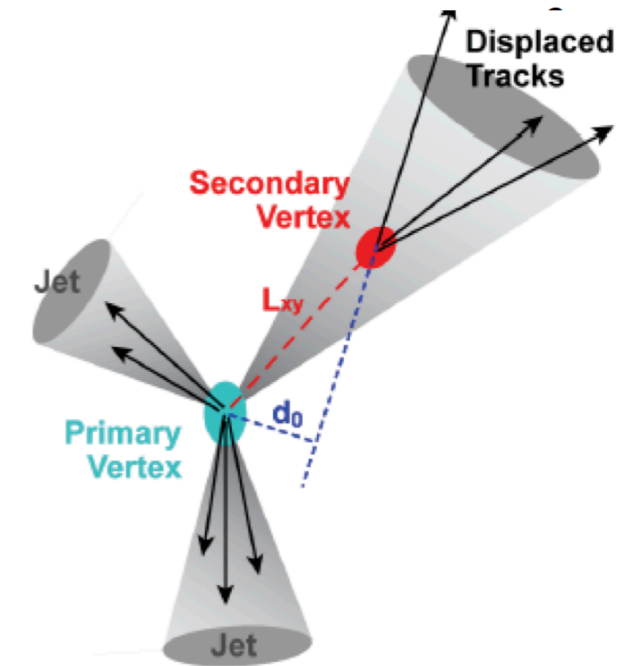


TAGGING AT HIGH PT

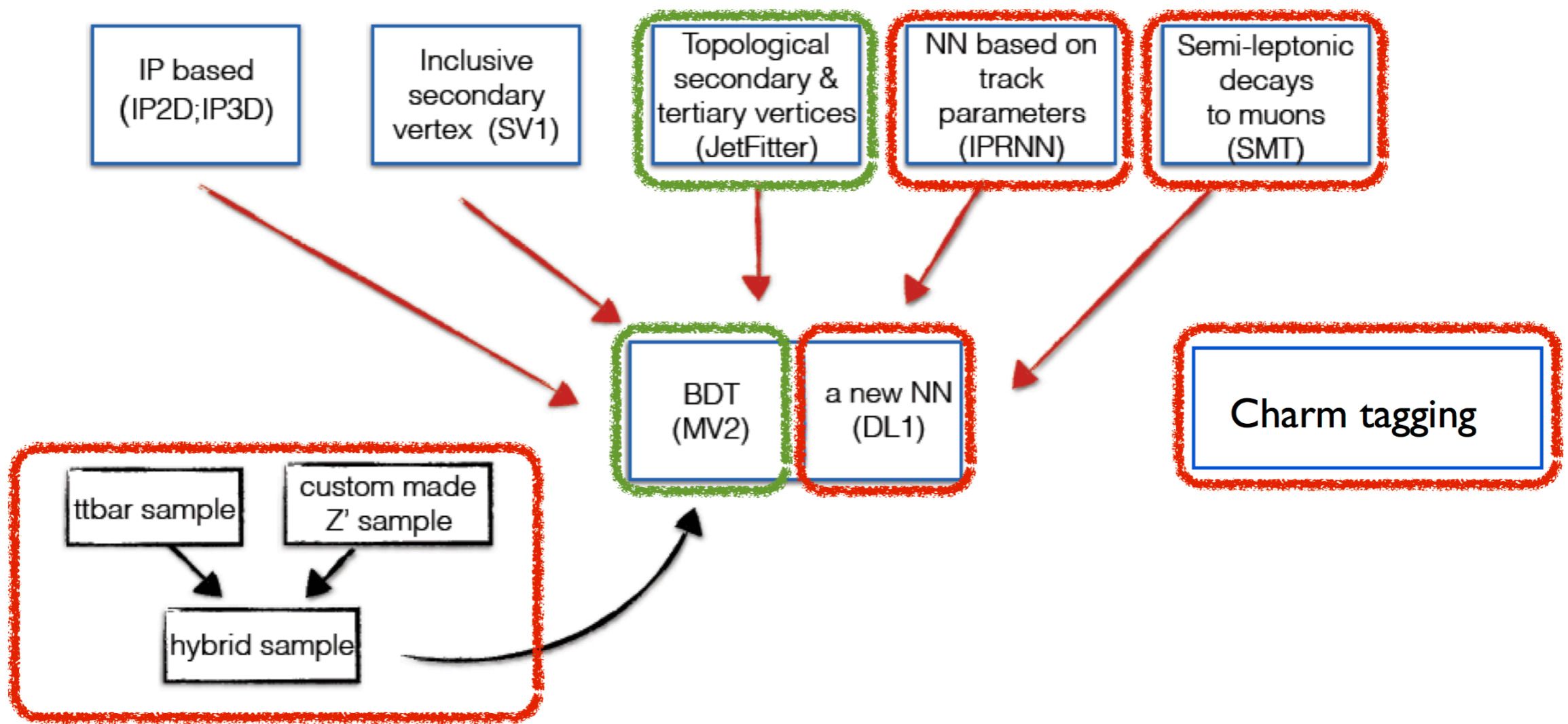
INFN Pisa - 15/10/2018

B-tagging chain in r21

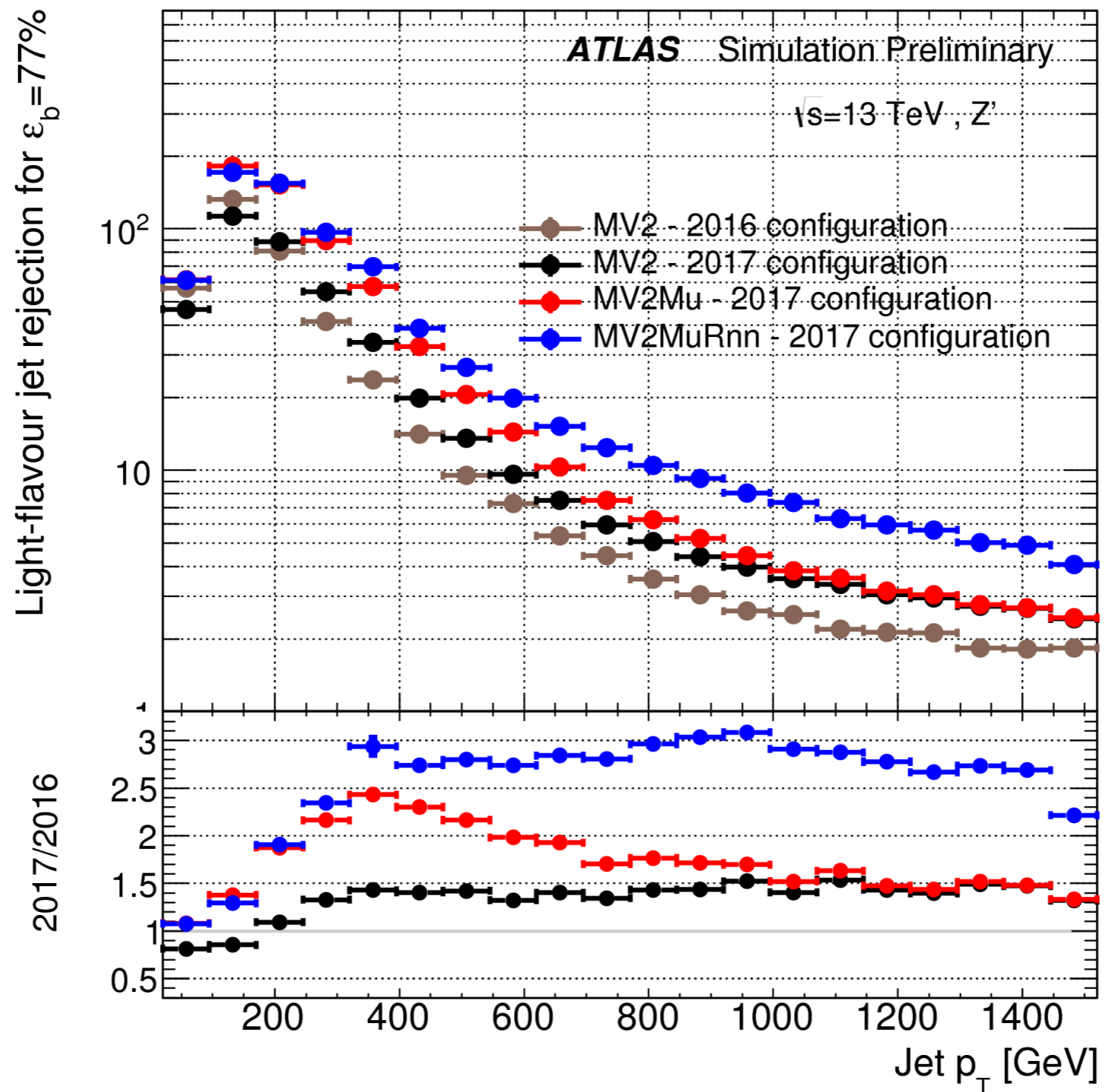


Improvements of the existing tagger available in r20.7

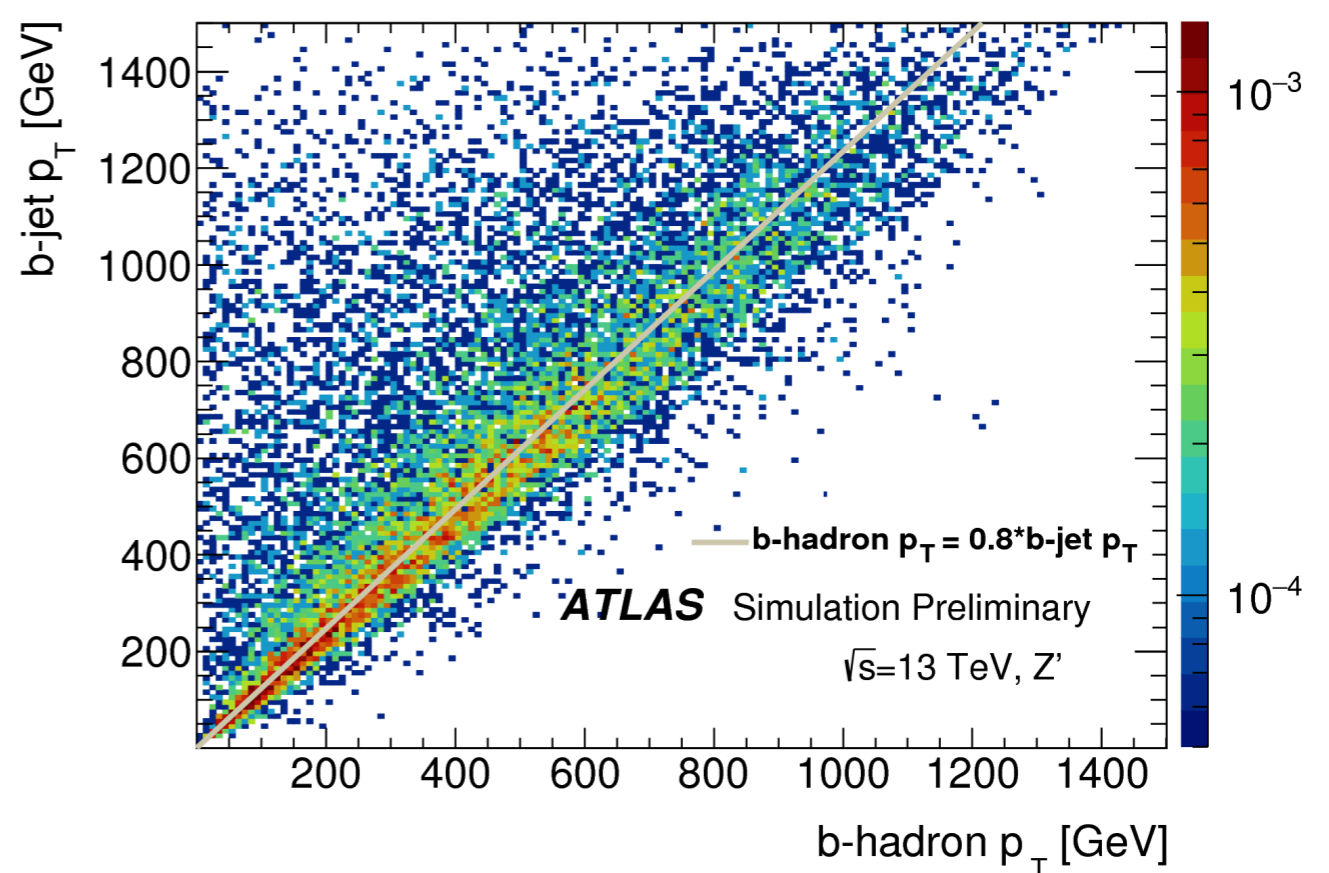
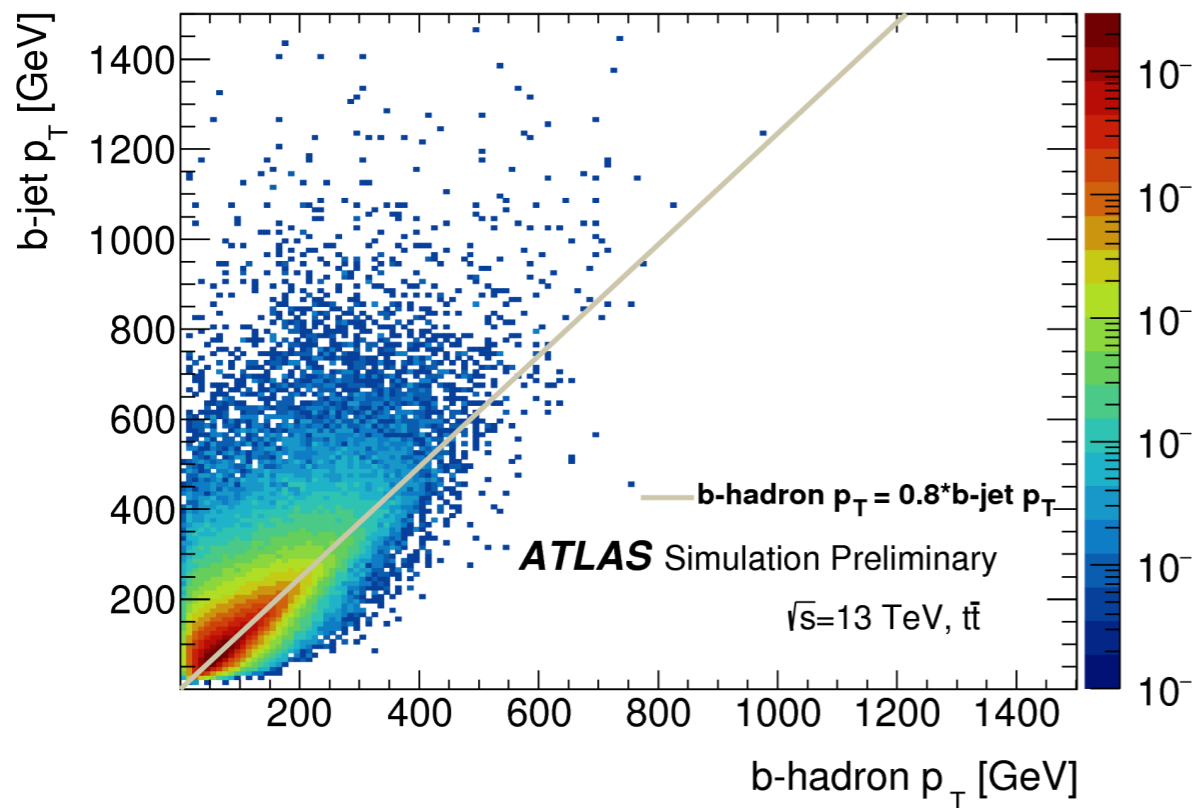
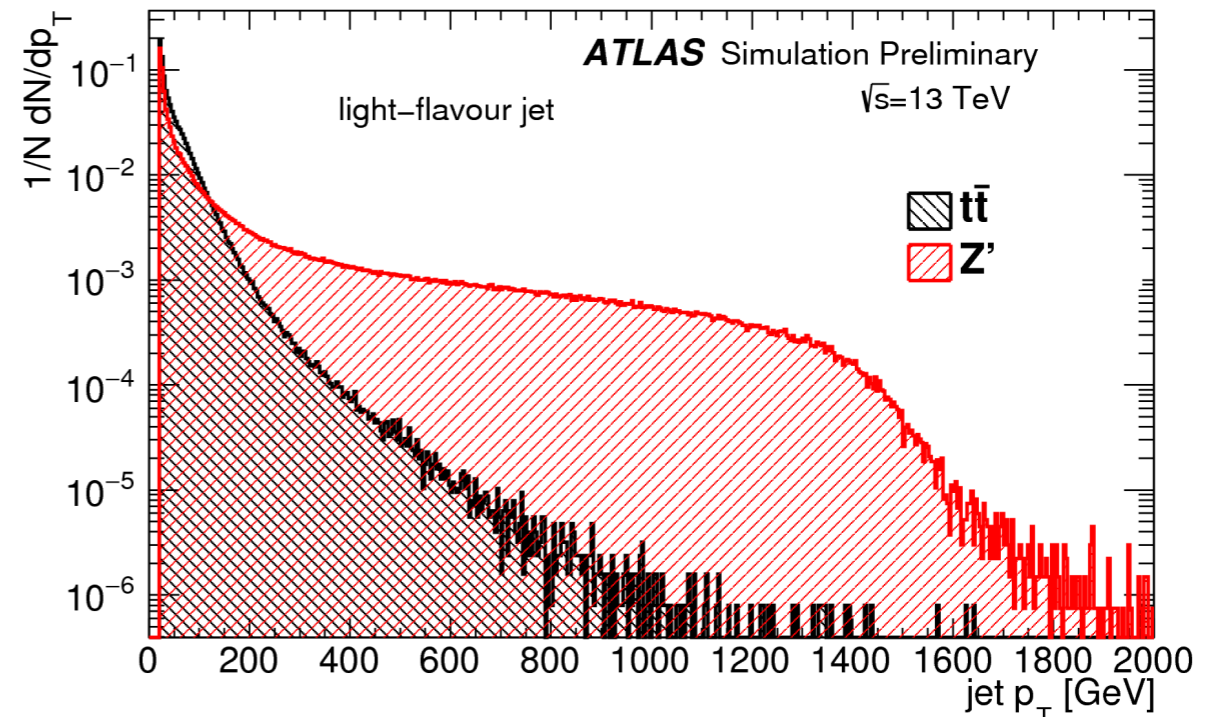
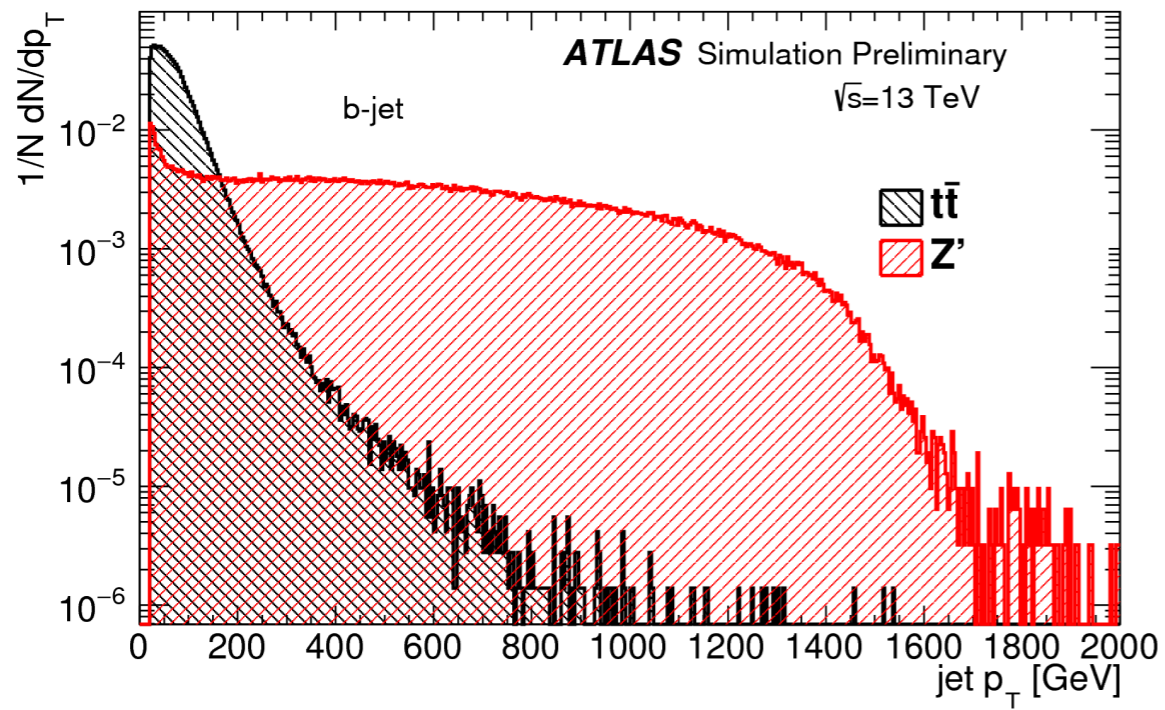
New features for r21



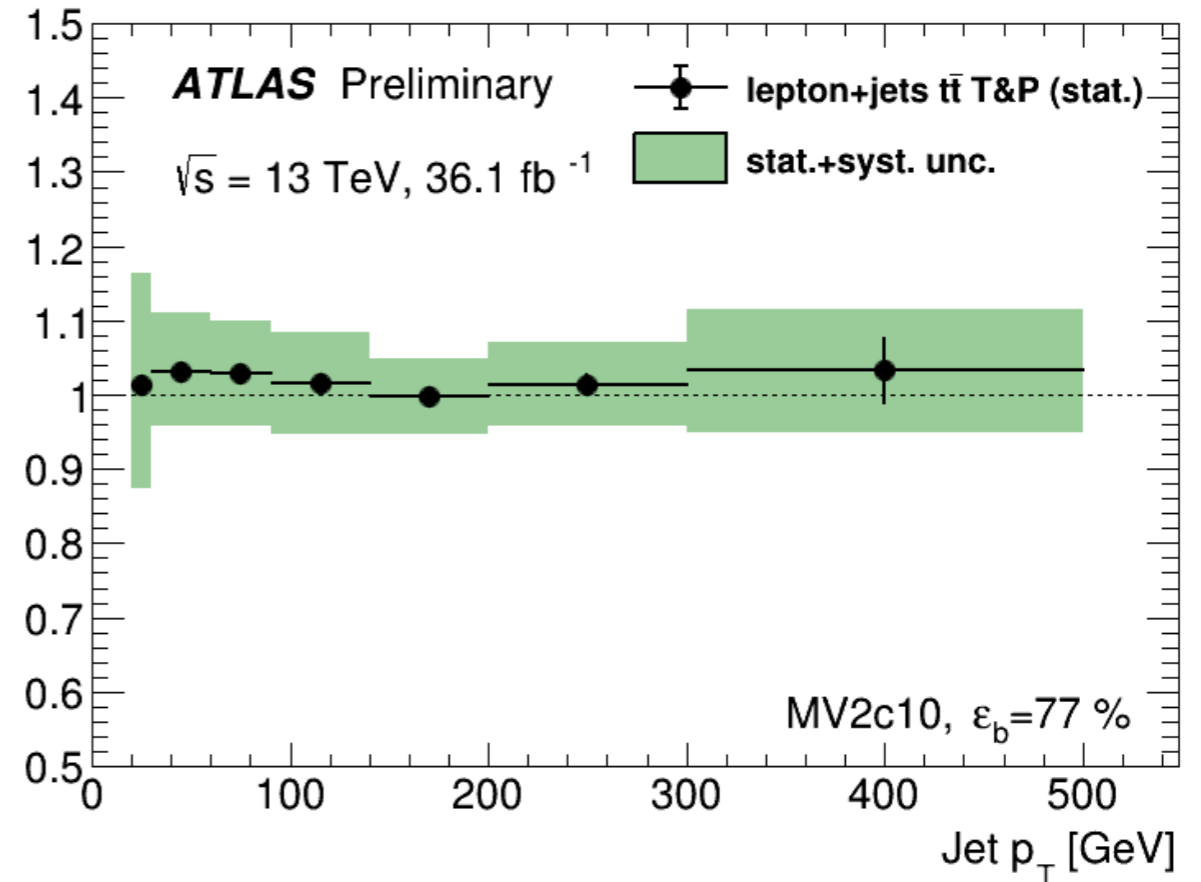
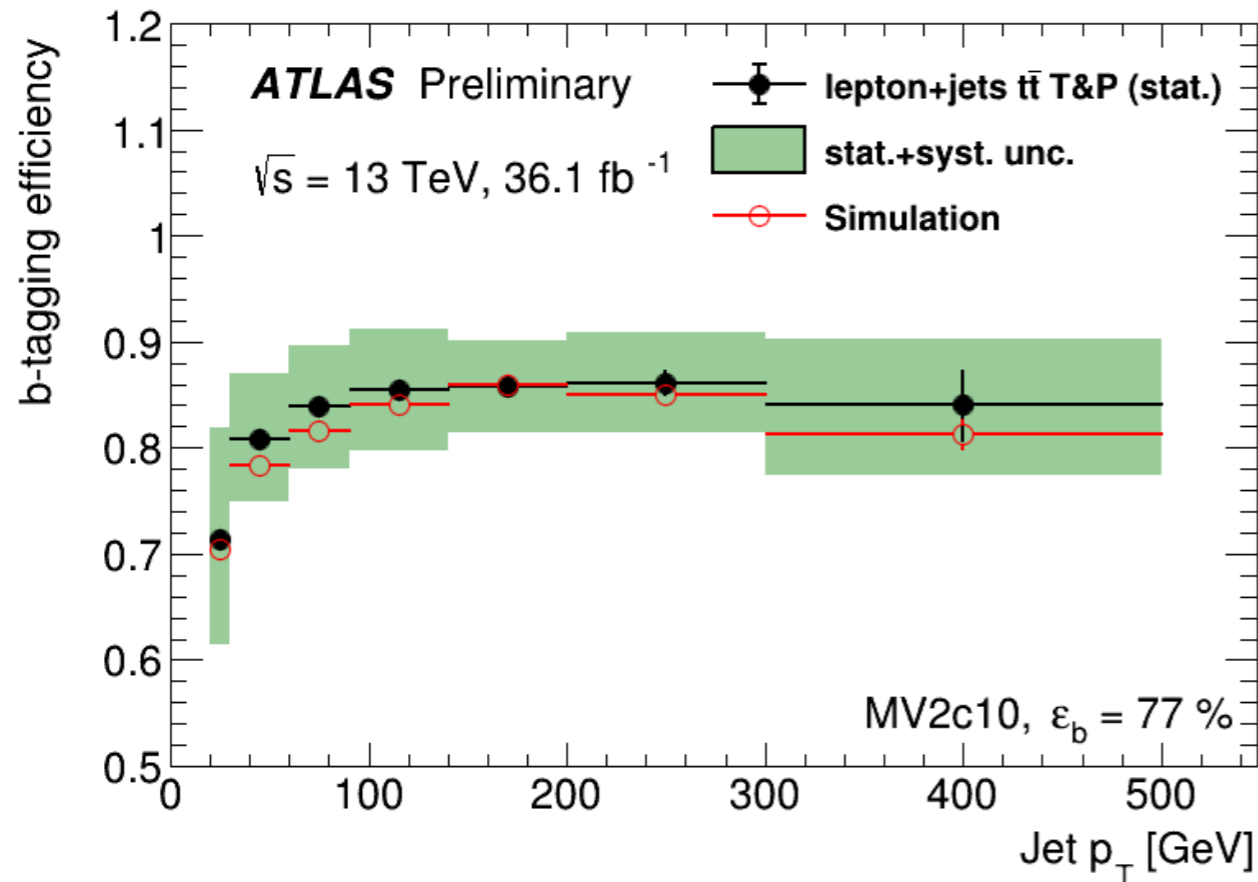
FLAVOUR TAGGING IMPROVEMENTS AT HIGH-PT



TRAINING WITH HIGH-PT JETS

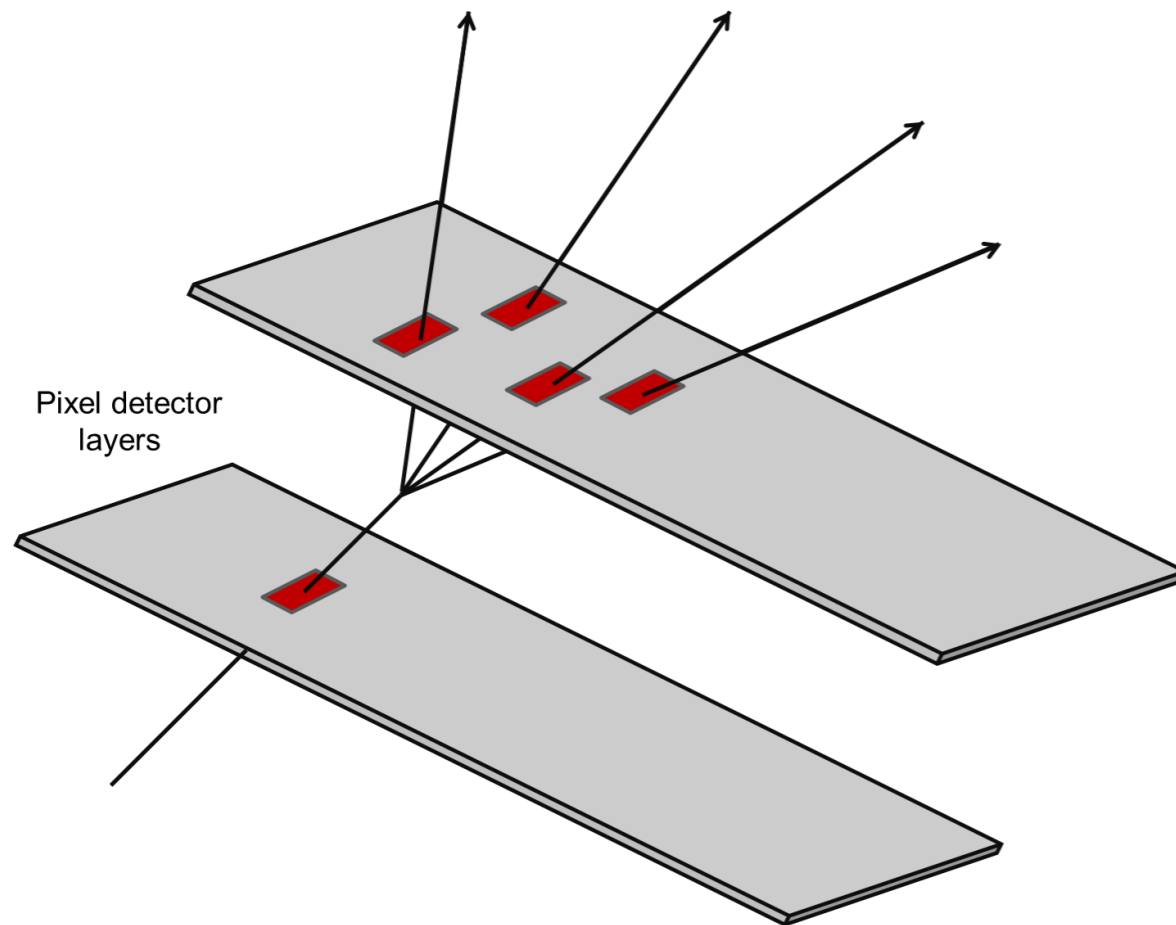


CALIBRATION FOR HIGH-PT JETS



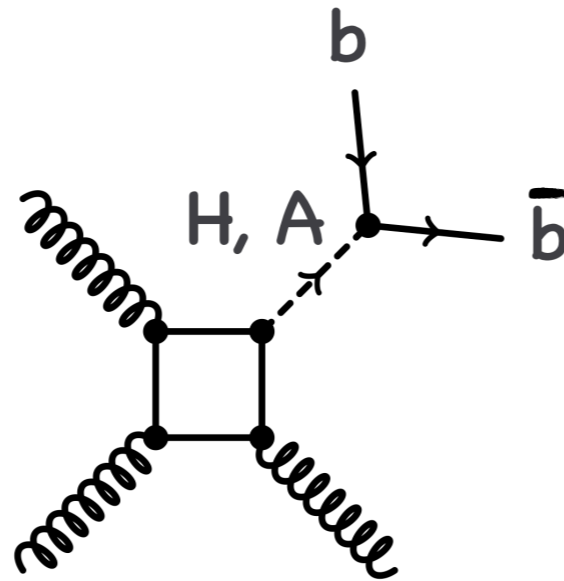
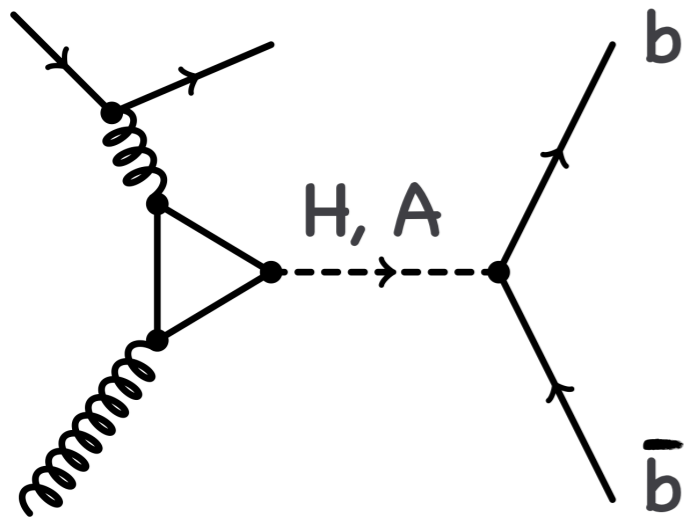
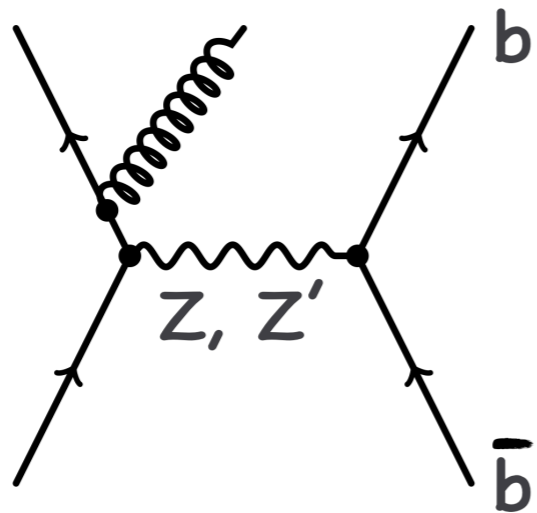
- higher statistics in single-lepton $t\bar{t}$ calibration compared to di-lepton
- di-jet based calibration should be also possible
 - limited by the ability of fitting the flavour fractions
 - CMS is doing this since Run-1
 - various attempts within ATLAS

FURTHER IMPROVEMENTS?



- some documentation
 - standalone studies in [arXiv:1604.05036](#) and [arXiv:1701.06832](#)
 - being investigated for FCC-hh - [link](#)
- at very high- p_T
 - b-hadron decay products get more and more collimated
 - b-hadron mean decay length is longer than IBL and b-layer
- further improvements
 - track classification to reject fragmentation tracks
 - consider hits in addition to tracks
 - VR track-jets with ghost-association for labelling and for track association
 - double b-tagging for Higgs

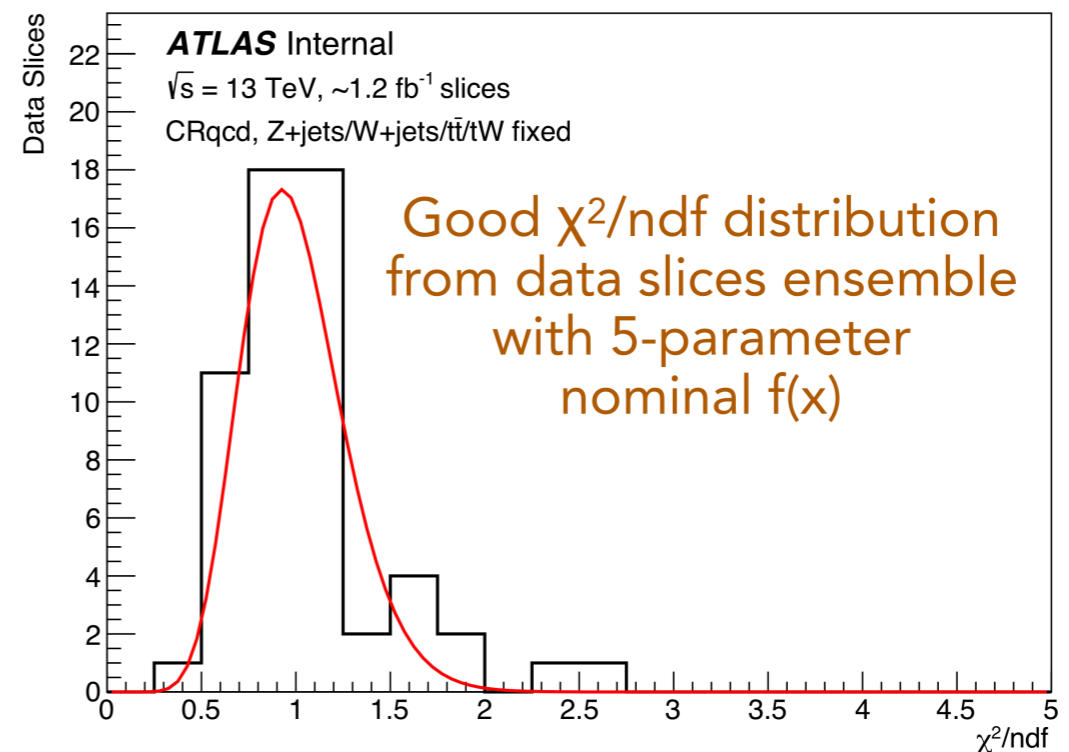
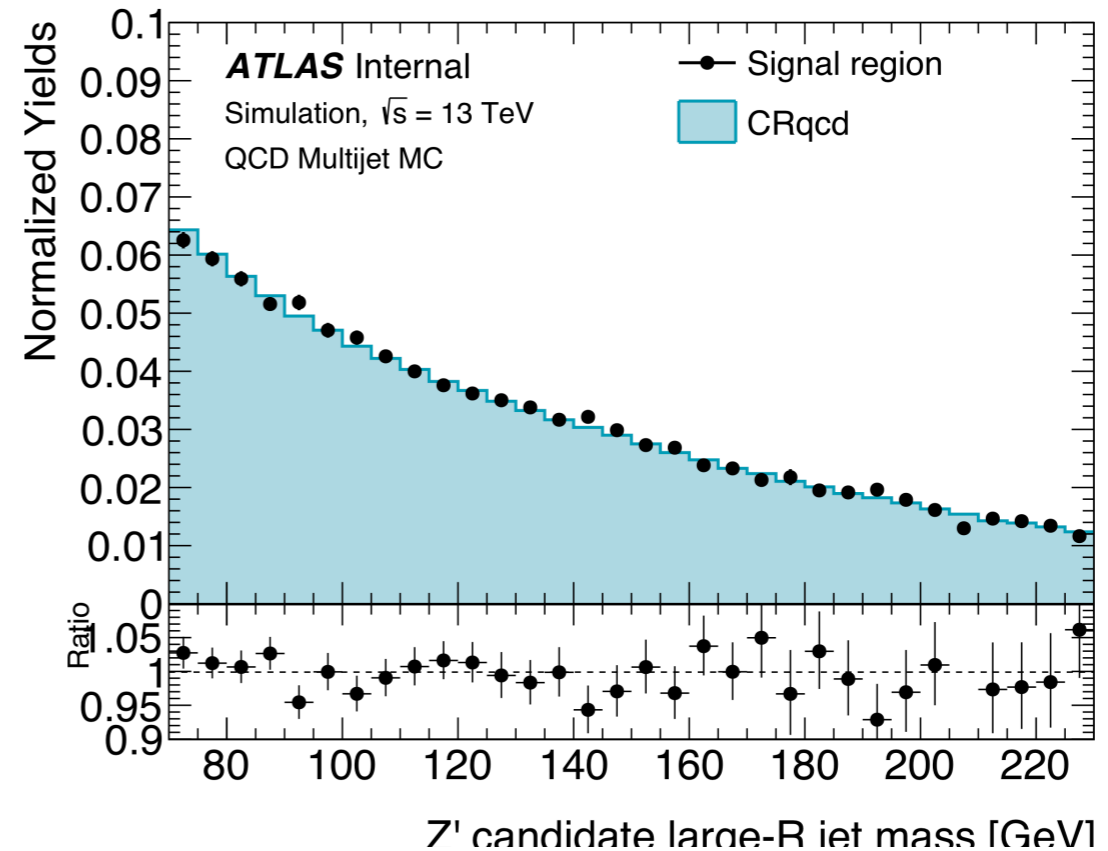
USECASE: BOOSTED DI-JET WITH B-TAGGING PLUS ISR



- ingredients
 - double b-tagging with VR track-jets ghost-matched to large-R trimmed jet
- signal strength measurement of W/Z
- limits on Z' as DM mediator
- limits on SM H

USECASE: BOOSTED DI-JET WITH B-TAGGING PLUS ISR

- CR: VR track-jets failing the 85% WP
- SR: VR track-jets tagged with 77% WP
- similar shape of SR and CR predicted by simulation above 70 GeV
- fit of MC CR slices with QCD model + MC templates with fixed signal strength



USECASE: BOOSTED DI-JET WITH B-TAGGING PLUS ISR

- analysis unblinded last week
- CONF note in the works for Higgs Coupling

Summary/Status/To-do

Note: <http://cds.cern.ch/record/2310645>

Analysis matured quickly in the past few months, after iterations with derivation problems and understanding how to properly model backgrounds!

- Great work done by everyone in the team!

Small missing pieces

- Answering CDS comments - no major roadblocks identified!
- Full estimation of ttbar k-factor systematic uncertainty
- Finish running JMR variation histograms
- Waiting full sim Sherpa 2.2.1 Z+Jets sample (for b-tagging MC/MC SF's)
- Retrieve Higgs top mass effect weights
- **None of these items will change analysis methods or strategies!**



ATLAS Note
ANA-EXOT-2018-04-INT1
21st September 2018



Draft version 0.1

Search for boosted dijet resonances decaying to two b-quarks and produced in association with a jet

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Many thanks to our EB (C. Pollard, J. Taenzer, E. Kajamovitz), JDM conveners (S. Meehan & M. Bauce), and other comment senders!