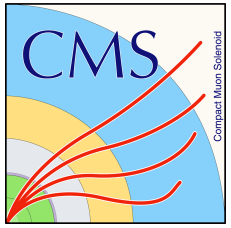
HEP Weekly Report
NTUA
1/7/2020

George Bakas



Status Report

- Stack of input variables for the topTagger (Data vs MC)
  - Leading and Subleading jets
  - Fit a new Control Region (same as SR without any top tagging requirement)
    - Fit on Top candidate mass
    - Ttbar signal strength in this region in order to scale ttbar MC
      - 2016: 0.78 ± 0.052
      - 2017: 0.58 ± 0.089
      - 2018: 0.68 ± 0.039
  - How to measure top tagger scale factors
    - Tag and Probe method

- Ultra Legacy Files
  - Most files are there
  - No deepCSV working points

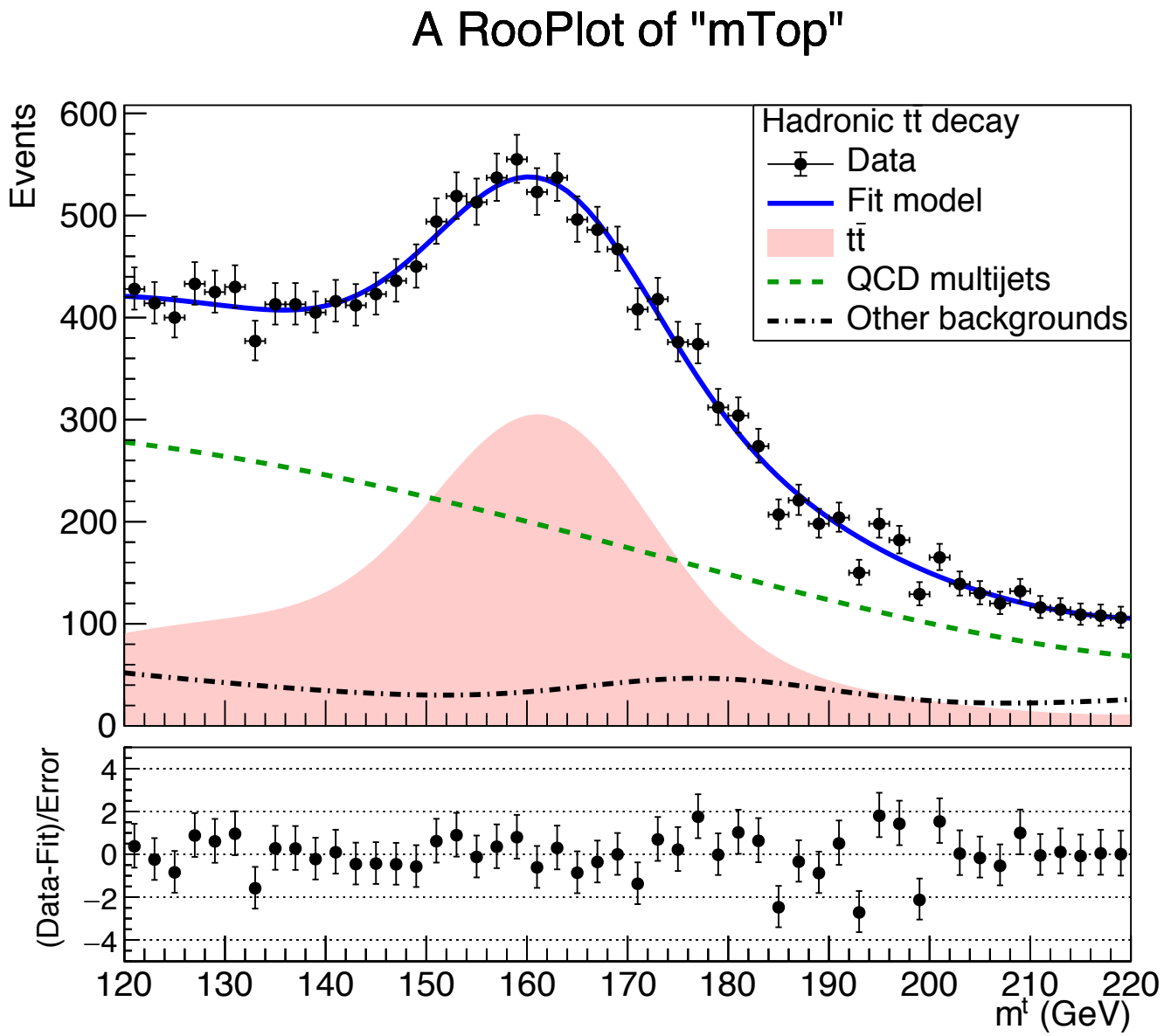
Signal Selection

Variables	Selected Cut
pT (both leading jets)	> 400 GeV
Njets	> 1
N leptons	= 0
|eta| (both leading jets)	< 2.4
mJJ	> 1000 GeV
jetMassSoftDrop (only for fit)	(50,300) GeV
Top Tagger	> 0.2
B tagging (2 btagged jets)	> Medium WP
Signal Trigger	

Control Region Selection

Variables	Selected Cut
pT (both leading jets)	> 400 GeV
Njets	> 1
N leptons	= 0
|eta| (both leading jets)	< 2.4
mJJ	> 1000 GeV
jetMassSoftDrop (only for fit)	(50,300) GeV
Top Tagger	> 0.2
B tagging (0 btagged jets)	< Medium WP
Control Trigger	

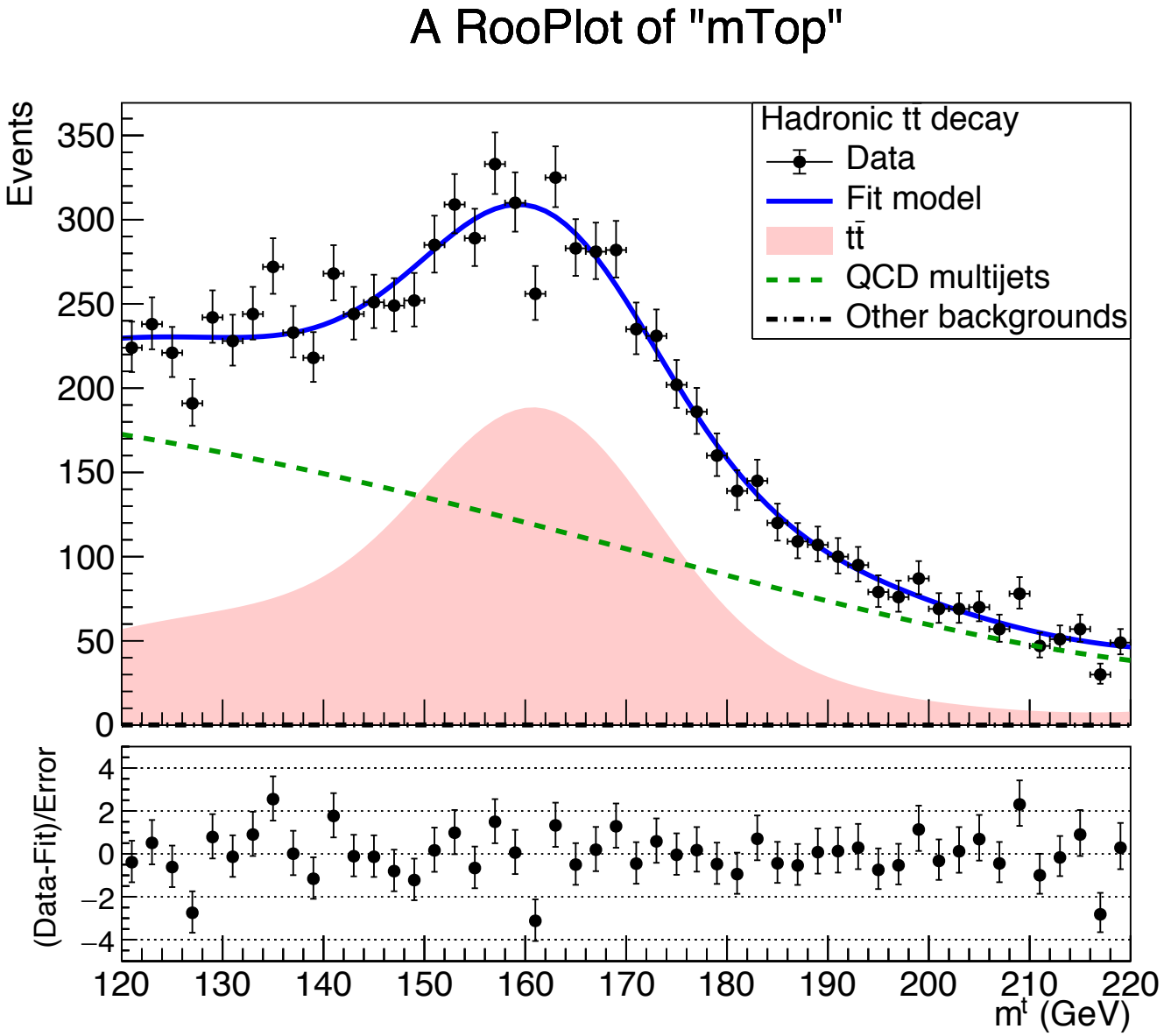
Mass Fit in new Control Region (SR without any tagging requirements) 2016



Signal strength: r = 0.784403 ± 0.0524155

Floating Parameter	FinalValue +/-	Error
kMassResol	9.9169e-01 +/-	5.02e-02
kMassScale	9.9117e-01 +/-	5.86e-03
kQCD_2b	7.2660e-03 +/-	5.63e-03
nFitBkg_2b	1.7509e+03 +/-	1.35e+03
nFitQCD_2b	8.6815e+03 +/-	1.54e+03
nFitSig2b	6.1639e+03 +/-	3.24e+02

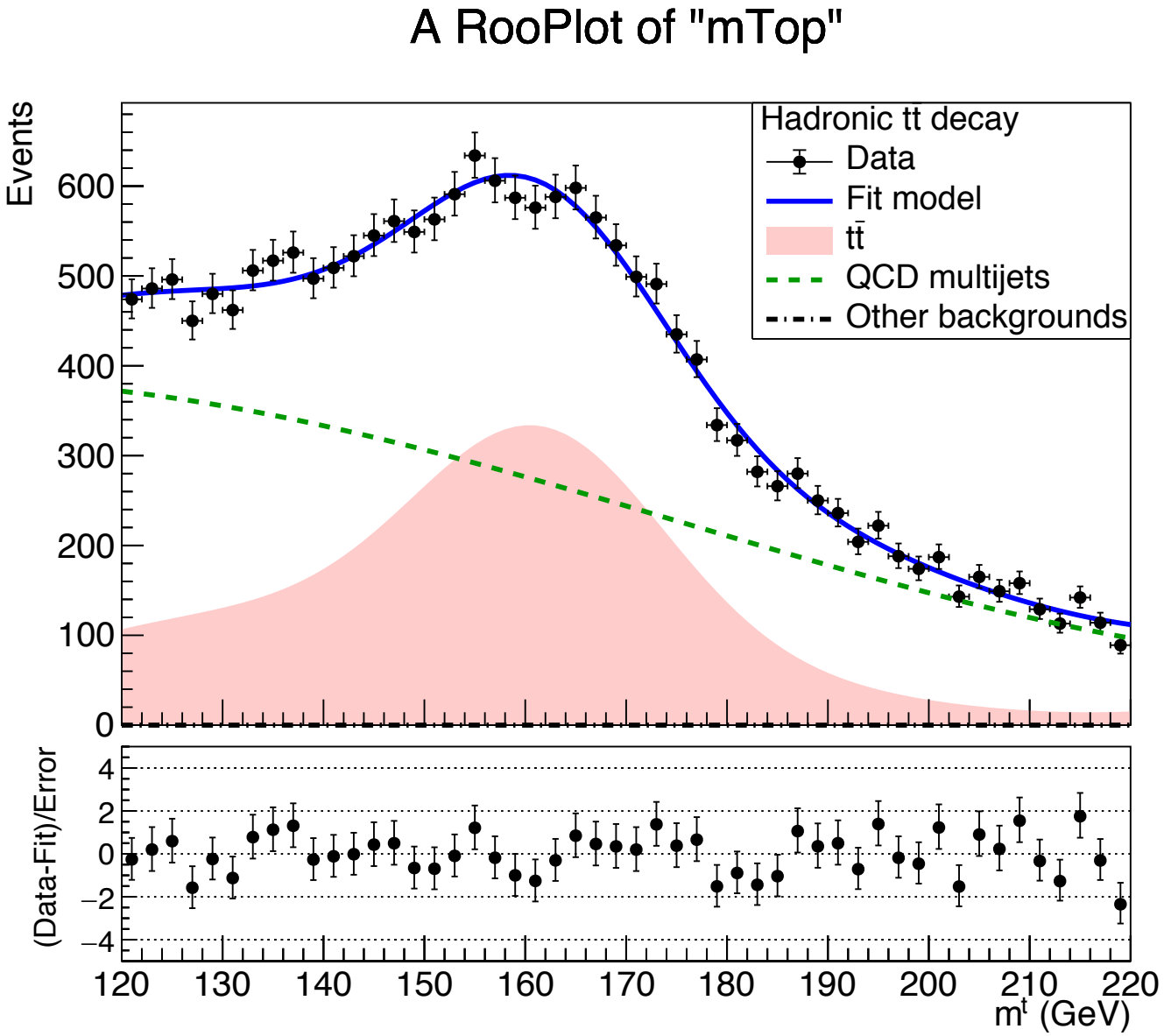
Mass Fit in new Control Region (SR without any tagging requirements) 2017



Signal strength: r = 0.579506 ± 0.0893904

Floating Parameter	FinalValue +/-	Error
kMassResol	1.0822e+00 +/-	6.02e-02
kMassScale	9.9217e-01 +/-	4.97e-03
kQCD_2b	1.8117e-03 +/-	1.14e-03
nFitBkg_2b	4.3944e+00 +/-	7.38e+03
nFitQCD_2b	5.2346e+03 +/-	9.25e+02
nFitSig2b	3.9421e+03 +/-	5.26e+02

Mass Fit in new Control Region (SR without any tagging requirements) 2018

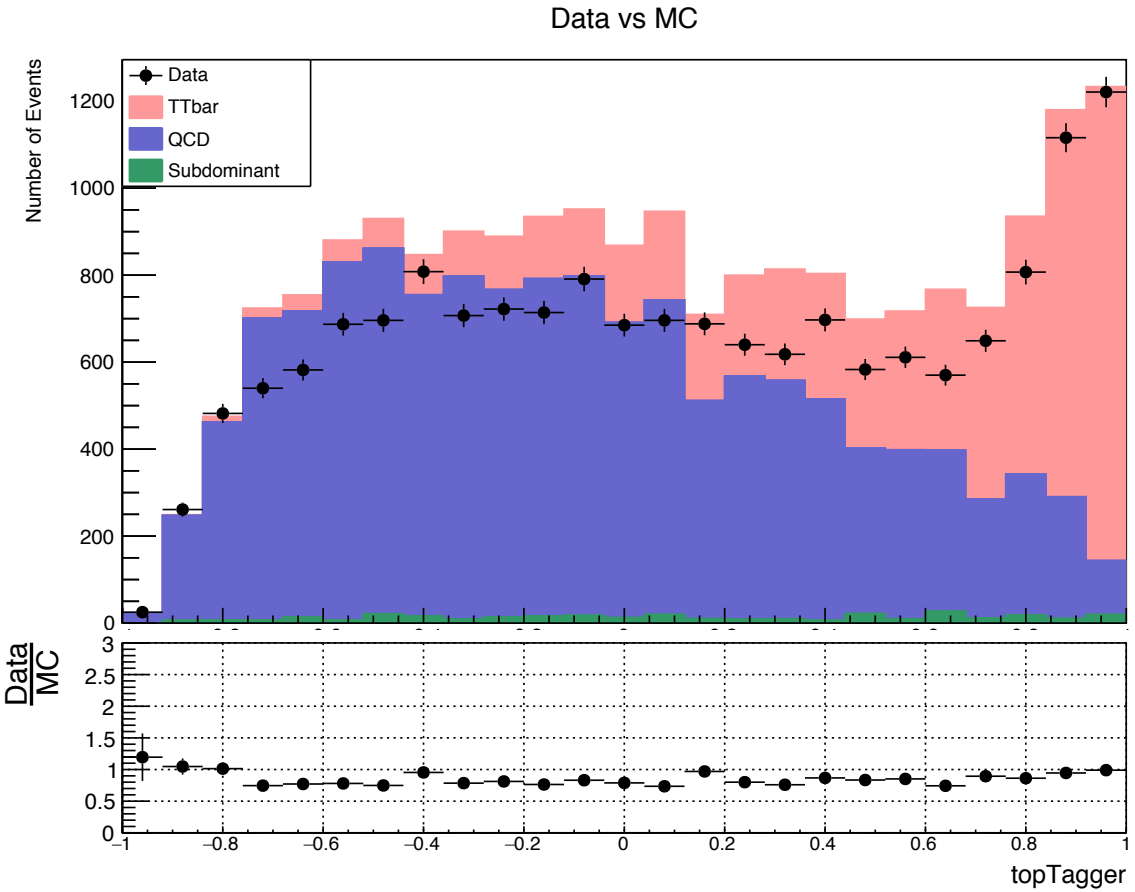


Signal strength: r = 0.681708 ± 0.0391799

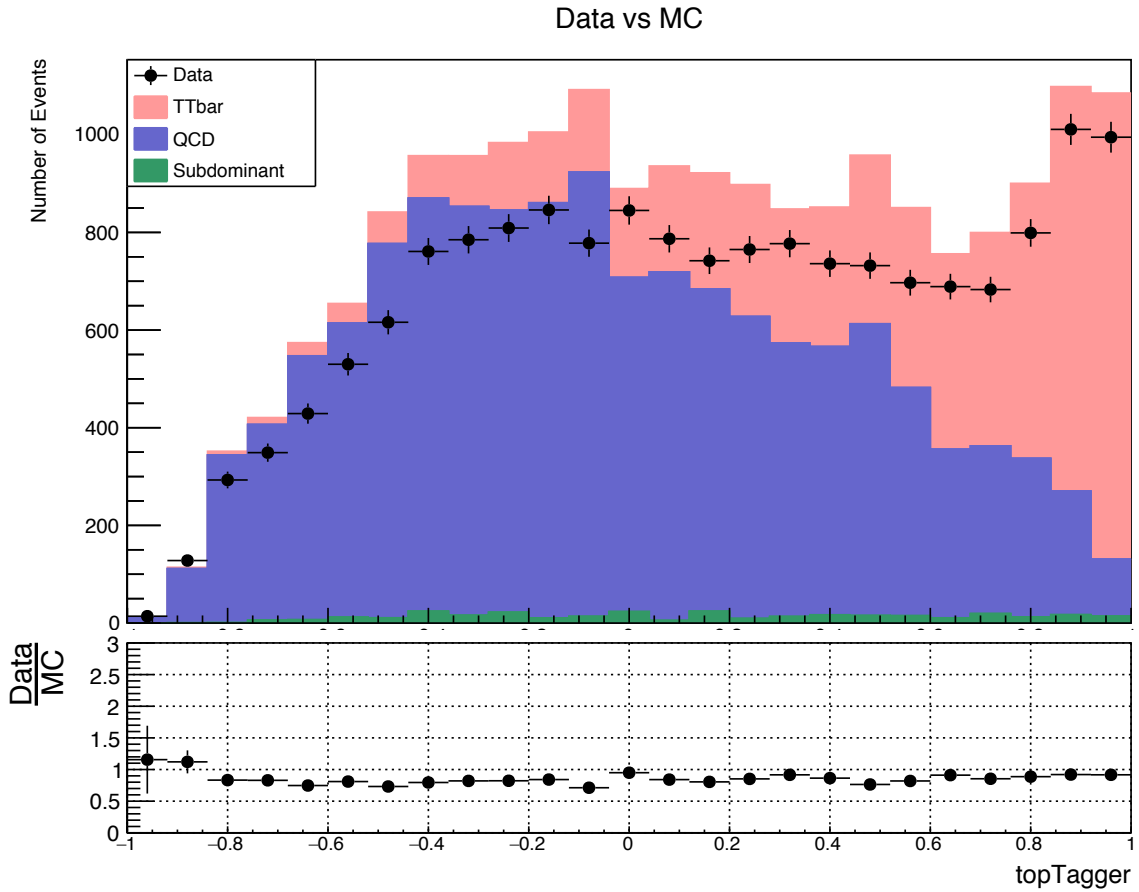
Floating Parameter	FinalValue +/-	Error
kMassResol	1.1551e+00 +/-	5.59e-02
kMassScale	9.8898e-01 +/-	3.45e-03
kQCD_2b	4.9131e-03 +/-	1.44e-03
nFitBkg_2b	1.6862e-03 +/-	3.34e+02
nFitQCD_2b	1.2031e+04 +/-	5.52e+02
nFitSig2b	7.3653e+03 +/-	3.50e+02

Stack of BDT input variables for leading and subleading jet (2016)

Leading

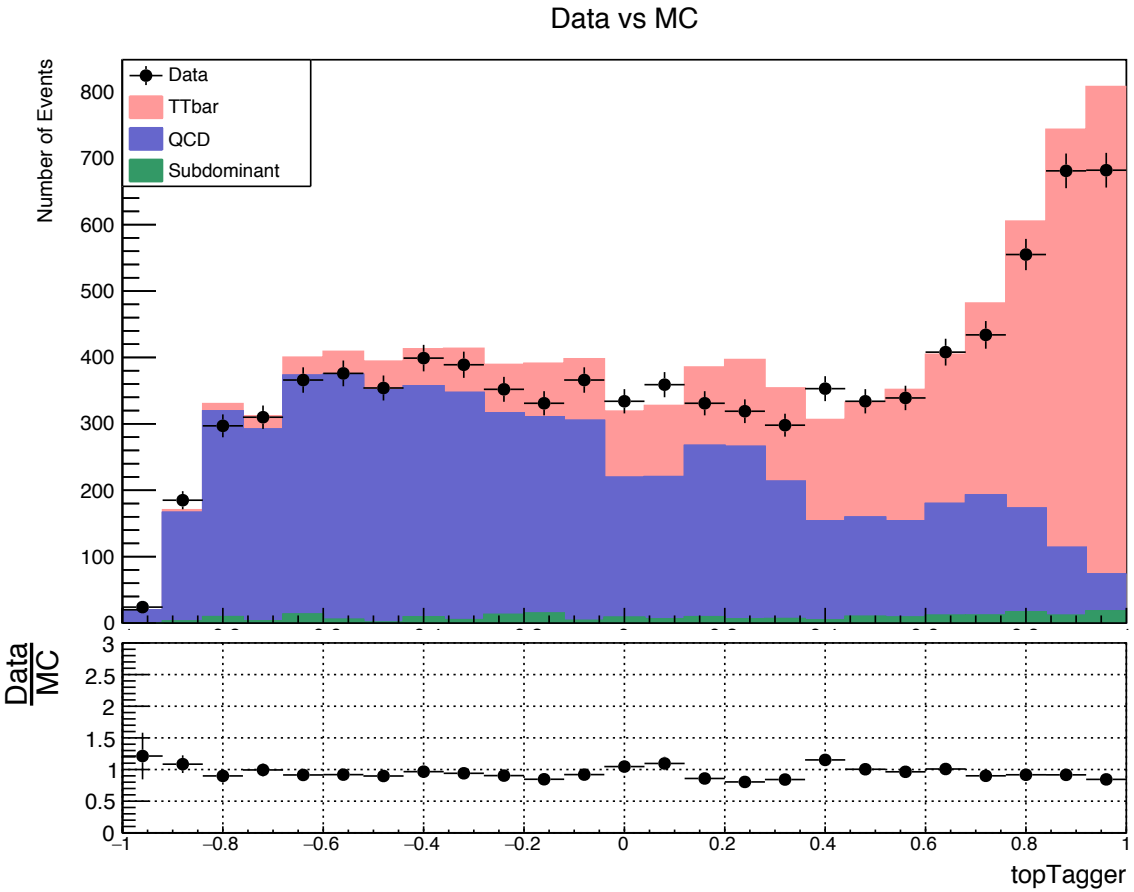


Sub-Leading

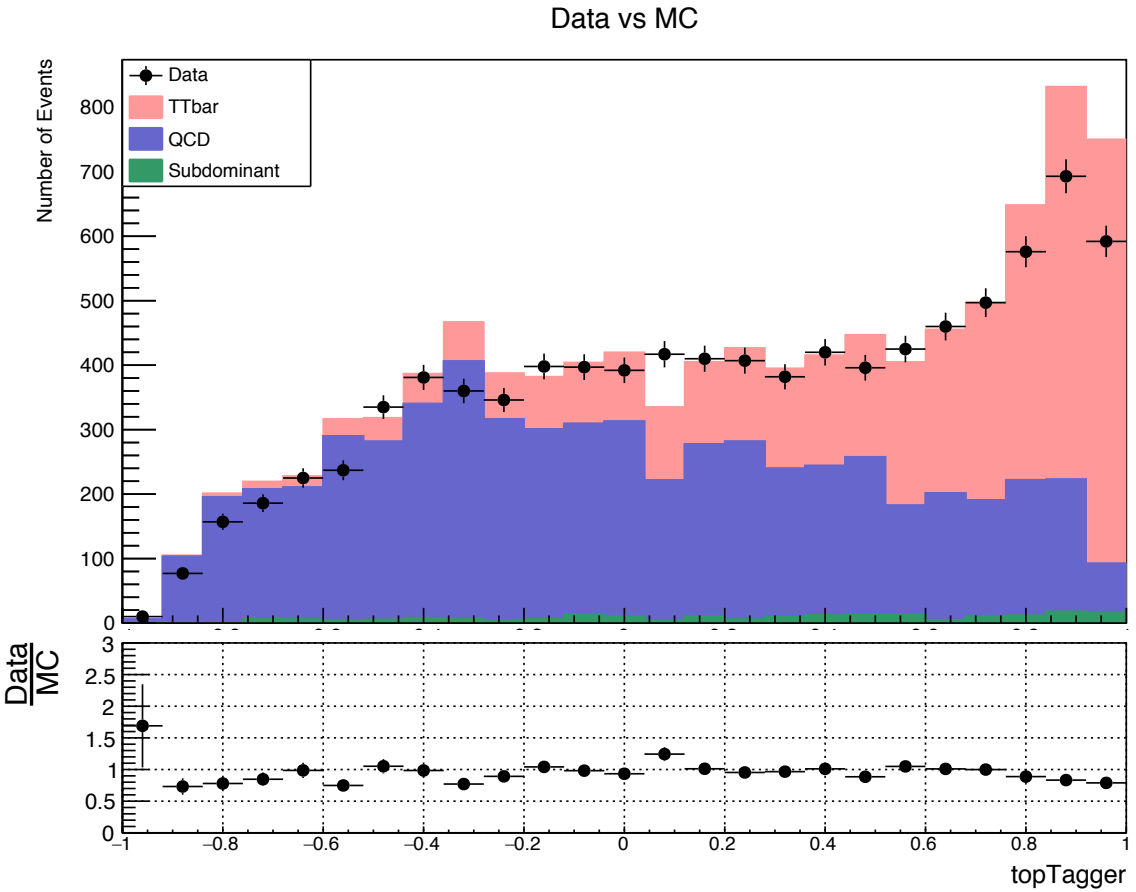


Stack of BDT input variables for leading and subleading jet (2017)

Leading



Sub-Leading



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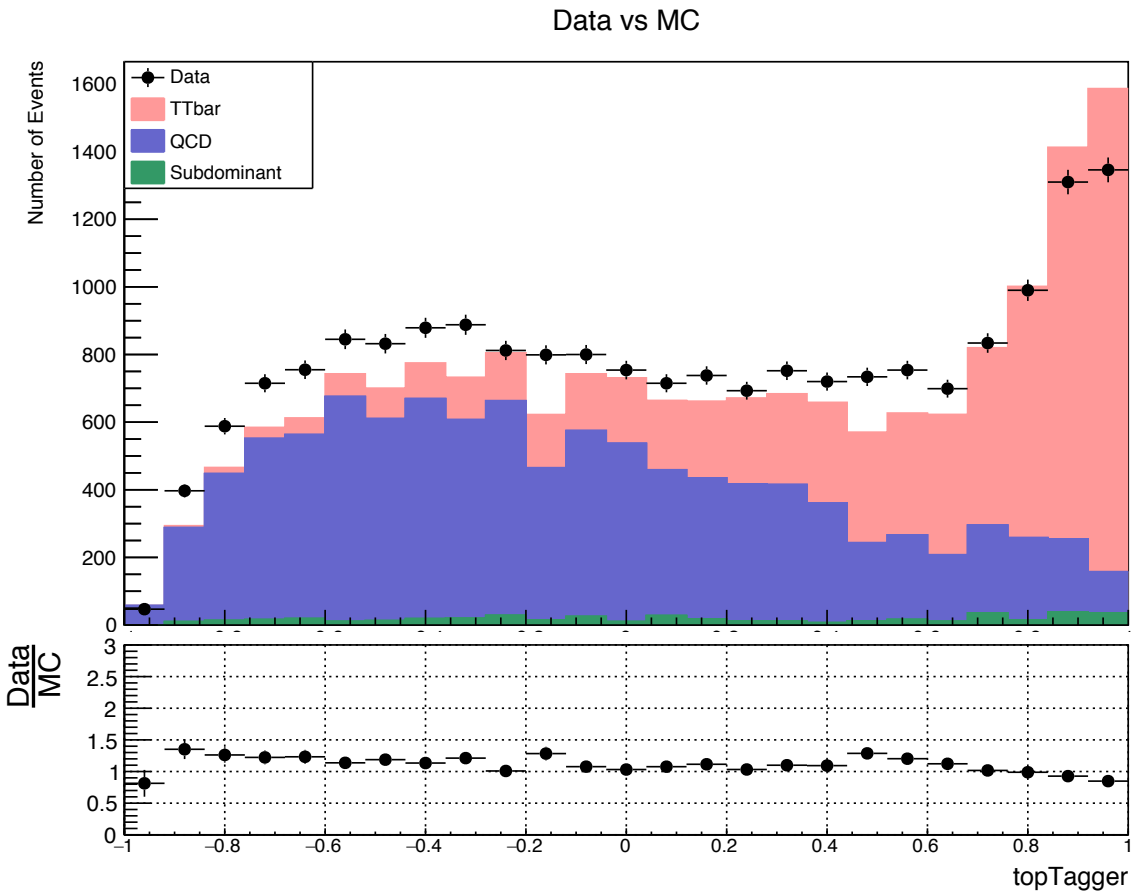
Leading



Sub-Leading