Update from Last Meeting

- **Apply triggers for dimuon channel: HLT_IsoMu24 || HLT_Mu17_TrkIsoVVL_Mu8_TrkIsoVVL_DZ**
  - **Lost 1.5% signal events in 700GeV MC sample**
  - **Lost more signal events in higher T' mass MC samples (up to 5.5%)** ***see backup***
    - **dimuon is boosted**

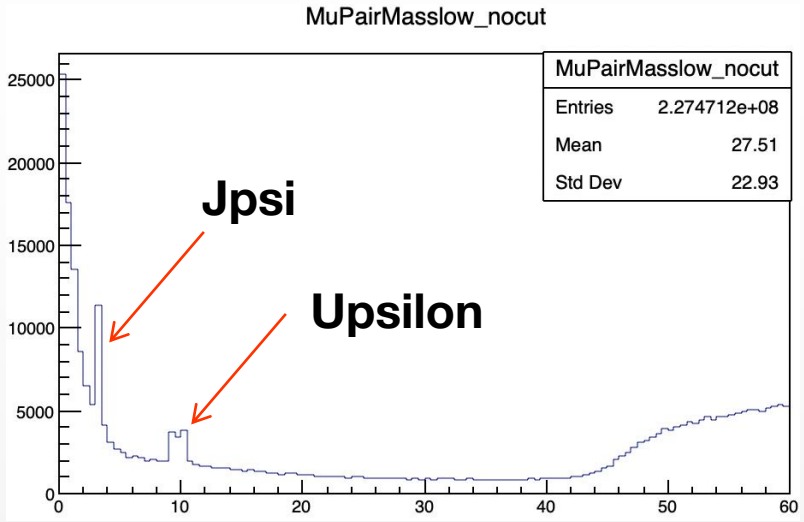
- ***First look at the real data!***
  - **No obvious difference between DoubleMuon& SingleMuon (<1% after basic cuts)**
  - **Compare 18A data with MC background**
    - **See a huge Z peak on dimuon mass spectrum after basic cuts**
    - **It turns out DY is one of the dominant background of dilepton OS channel**
    - **Add NLO DY MC sample to background study**
    - **Good news: Cut strategy still works when removing DY**
      - **around 1000 background events in total (new cut flow table is on the way)**

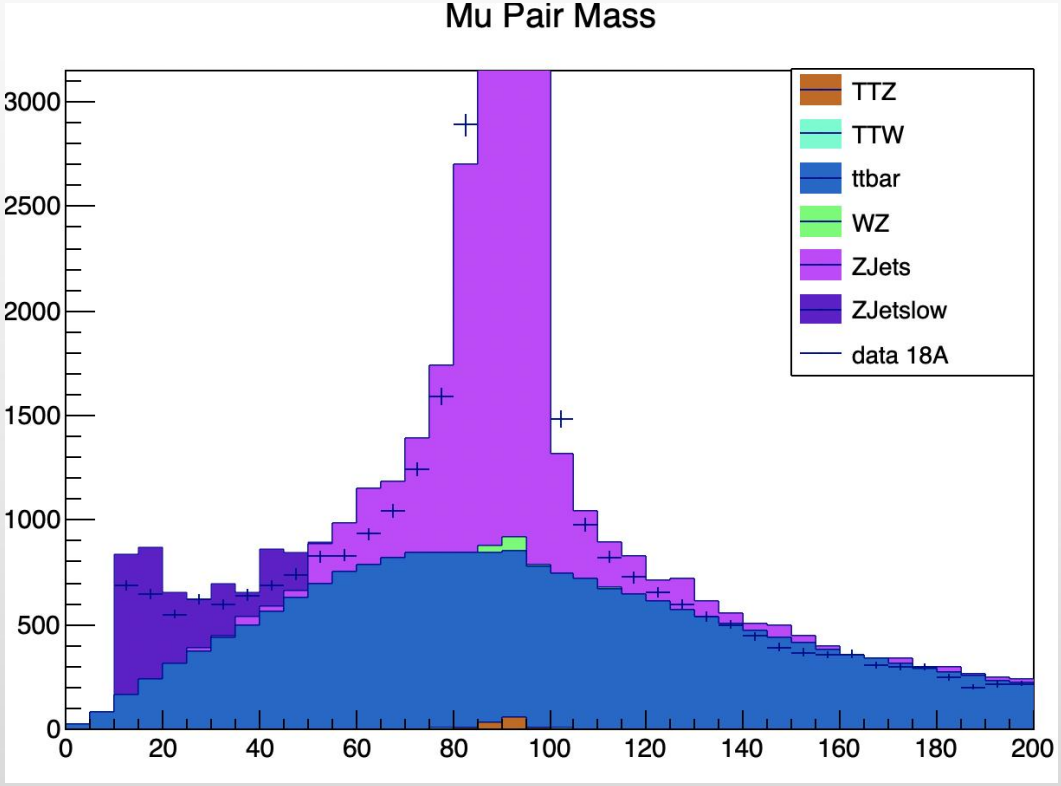
Generally I believe this analysis is on the right track though there still are a lot of work to do!

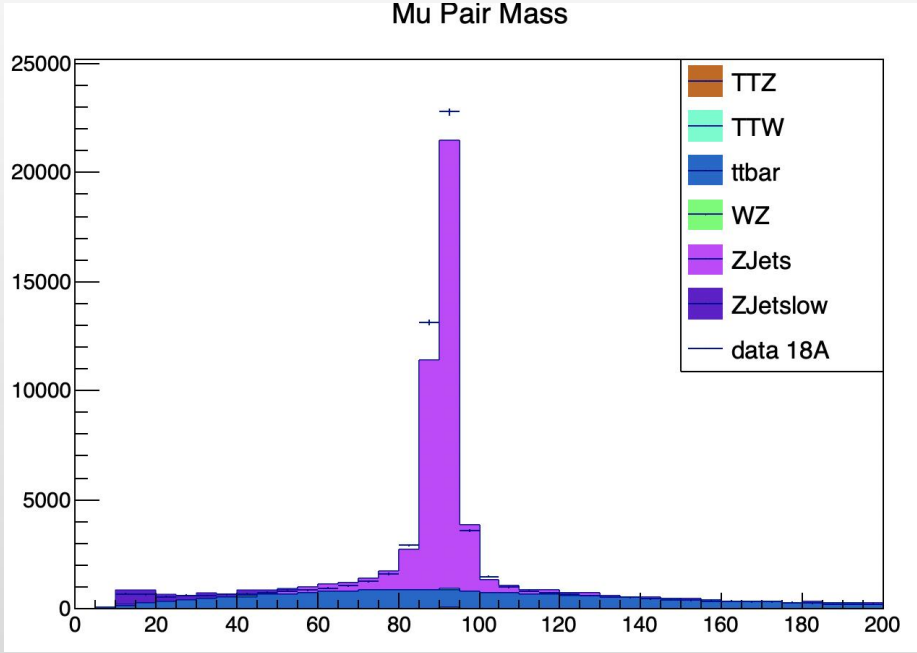
dimuon mass

- **DY& ttbar are dominant background processesof dilepton OS channel**
- **Most of them can be removed by cut0 (dimuon mass<60GeV)**
- **See lots of old friends in low mass region (<10GeV)**
  - **Maybe add dimuon mass > 10 cut to remove them? :-)**

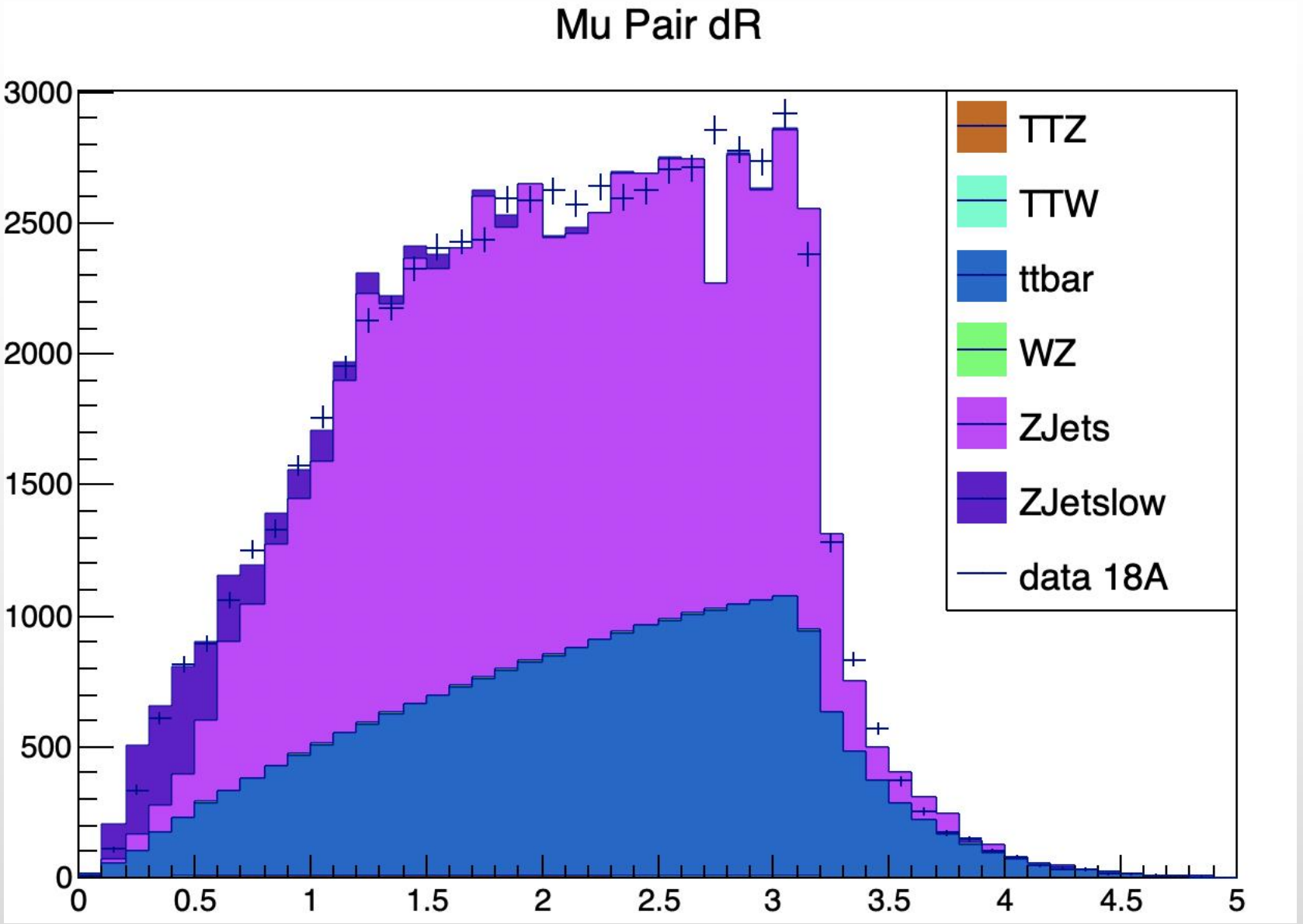
- ***Small difference between MC& data: working on that***





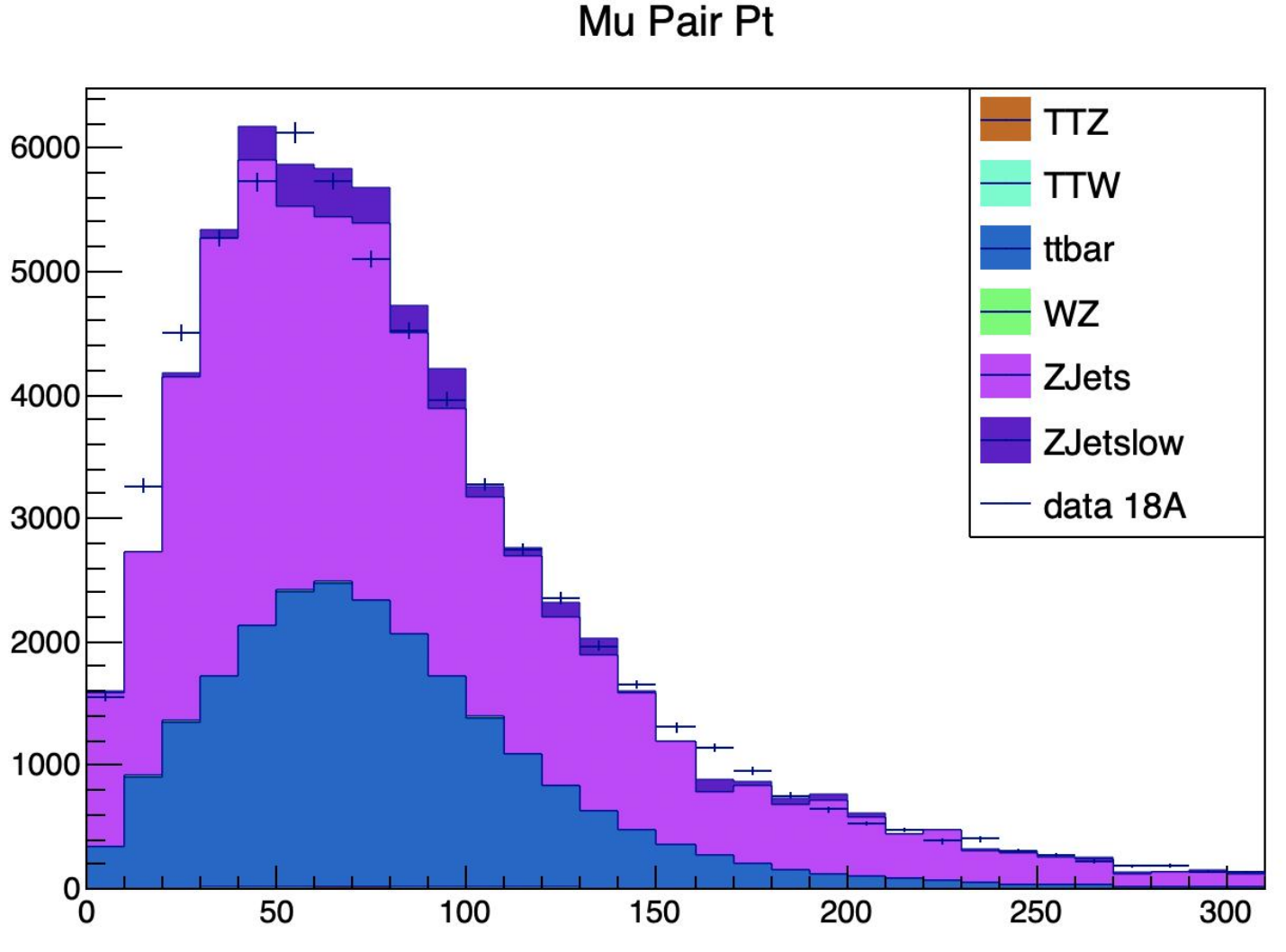


dimuon dR


Mu Pair dR
3000
2500
2000
1500
1000
500
0
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
TTZ
TTW
ttbar
WZ
ZJets
ZJetslow
data 18A

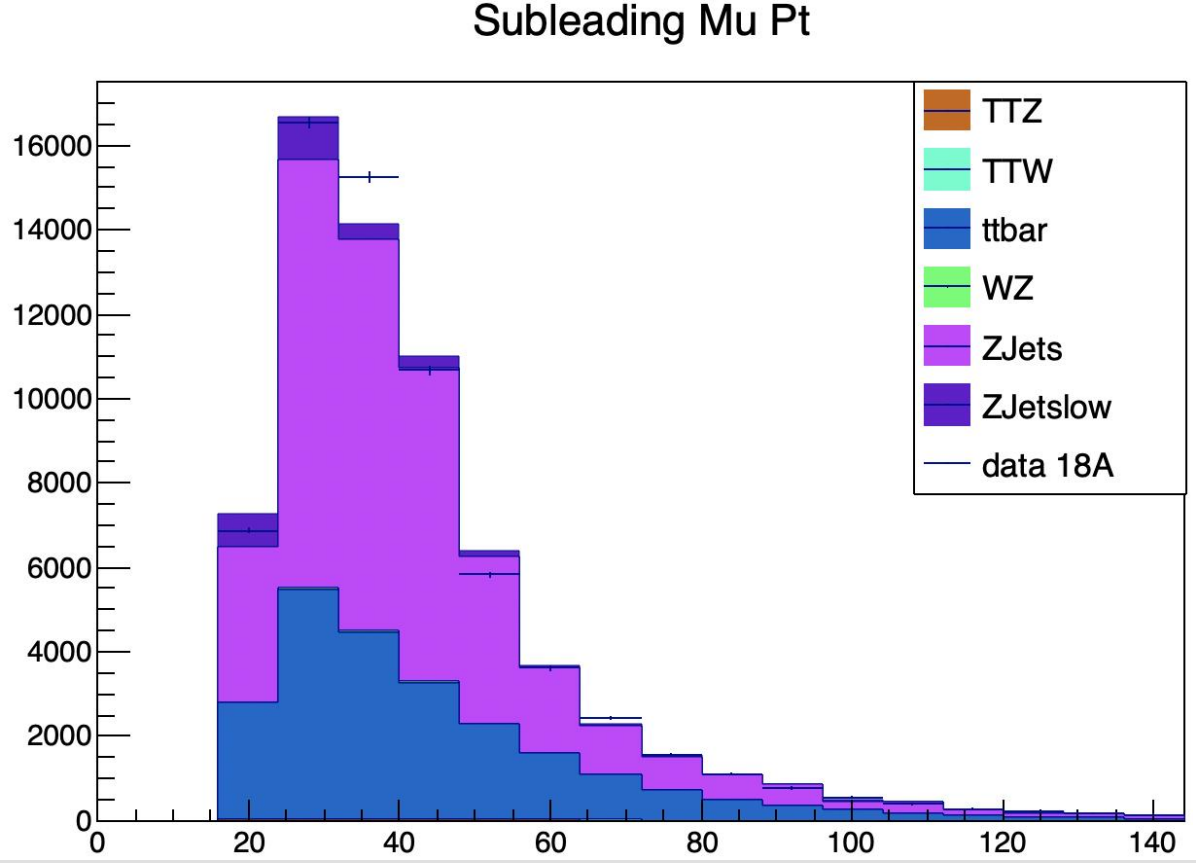
dimuon pT

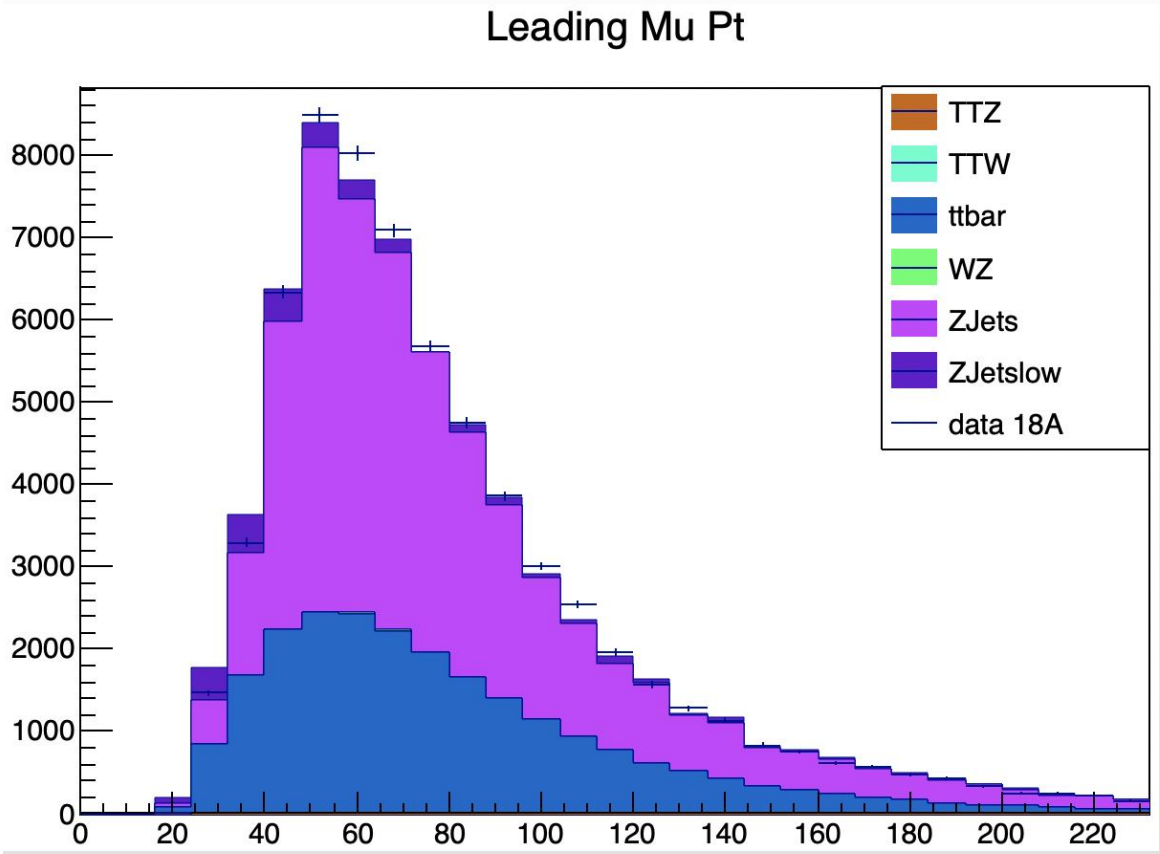
- **Will be better after adding muon pt corrections**



Muon pT

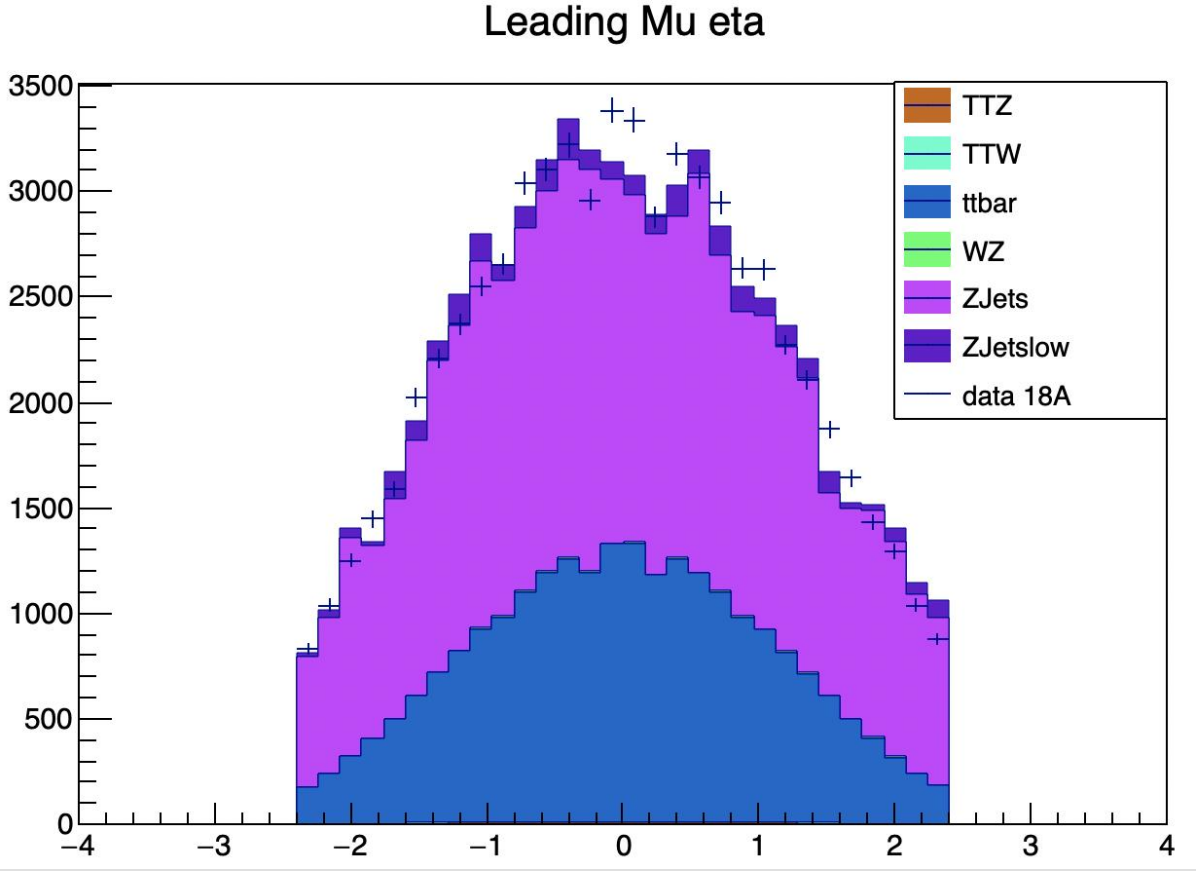
- **Will be better after adding muon pt corrections**

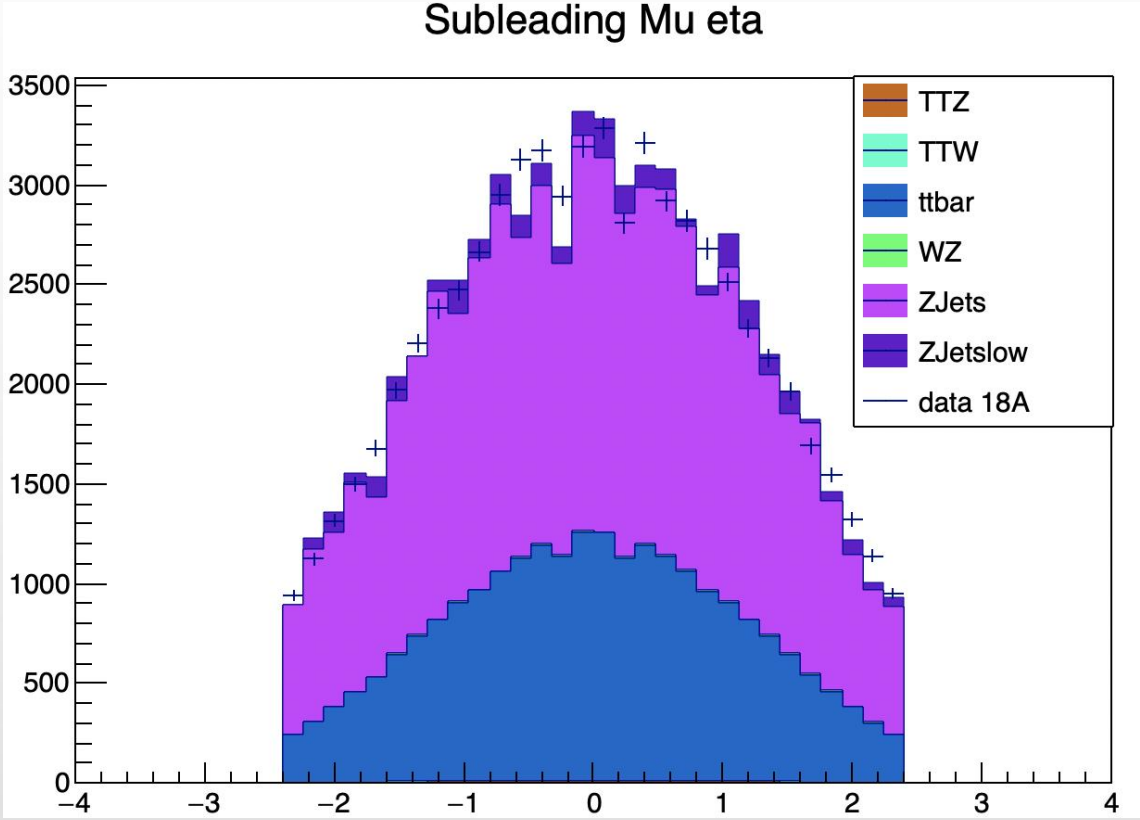




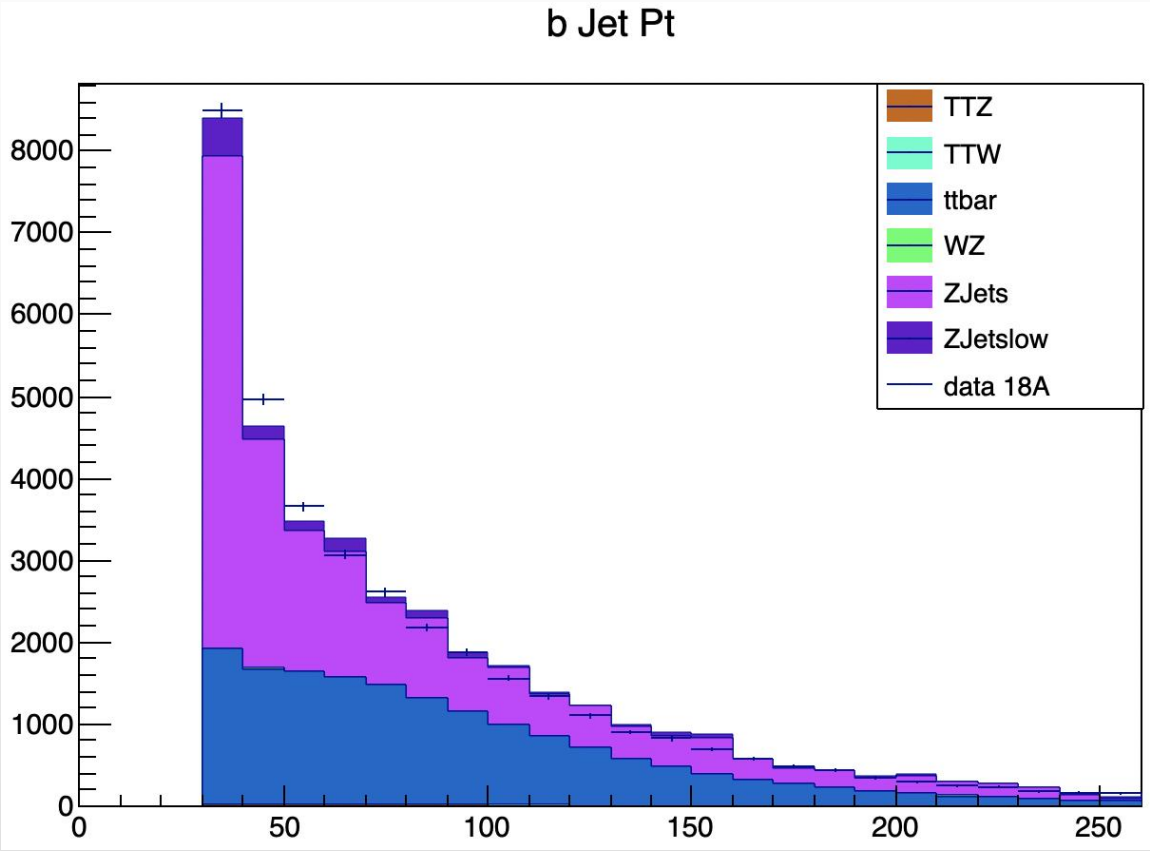
Muon Eta

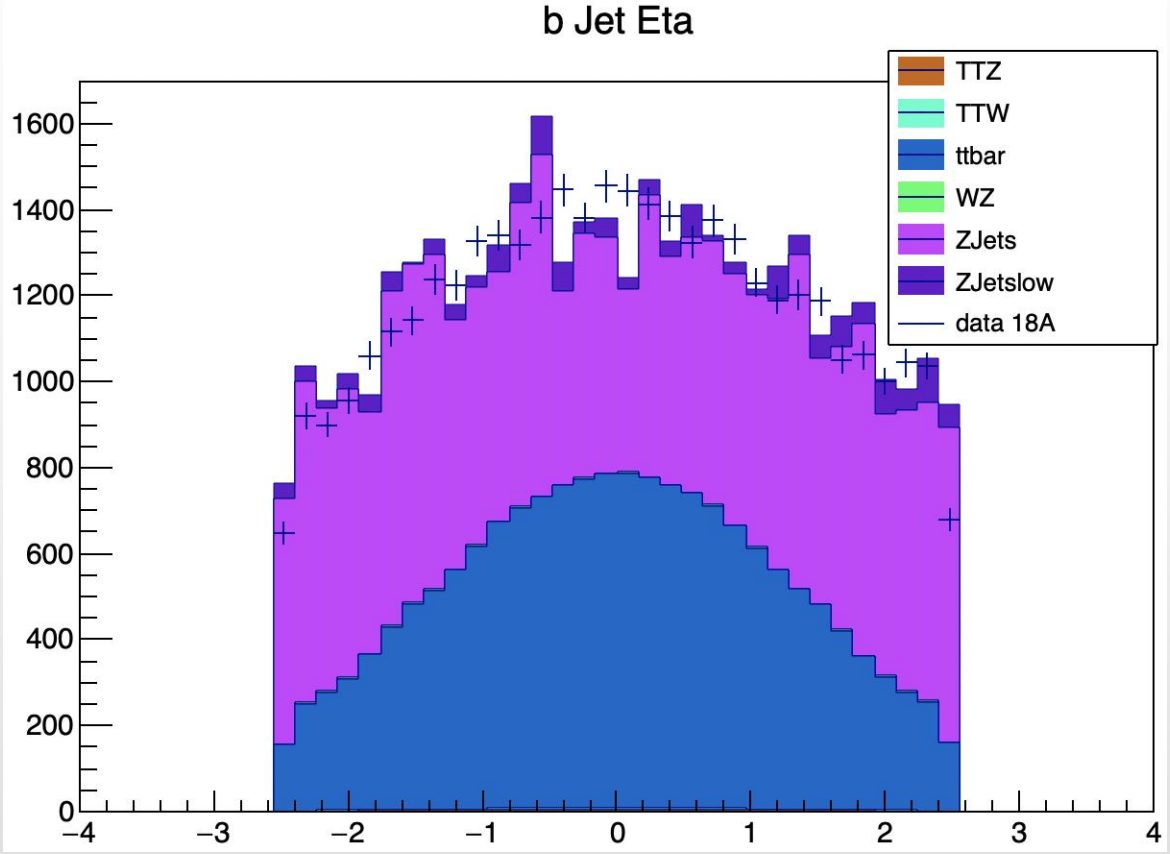
- **Will run the whole DY MC sample to decrease fluctuation**





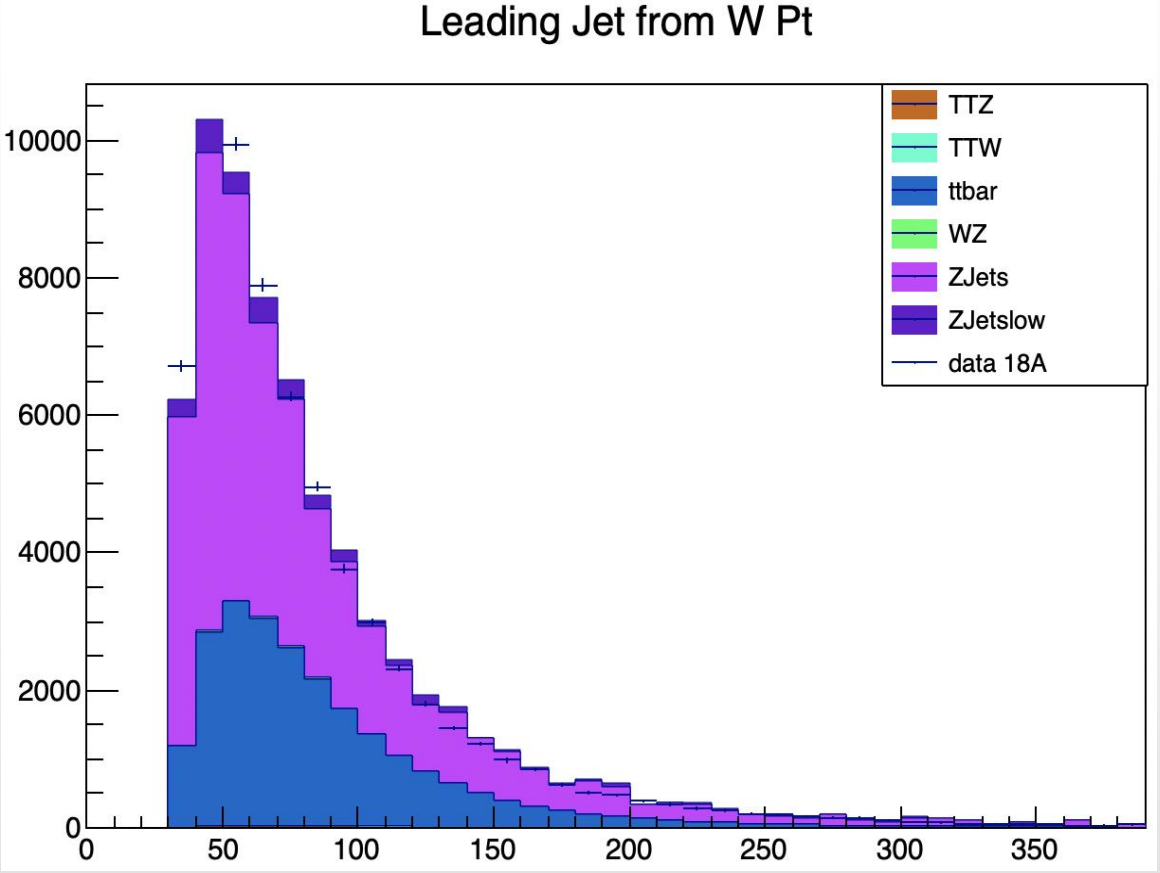
b Jet Pt& eta

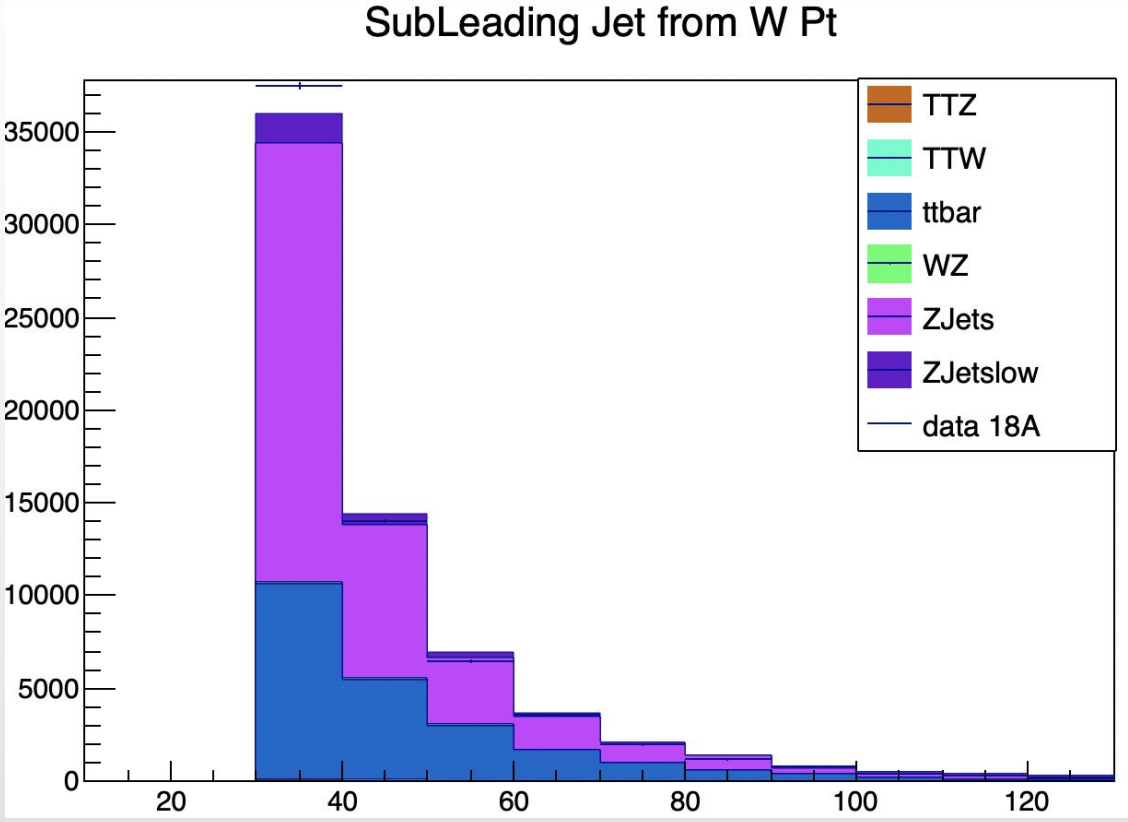

b Jet Pt
TTZ
TTW
ttbar
WZ
ZJets
ZJetslow
data 18A
0
1000
2000
3000
4000
5000
6000
7000
8000
0
50
100
150
200
250


b Jet Eta
TTZ
TTW
ttbar
WZ
ZJets
ZJetslow
data 18A
0
200
400
600
800
1000
1200
1400
1600
−4
−3
−2
−1
0
1
2
3
4

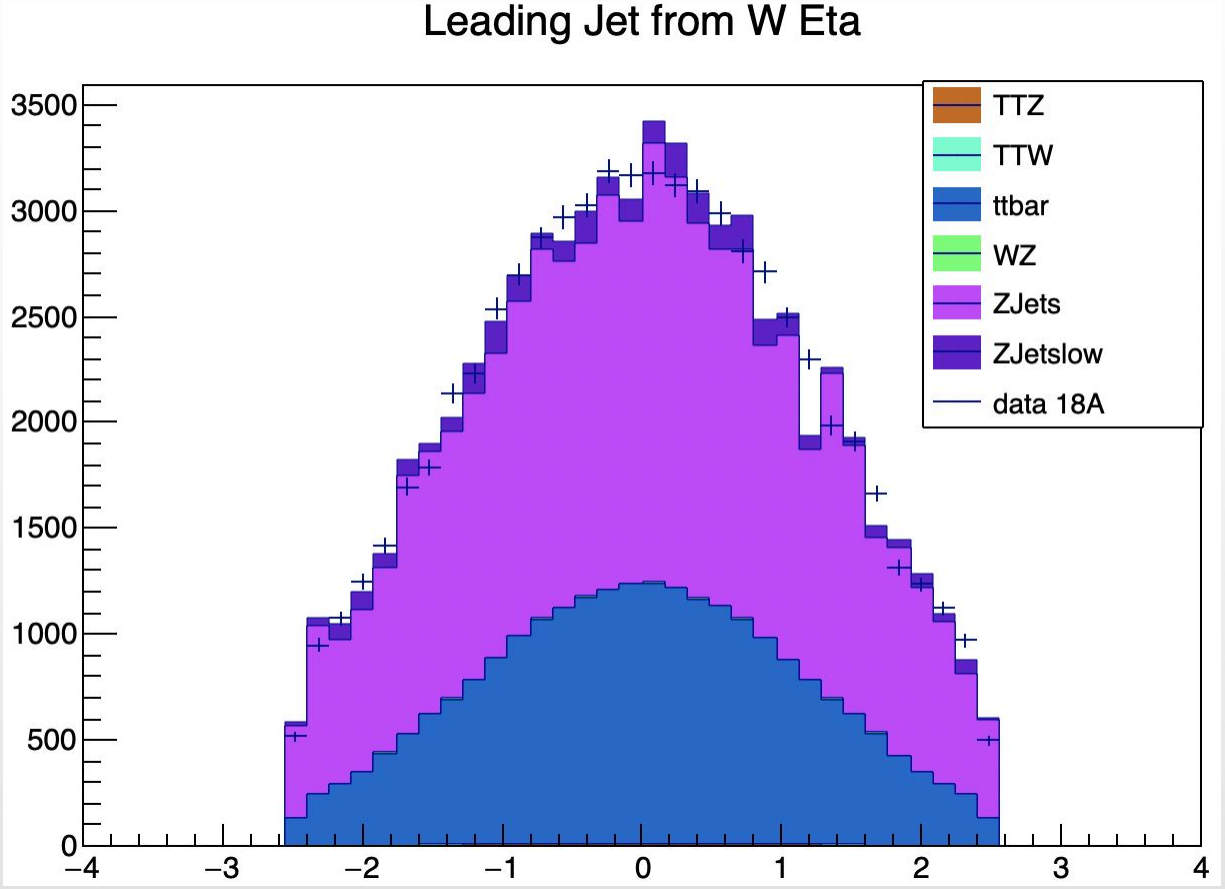
Jets from W Pt

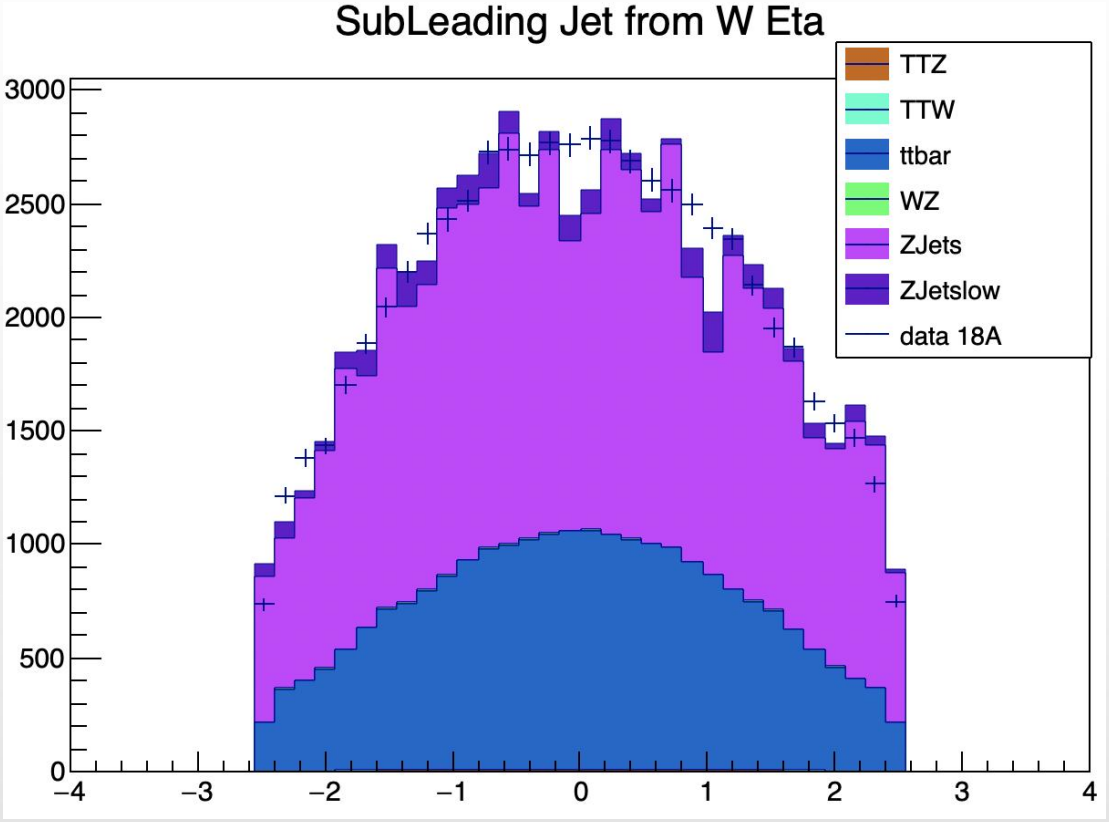
- **Jet pt correction is applied**



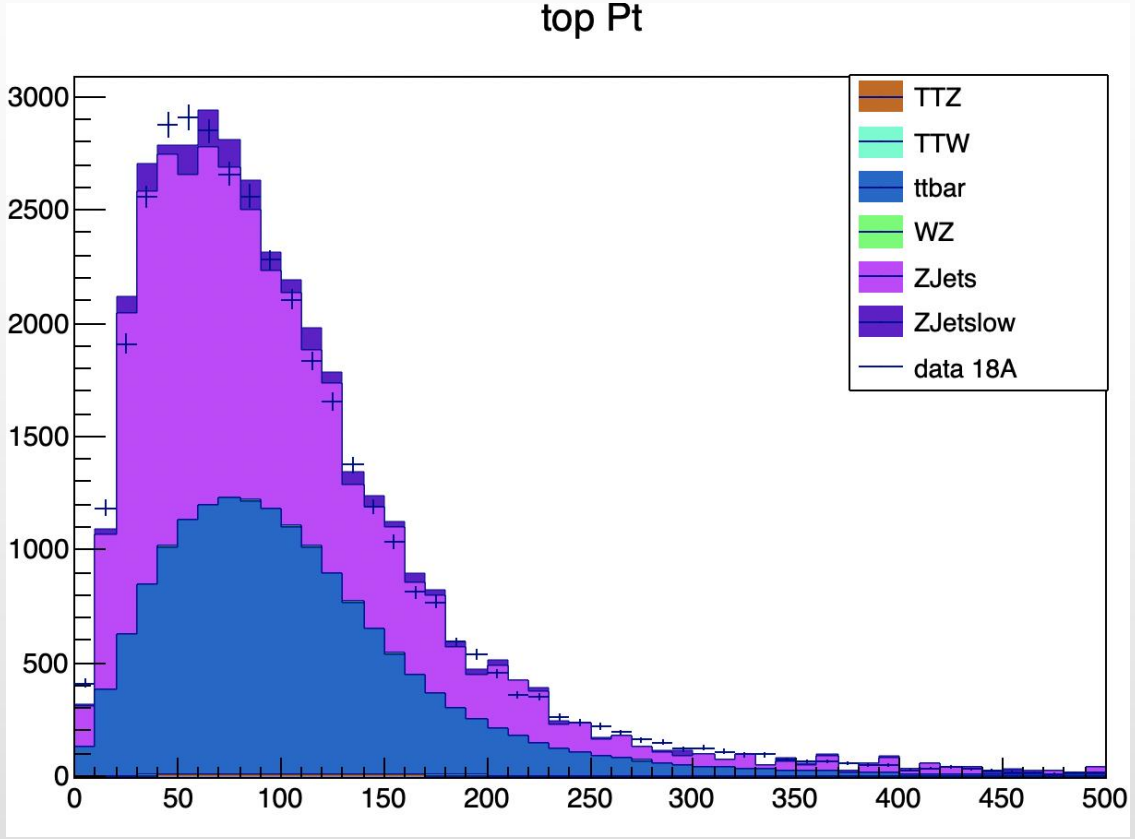


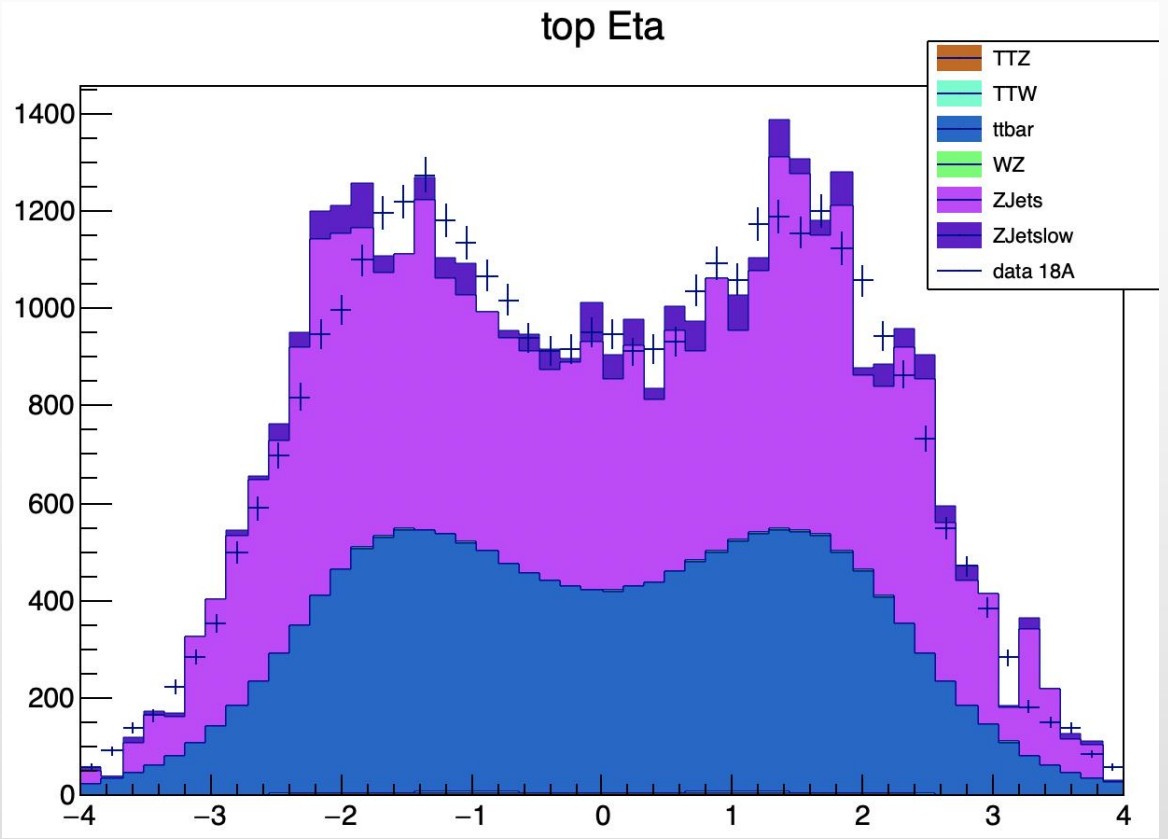
Jets from W Eta





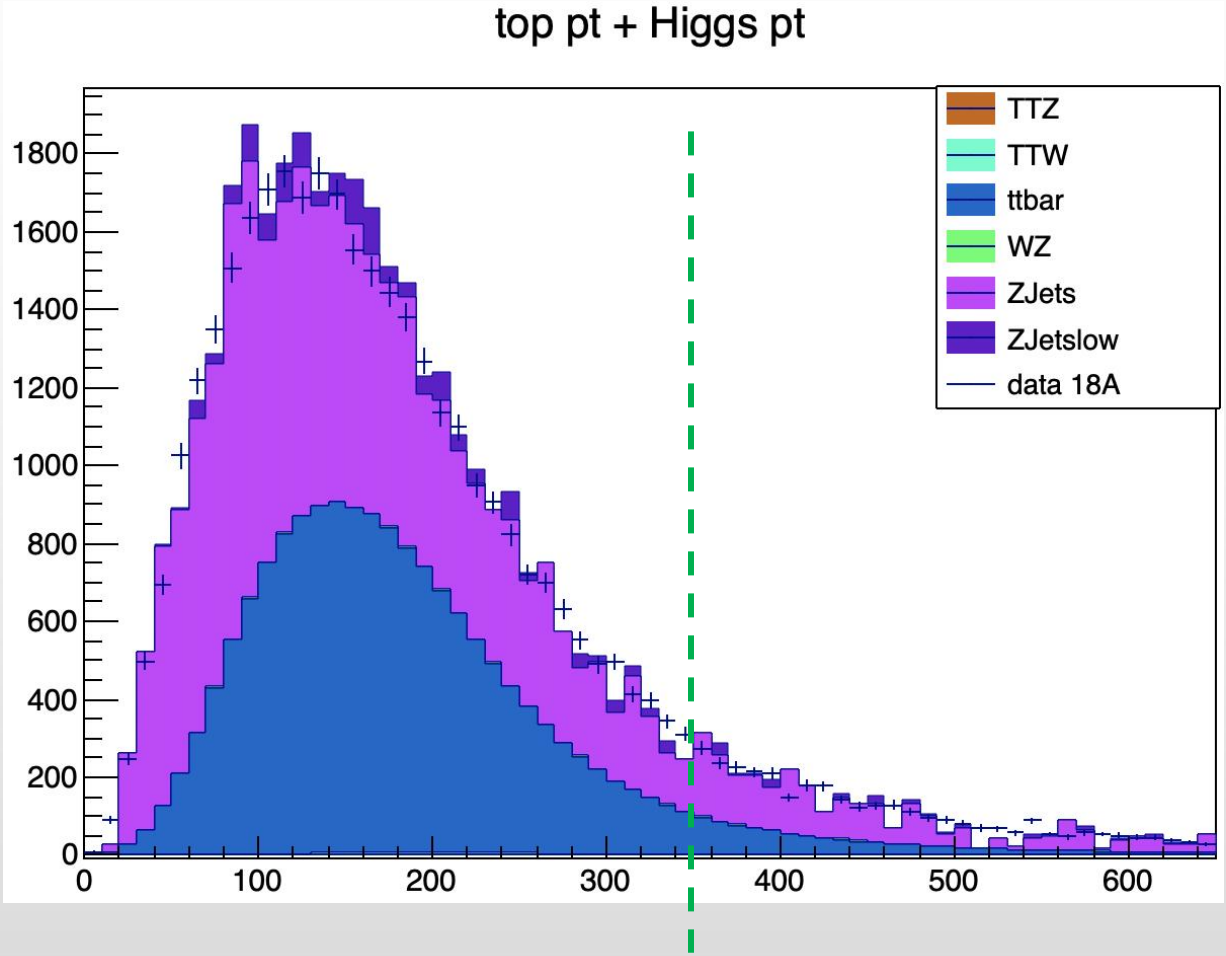
Reconstructed top pT& eta





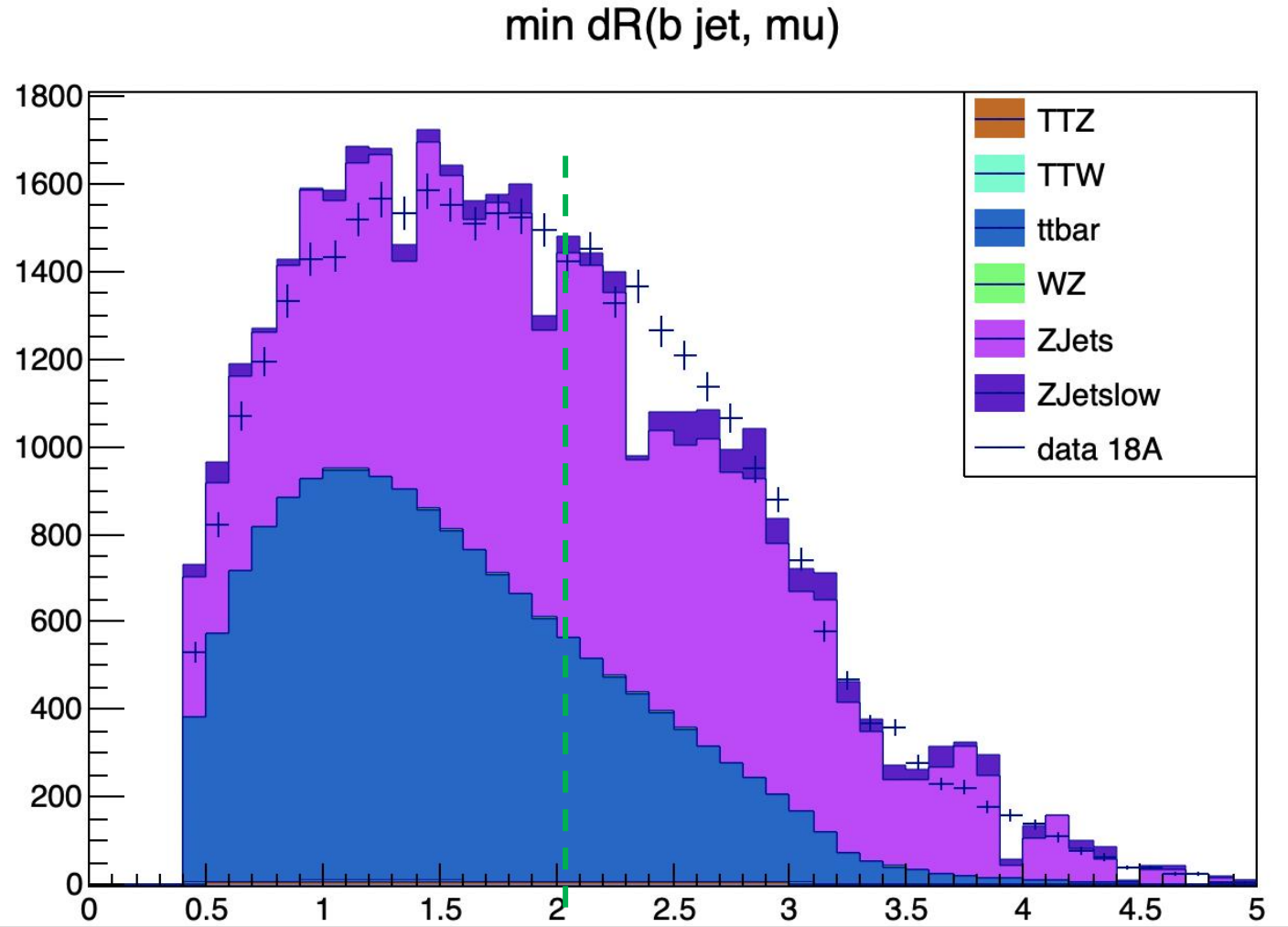
Reconstructed top pT + Higgs pT

- **It's one of my main cut variables**
  - **Cut1: top pt + Higgs pt > 350**



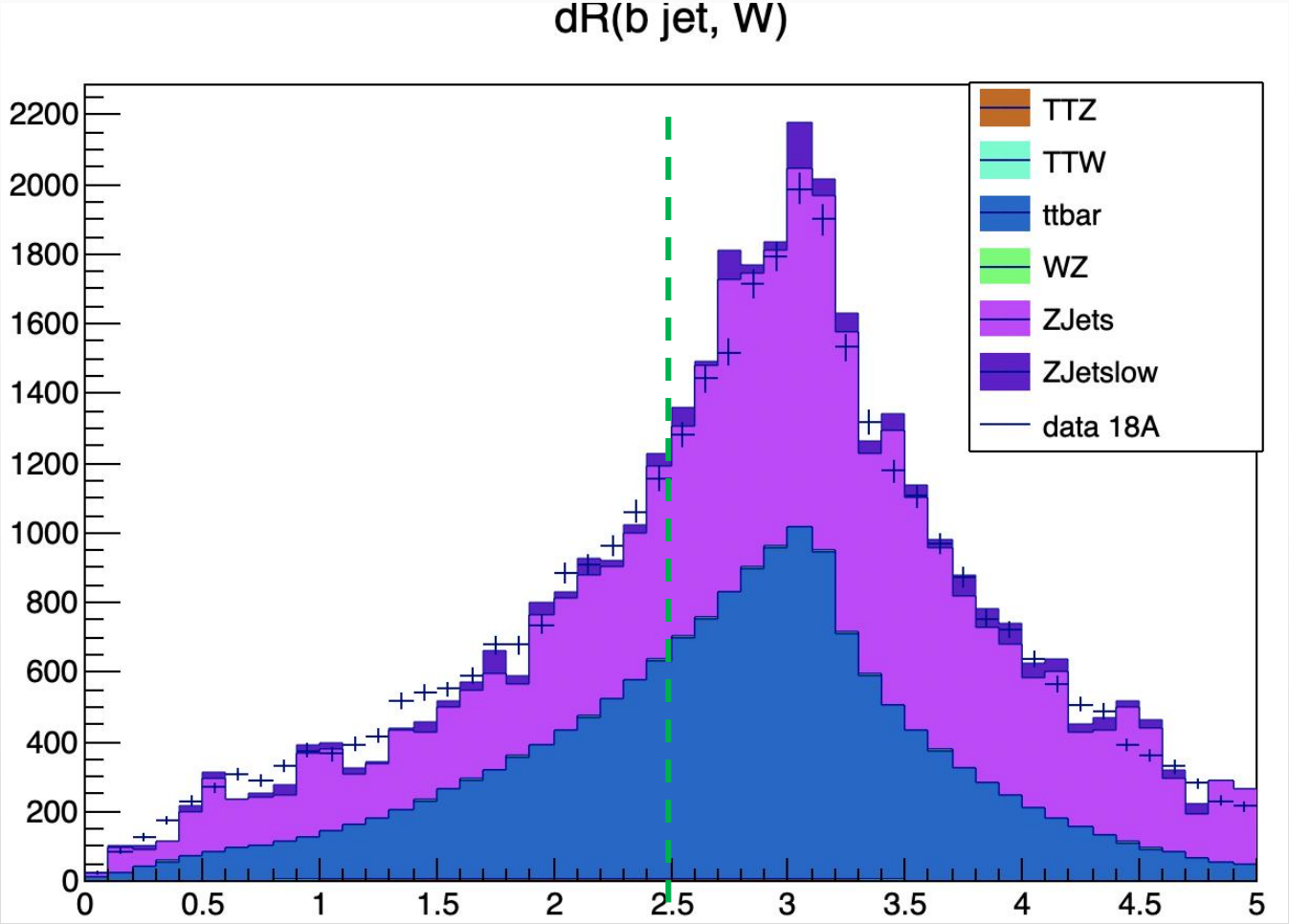
min dR(b jet from top, mu)

- **It's one of my main cut variables**
  - **Cut2: Minimal delta R (mu, b jet from top) > 2**



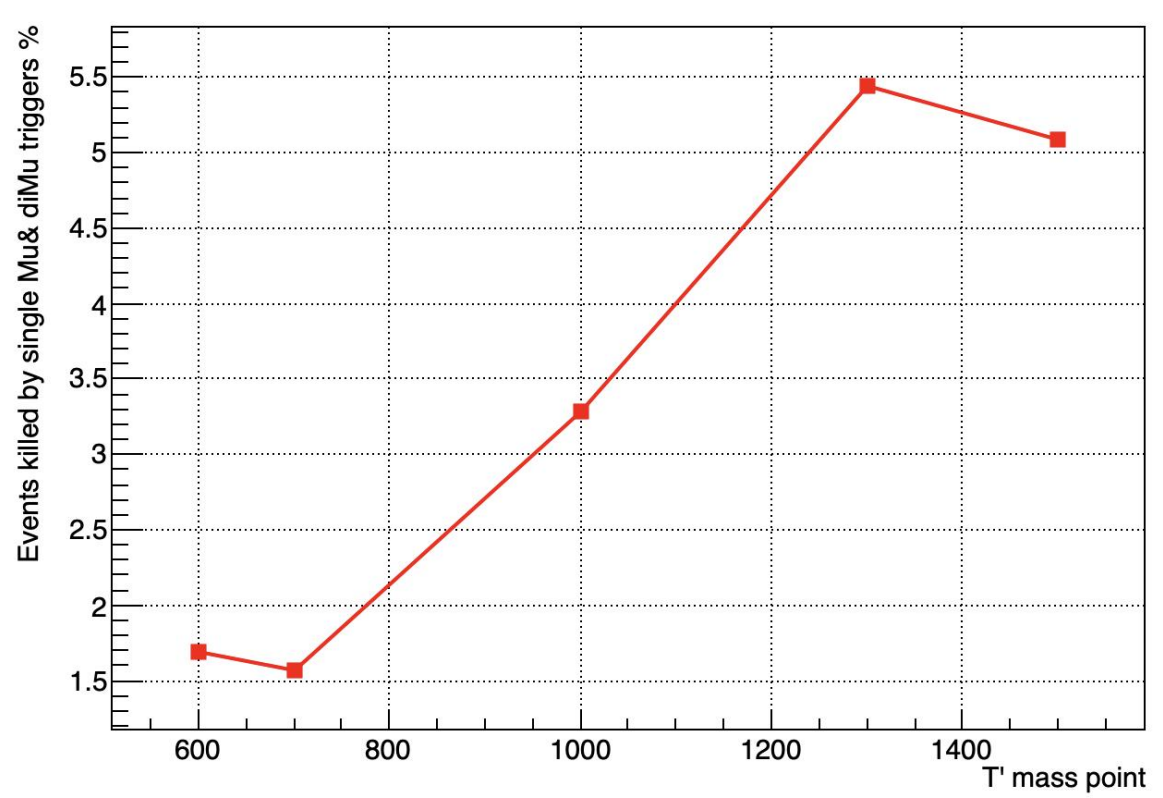
delta R (b jet from top, W from top)

- **It's one of my main cut variables**
  - **Cut3: delta R (b jet from top, W from top) < 2.5**



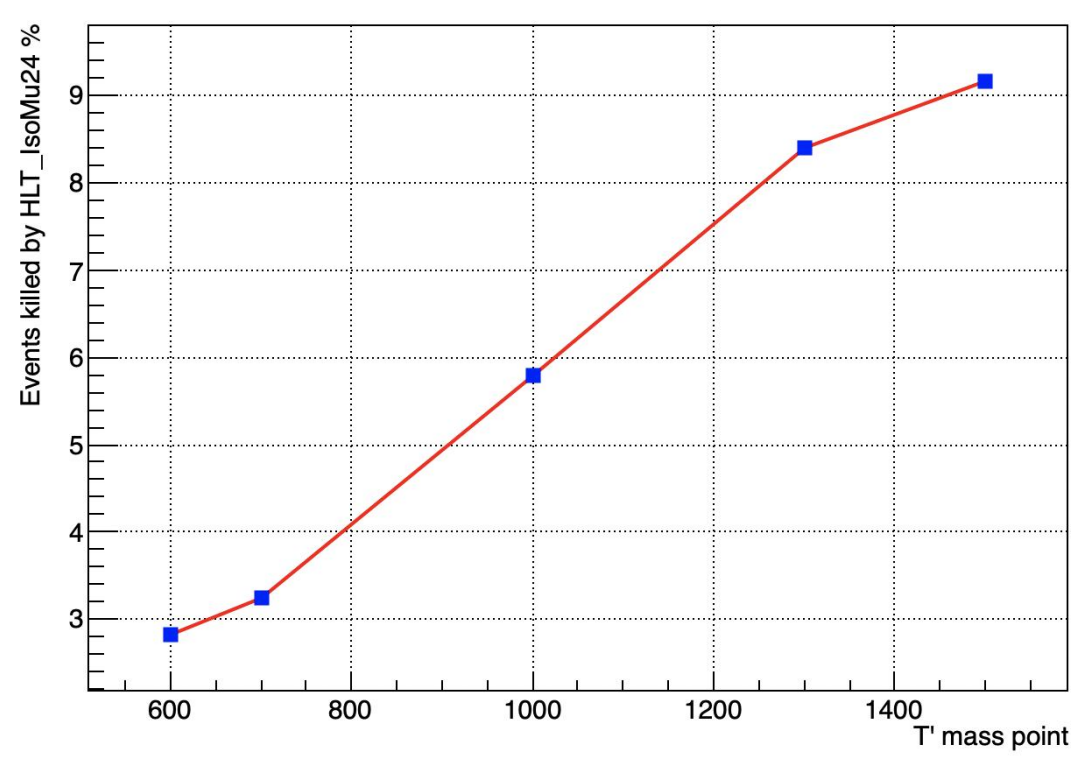
Trigger

- **Lost some signal events after applying single& dimu trigger HLT_Mu17_TrkIsoVVL_Mu8_TrkIsoVVL_DZ || HLT_IsoMu24**
  - **for TTbar: -0.5%**
  - **for signal: 1.5% ~ 5.5%: Way too much!**



Trigger

- **Lost lots of signal events after applying single mu trigger HLT_IsoMu24**
  - **for TTbar: -0.9%**
  - **for signal: 3% ~ 9%: Way too much!**



Trigger

- **Lost lots of signal events after applying dimu trigger HLT_Mu17_TrkIsoVVL_Mu8_TrkIsoVVL_DZ**
  - **for TTbar: -5.7%**
  - **for signal: 7% ~ 19%: Way too much!**