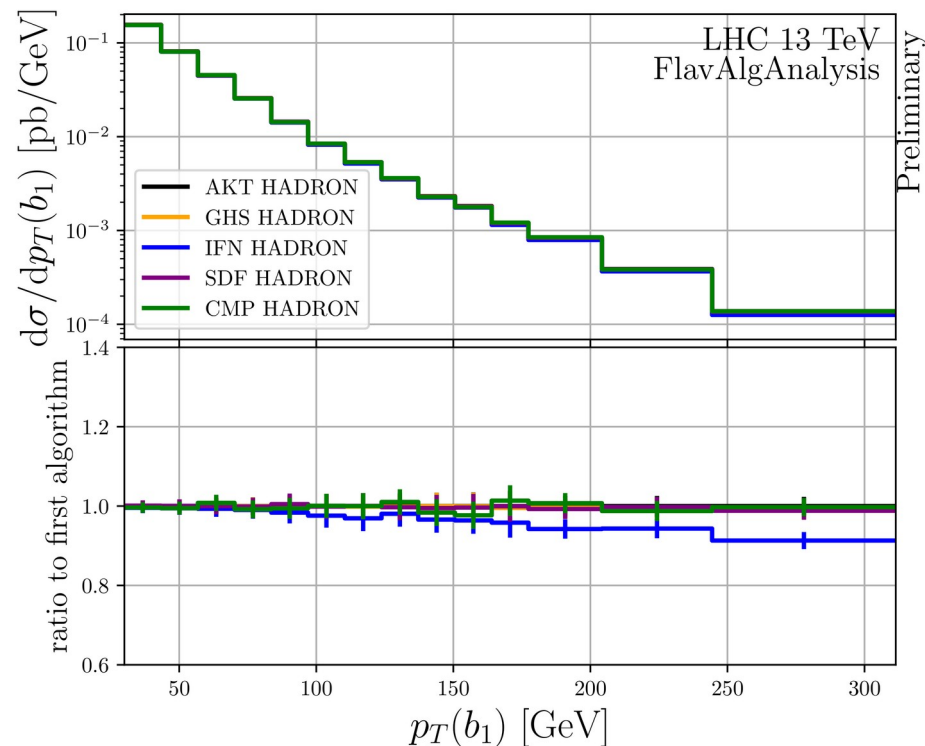
- ATLAS style truth-level ghost-tagging → CONE
- Anti-kT CMS truth level tag → TAG
- Anti-kT odd #B-hadron tag → AKT

Comparison flavoured algorithms

PARTON Level

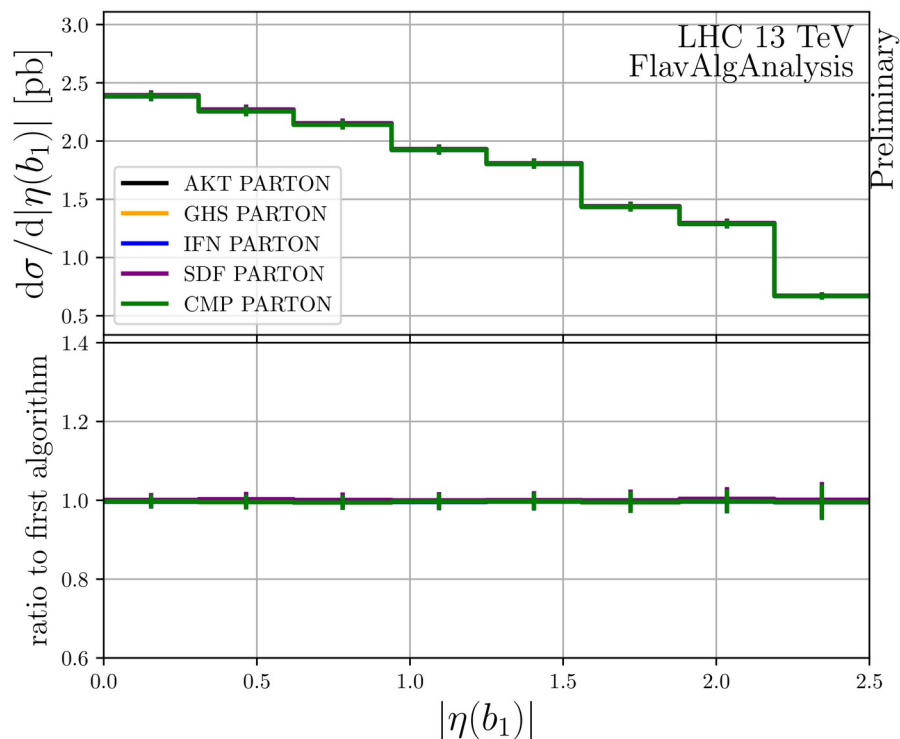


HADRON Level

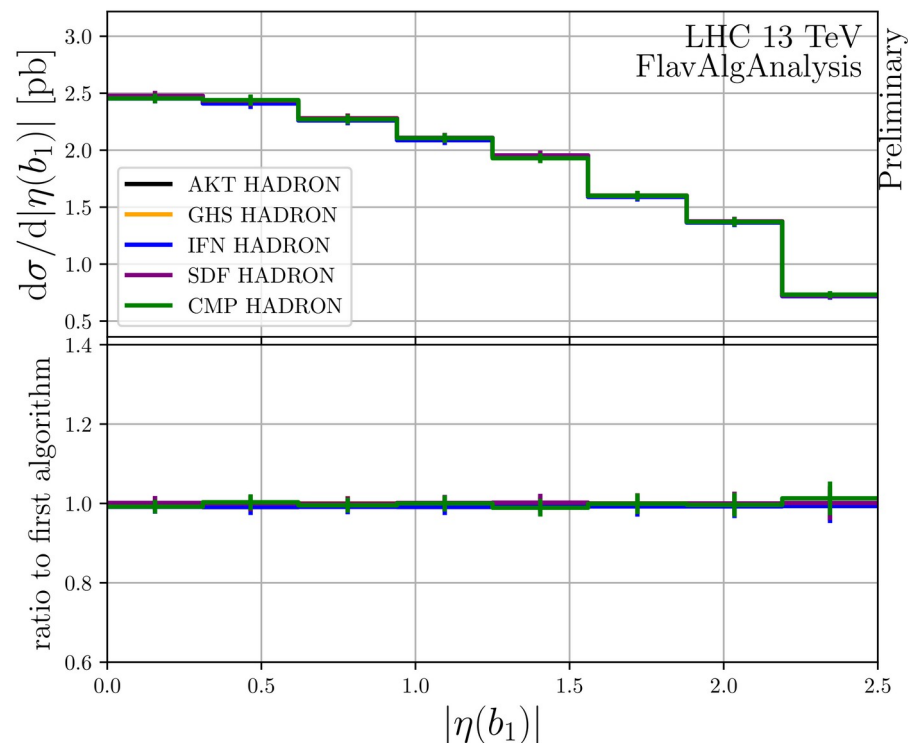


Comparison flavoured algorithms

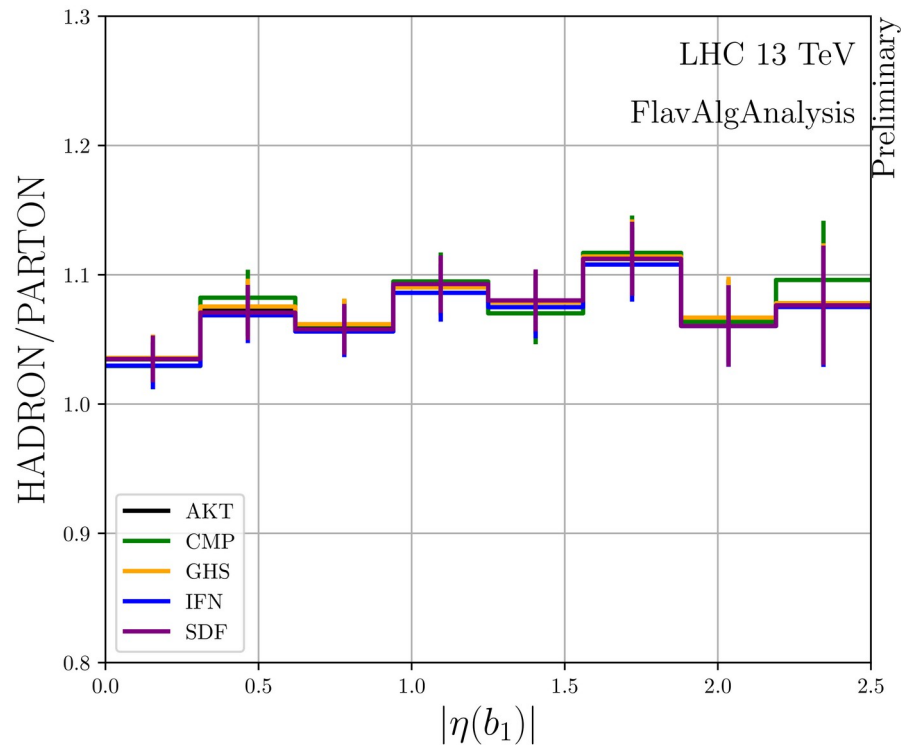
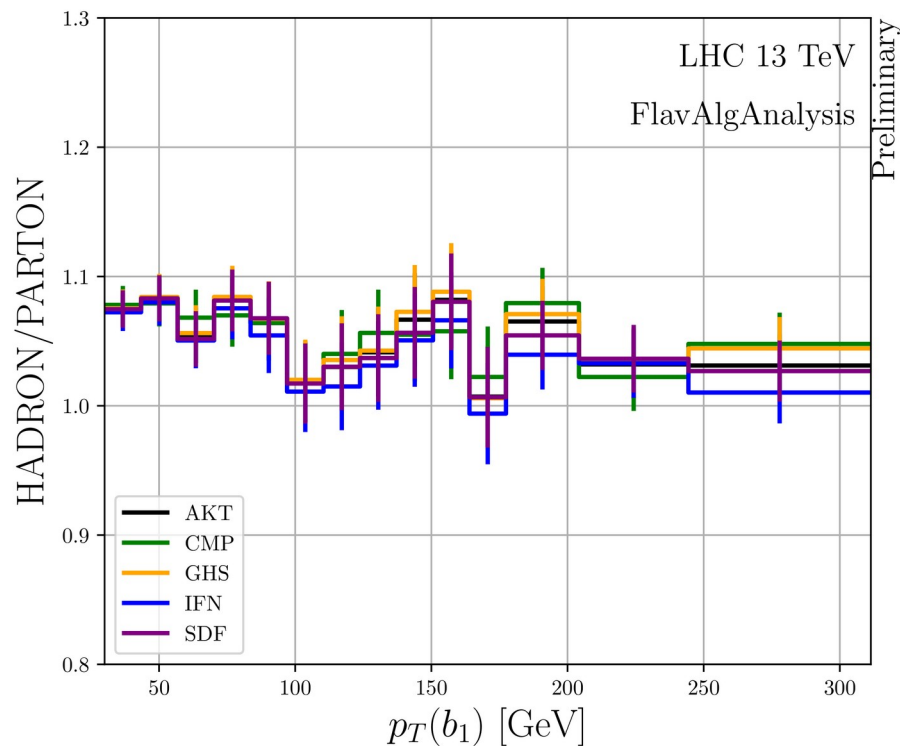
PARTON Level



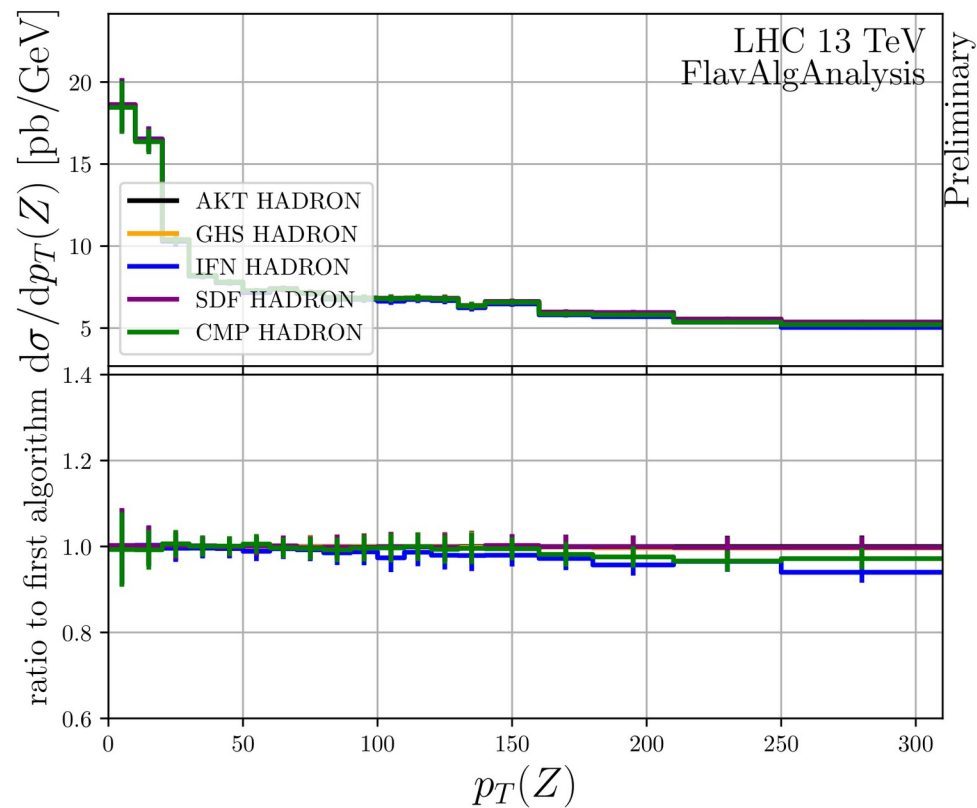
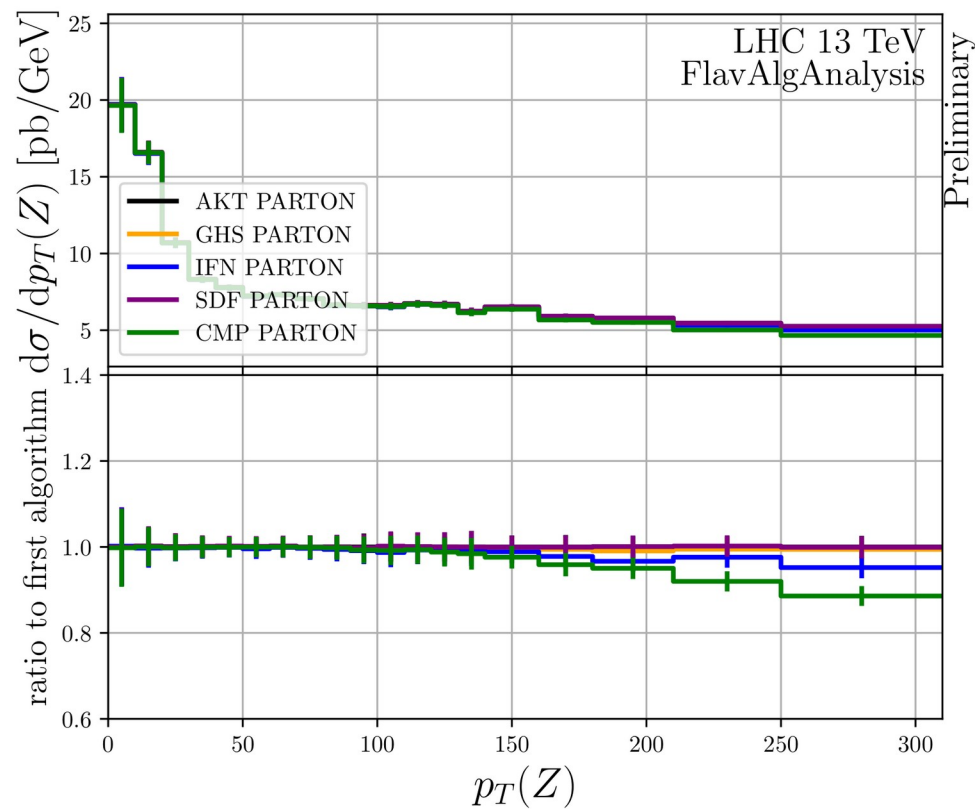
HADRON Level



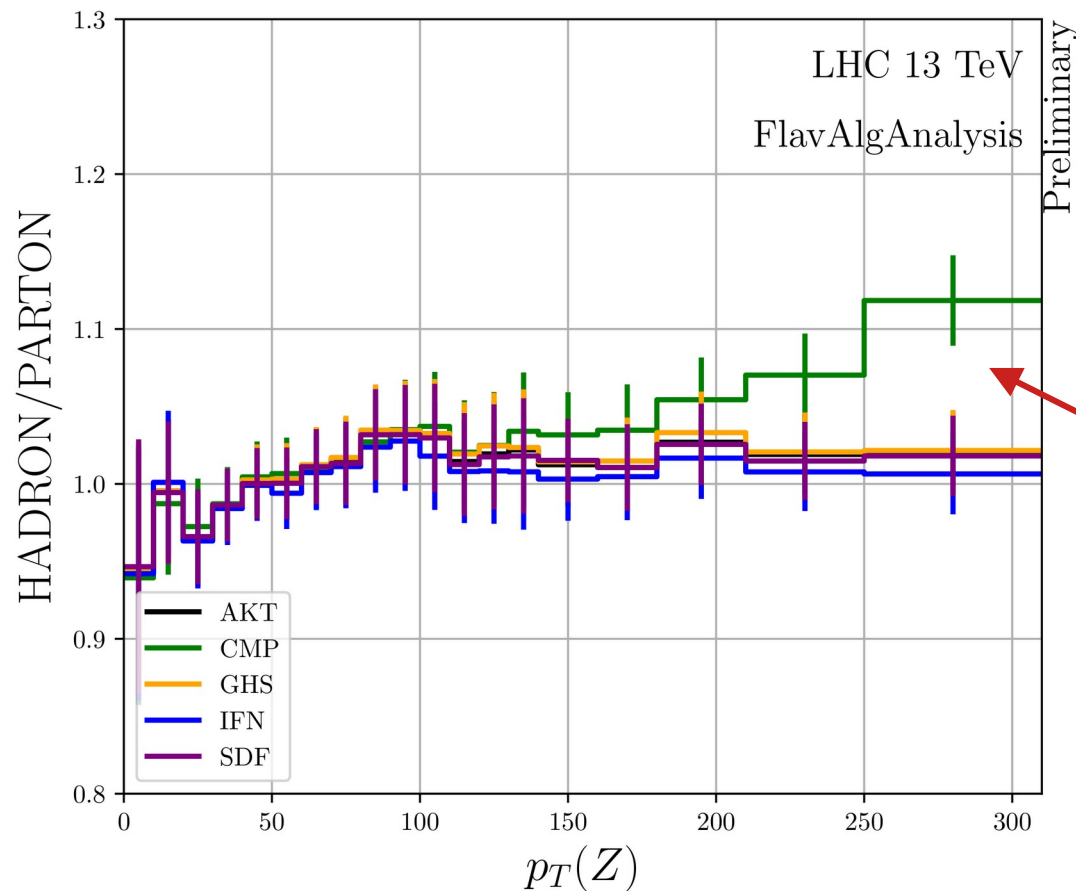
Unfolding \rightarrow simple k-factor analysis



$p_T(Z)$ distribution



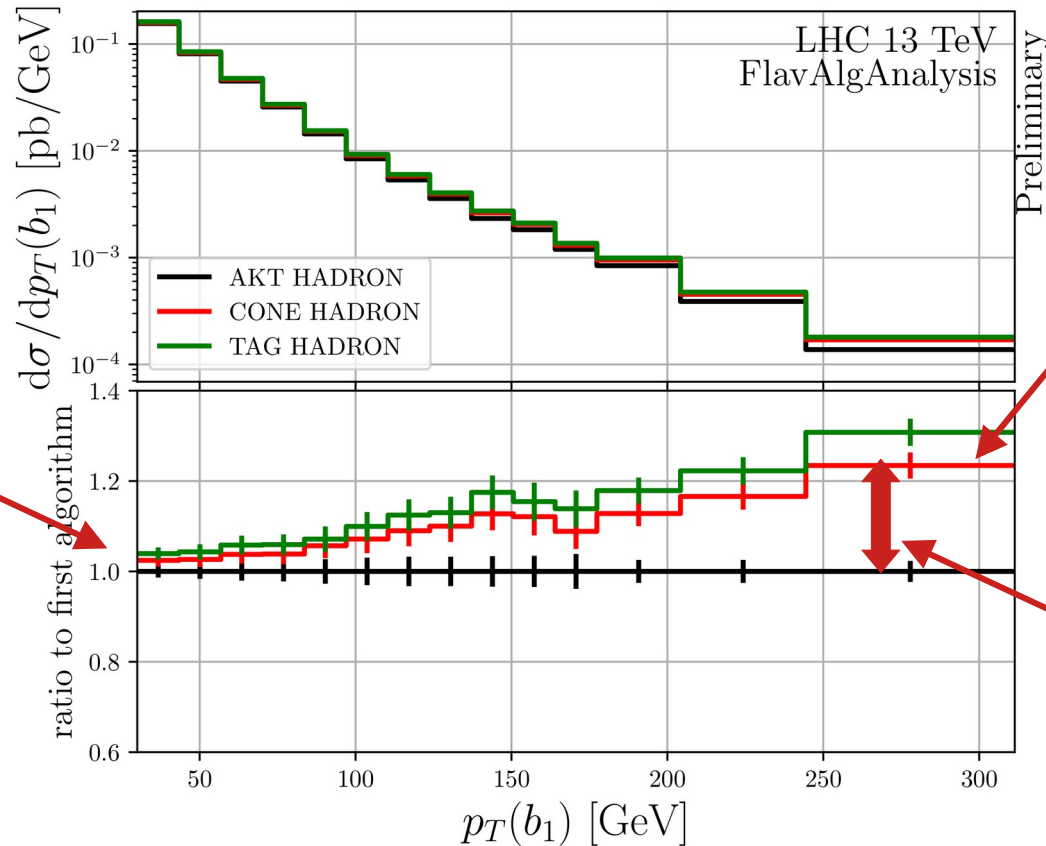
Unfolding \rightarrow simple k-factor analysis



Finally a shape...
 \rightarrow related to choice of kT_{max} ?

Comparison anti-kT tagging

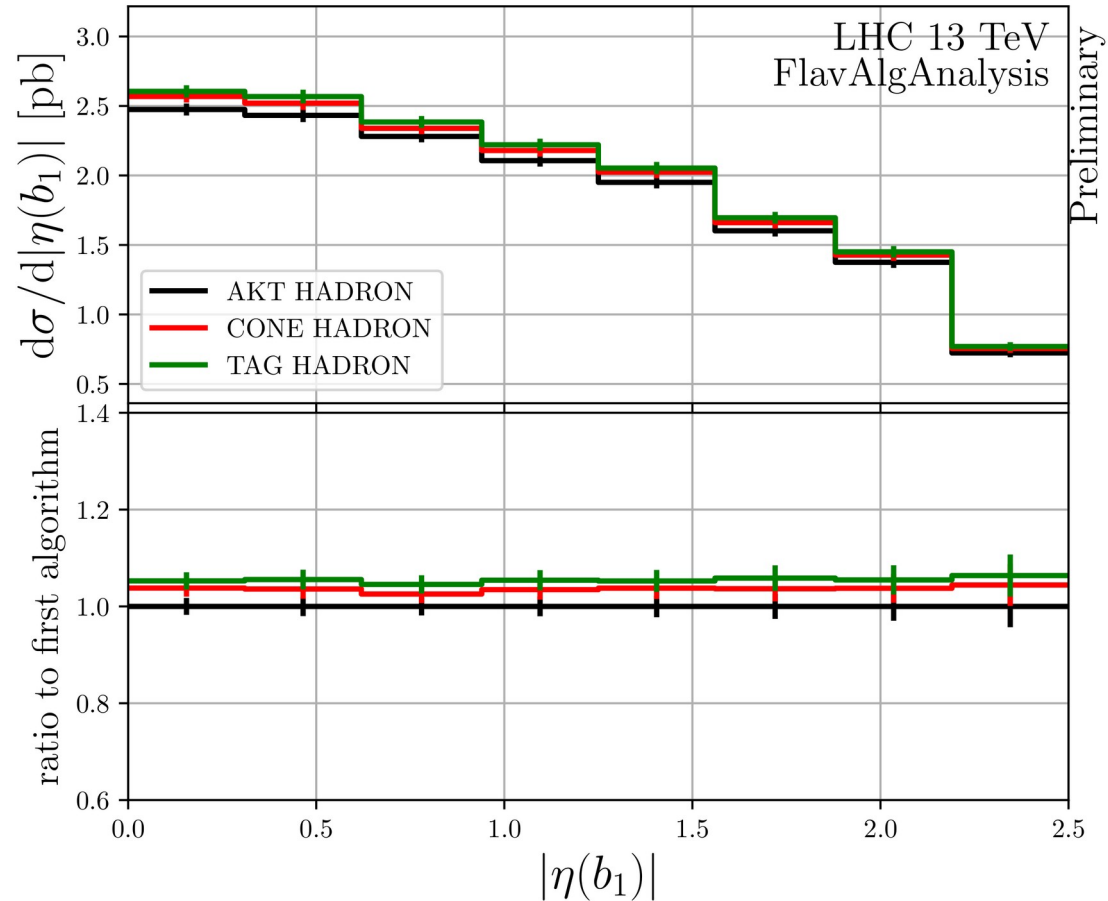
AKT
→ same as for the
flavoured jet
comparison



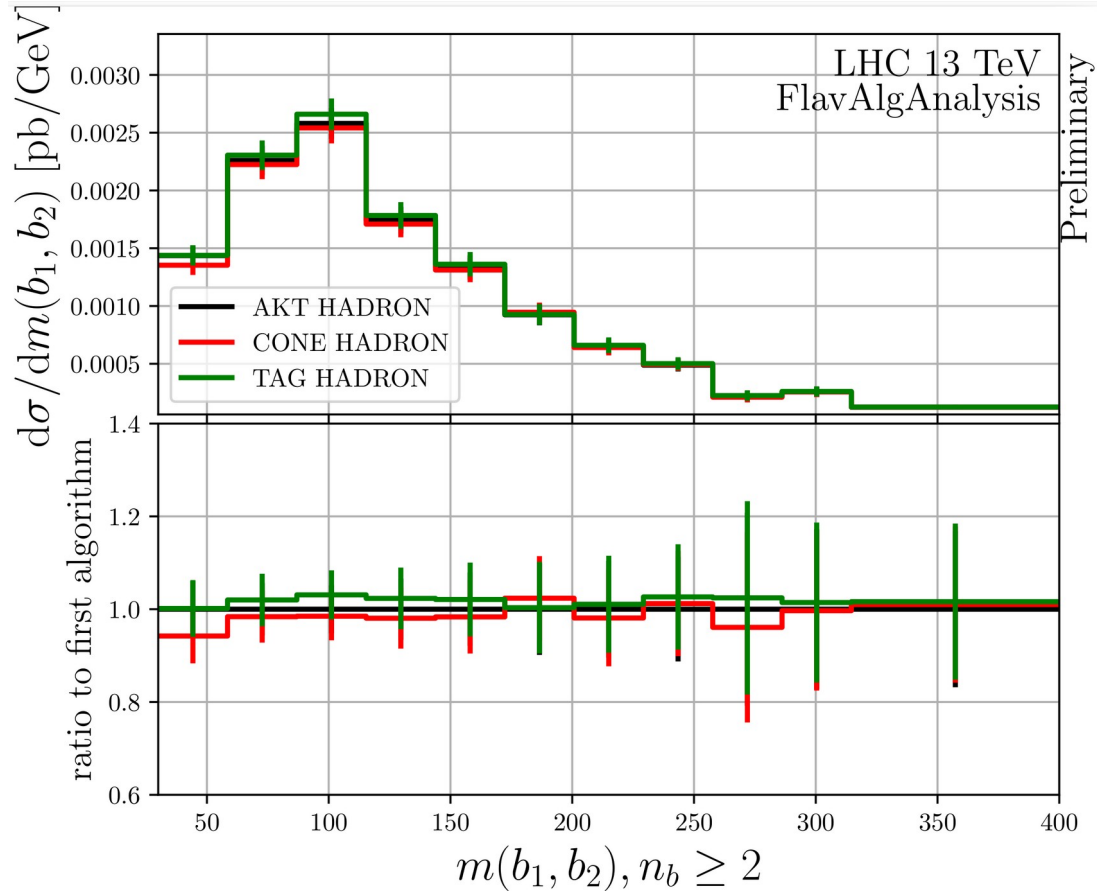
Note:
comparable results for
ATLAS and CMS tagging

Impact of double tags?

Comparison anti-kT tagging



Comparison anti-kT tagging



Little difference

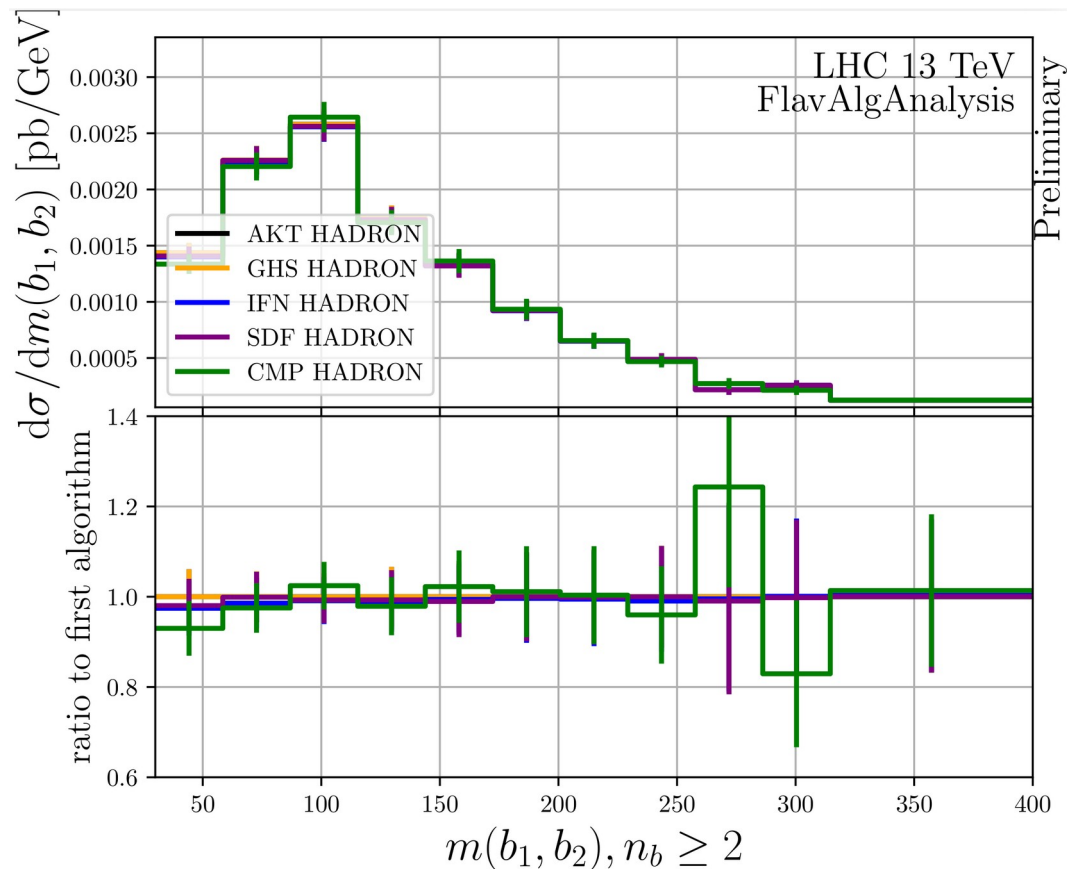
→ reduced probability of double tags

→ double tags come from first splitting

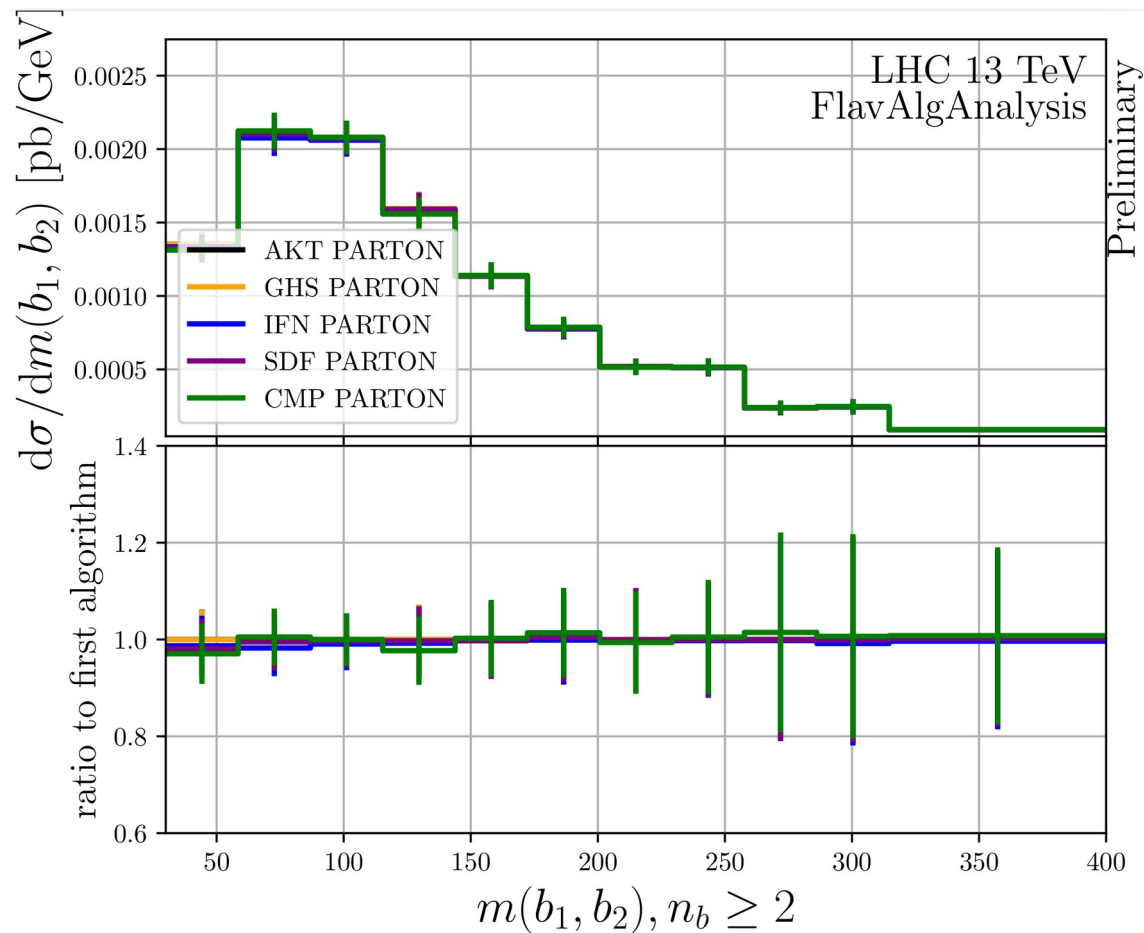
Summary

- Comparable results for all flavoured jet algorithms
→ even for high b-jet multiplicities
- Effect of multi-b tags important at high p_T
→ dominated by first splitting
→ much larger than any effect from the algorithms
- First look at unfolding corrections
→ also rather jet-algorithm independent
→ $p_T(Z)$ distribution...?

Comparison flavoured algorithms



Comparison flavoured algorithms



Unfolding \rightarrow simple k-factor analysis

