Top Discriminator Efficiencies and Signal Over Bkg for several selection Categories

NTUA

GIANNIS PAPAKRIVOPOULOS

GEORGE BAKAS

Overview

- Efficiencies vs mTTbarParton
- Signal over Background for
  - Mtt samples over Bkg
  - Nominal sample over Bkg
- Yields for all samples
- All Signal over Bkg are vs mJJ
- Categories:
  - 1. Both jets are top tagged and b tagged
  - 2. 1 Jet top and b tagged and other jet top tagged
  - 3. 1 Jet top and b tagged and other jet b tagged
  - 4. Both jets are top tagged
  - 5. Both jets are b tagged

Cuts:

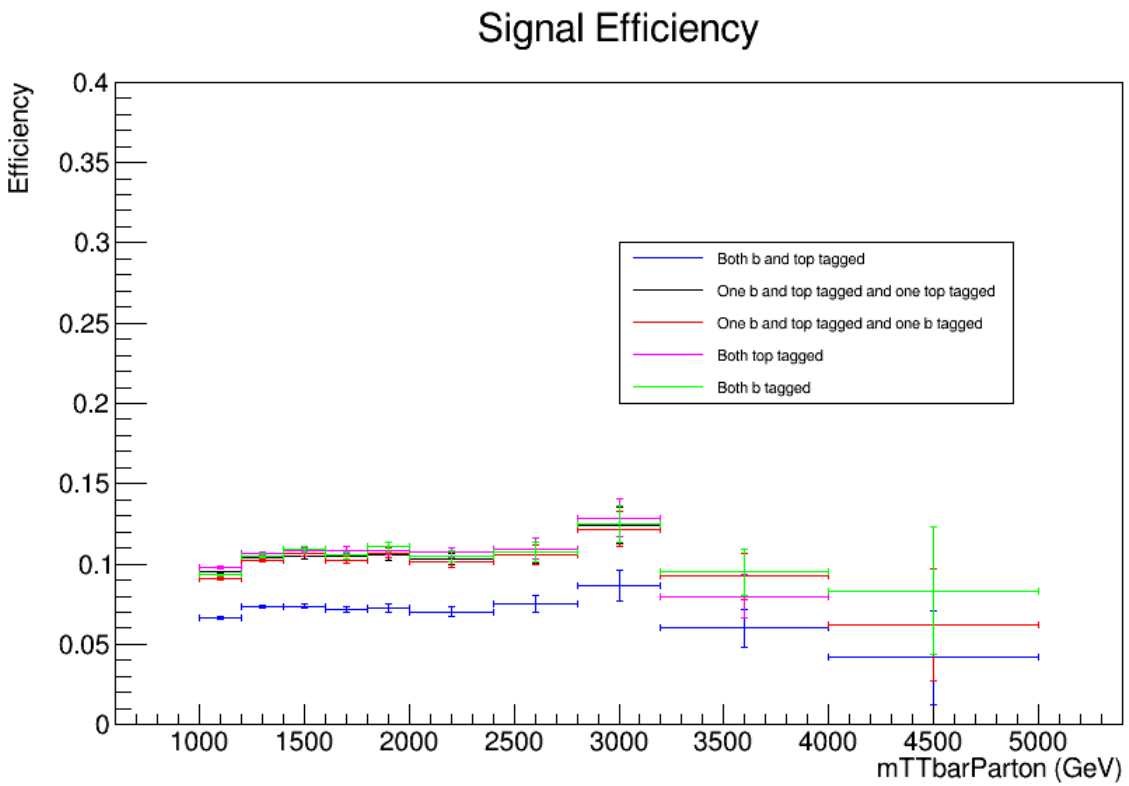
- Reco:
  - nJets > 1,
  - |jetEta| < 2.4 (both jets)
  - jetPt > 400 GeV (both jets)
  - 120 GeV < jetMassSoftDrop < 220 GeV (both jets)
- Parton:
  - |etaParton| < 2.4 (both partons)
  - ptTopParton > 400 GeV (both partons)
  - mTTbarParton > 1000

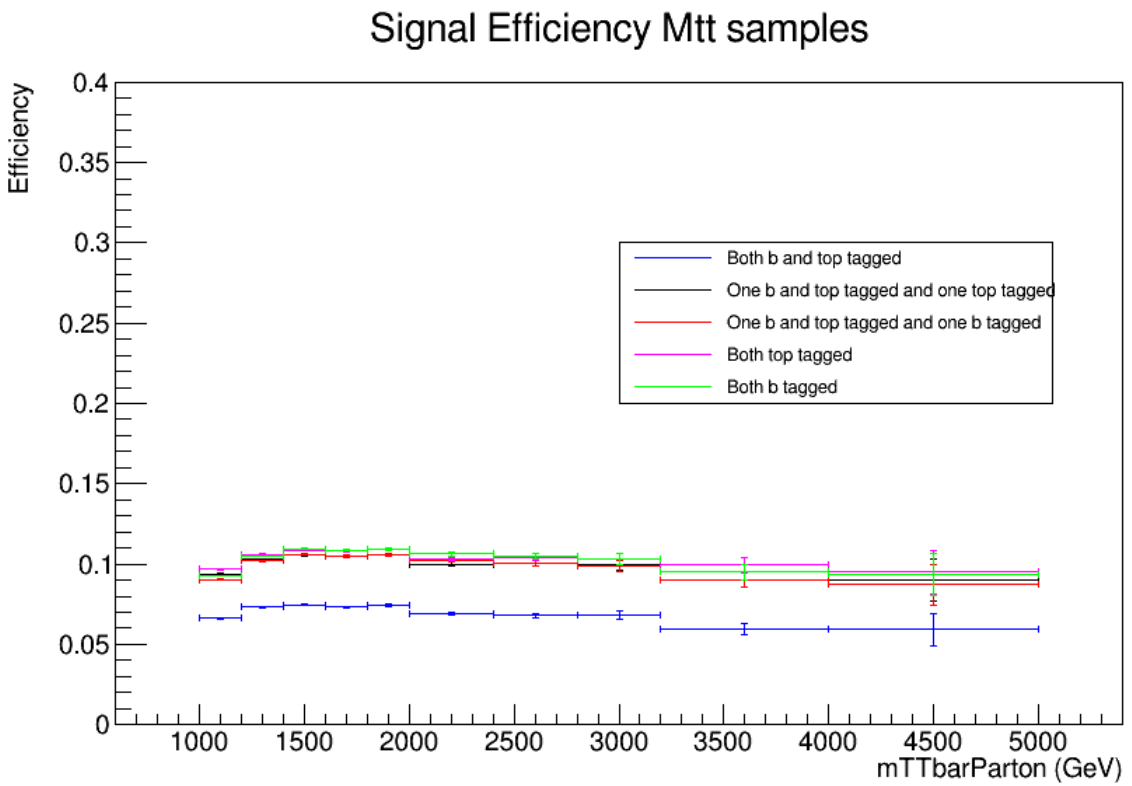
Efficiency vs mTTbarParton

Top tagger cut : 0.0
B-tagging: Loose working point

nominal TT_TuneCUETP8M2T4_13TeV-powherg-pythia8

Mtt Samples



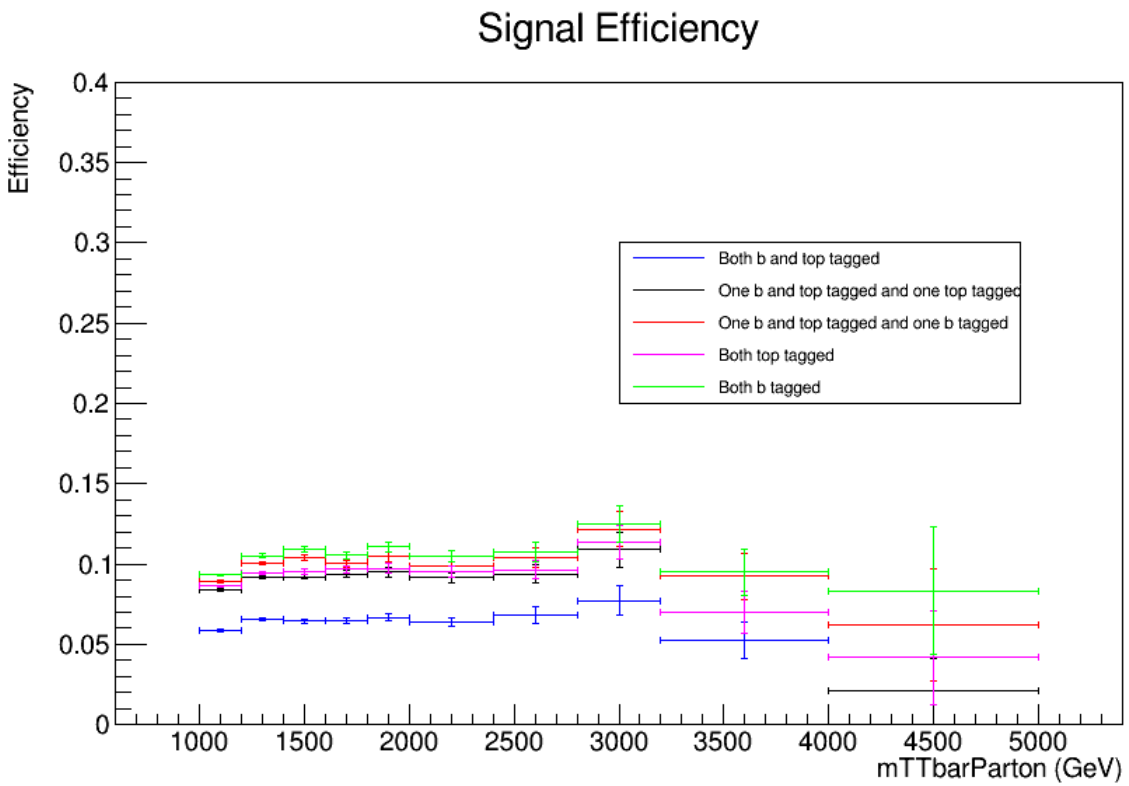


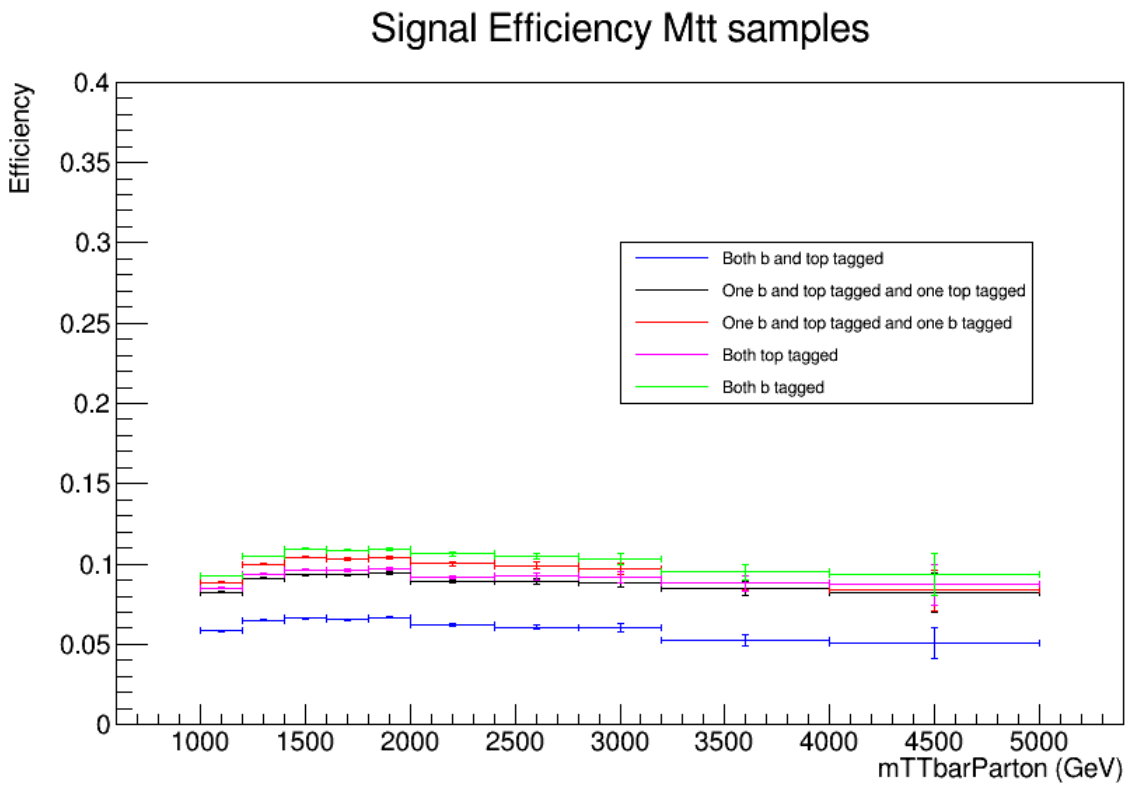
Efficiency vs mTTbarParton

Top tagger cut : 0.1
B-tagging: Loose working point

nominal TT_TuneCUETP8M2T4_13TeV-powherg-pythia8

Mtt Samples



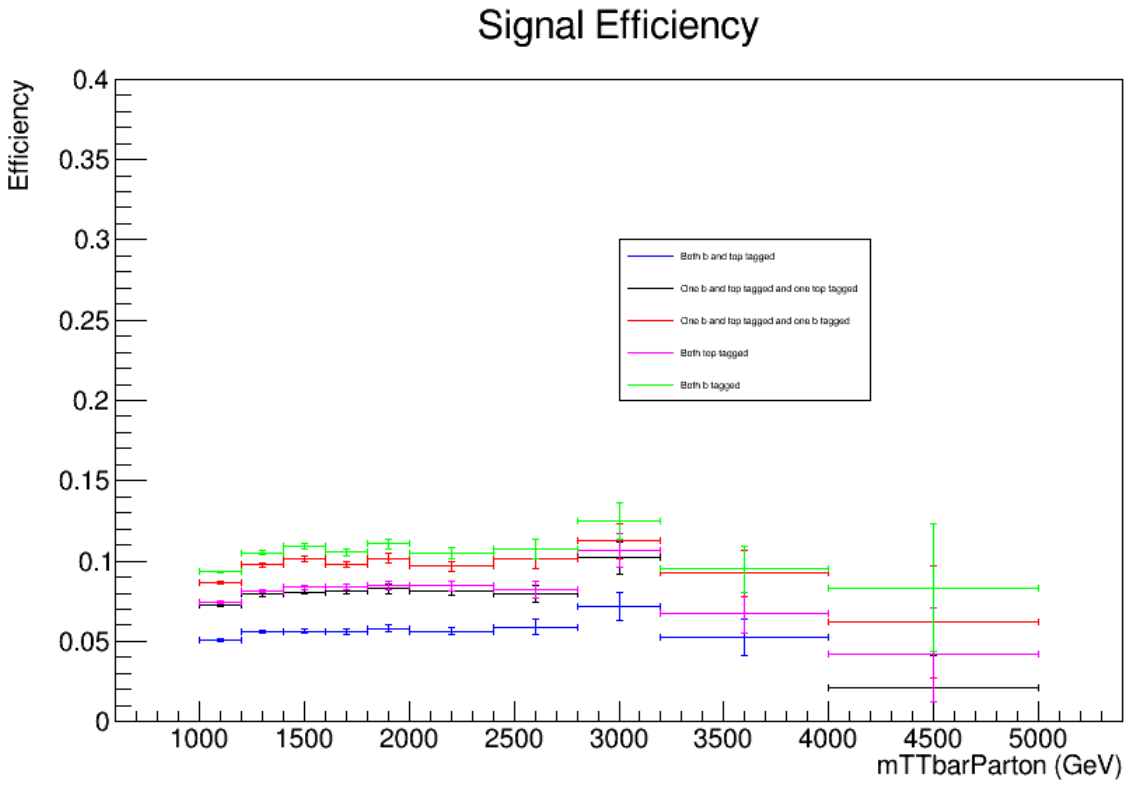


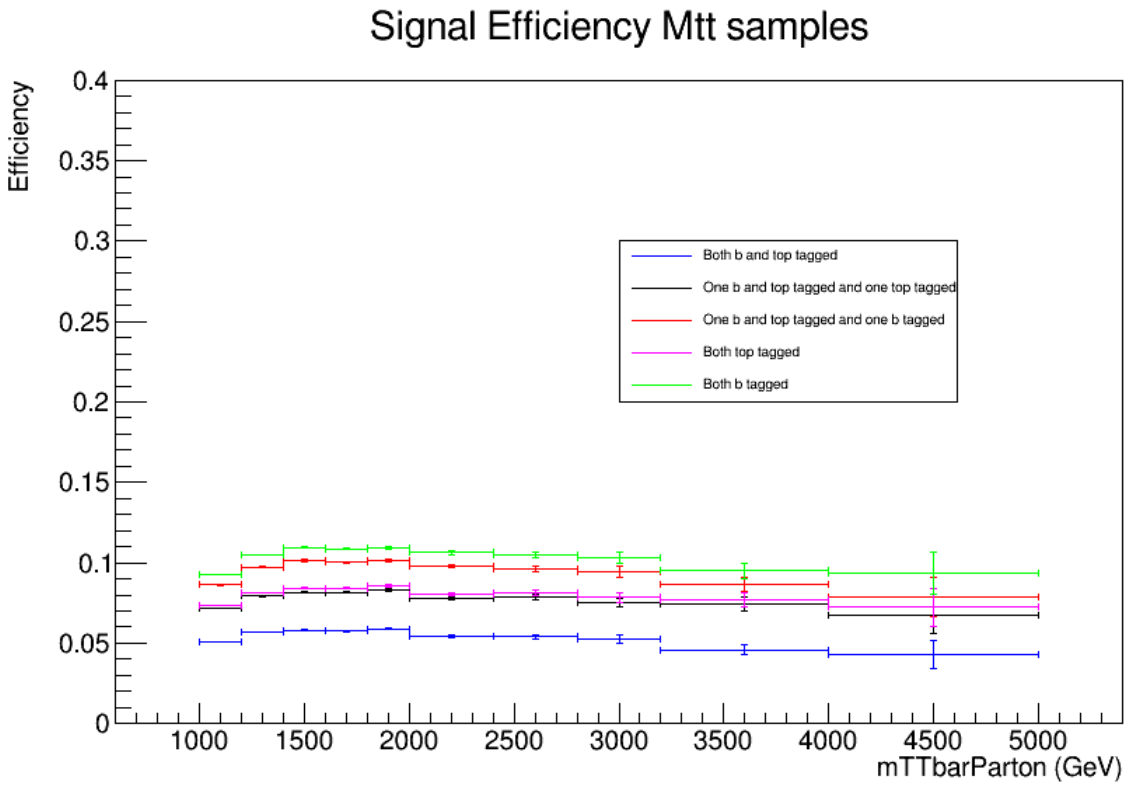
Efficiency vs mTTbarParton

Top tagger cut : 0.2
B-tagging: Loose working point

nominal TT_TuneCUETP8M2T4_13TeV-powherg-pythia8

Mtt Samples



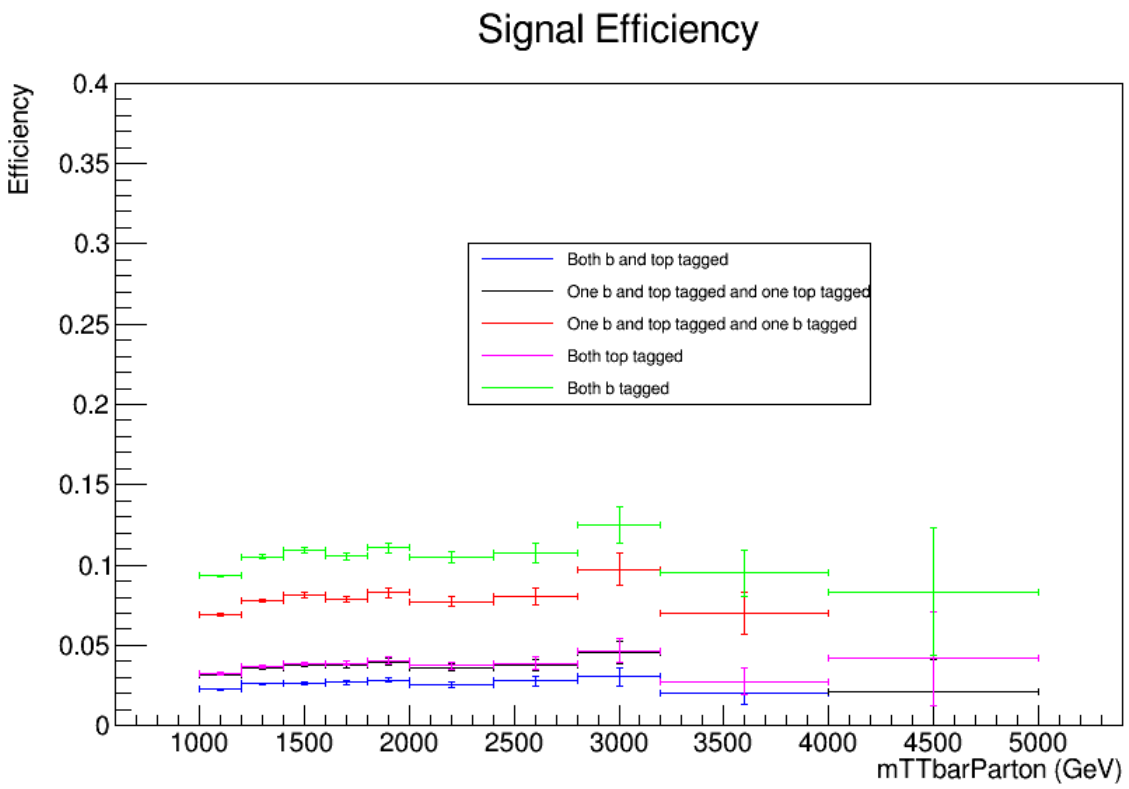


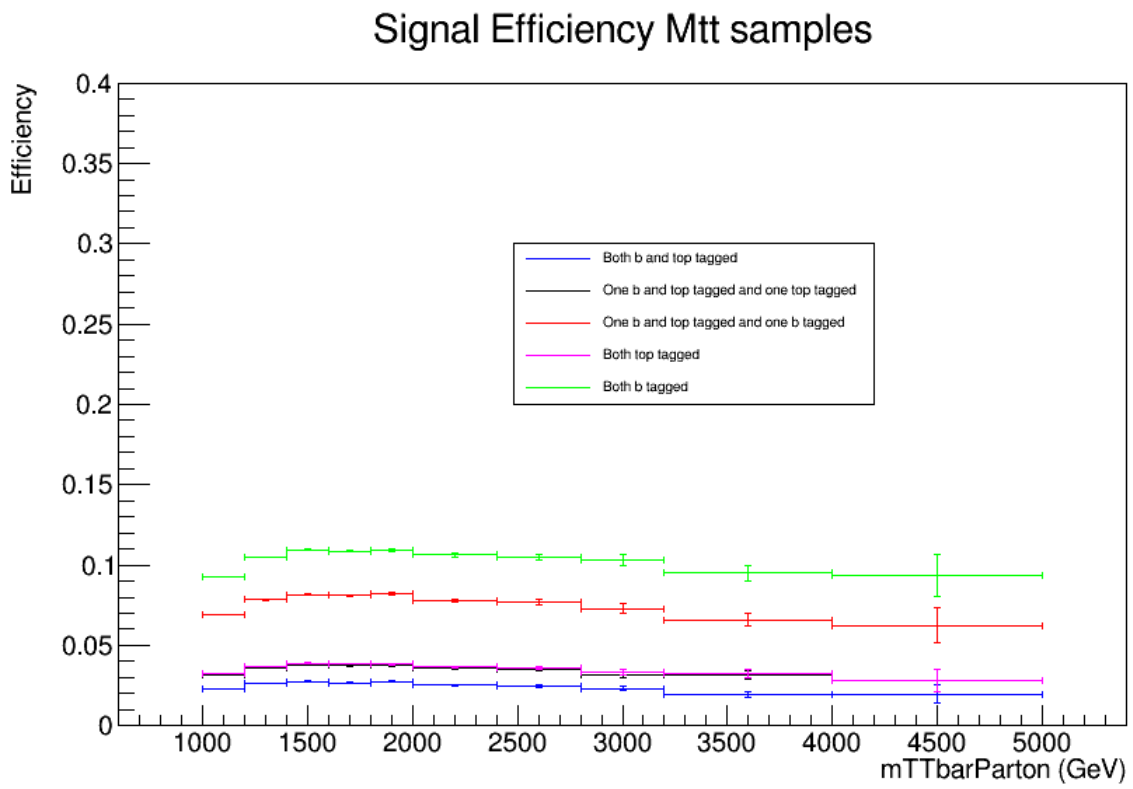
Efficiency vs mTTbarParton

Top tagger cut : 0.6
B-tagging: Loose working point

nominal TT_TuneCUETP8M2T4_13TeV-powherg-pythia8

Mtt Samples



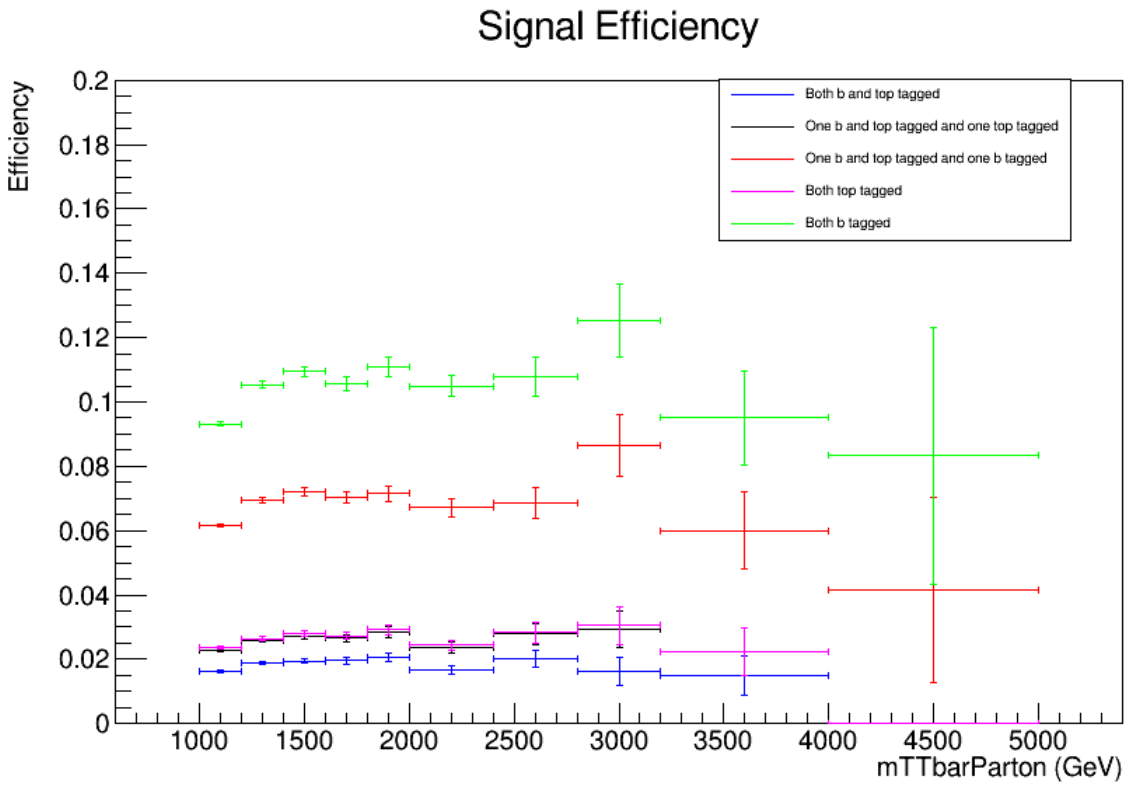


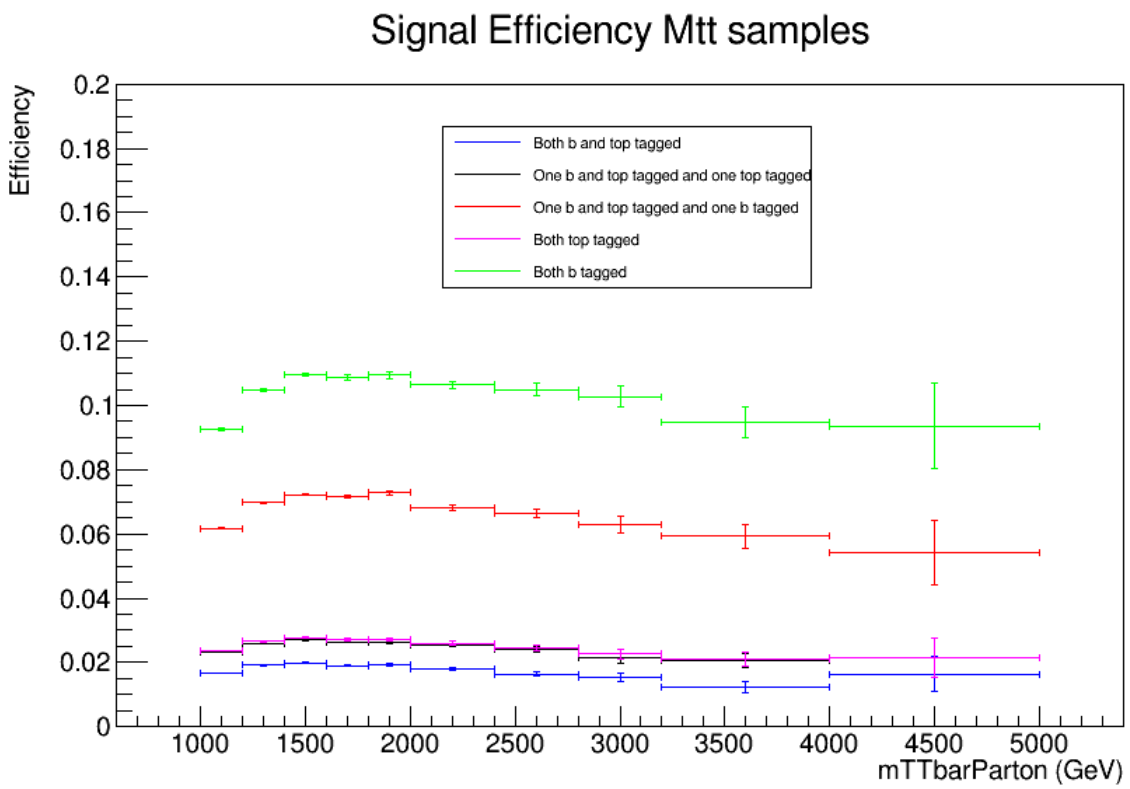
Efficiency vs mTTbarParton

Top tagger cut : 0.7
B-tagging: Loose working point

nominal TT_TuneCUETP8M2T4_13TeV-powherg-pythia8

Mtt Samples



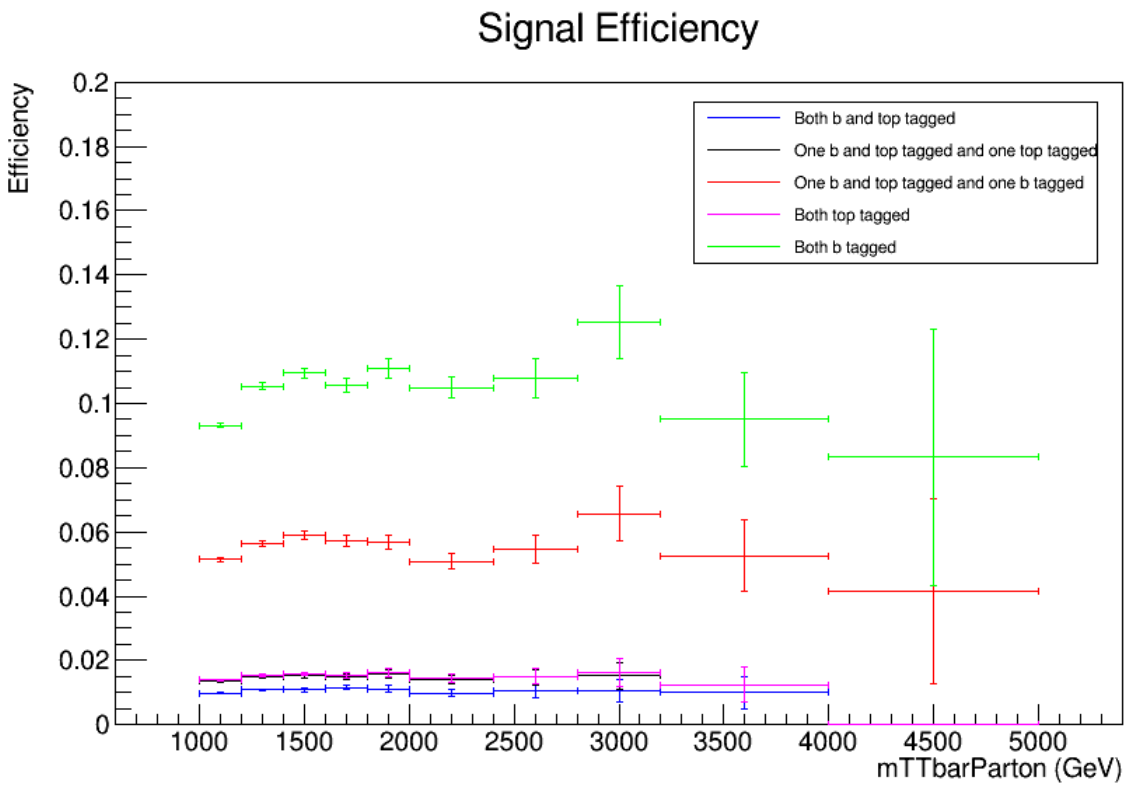


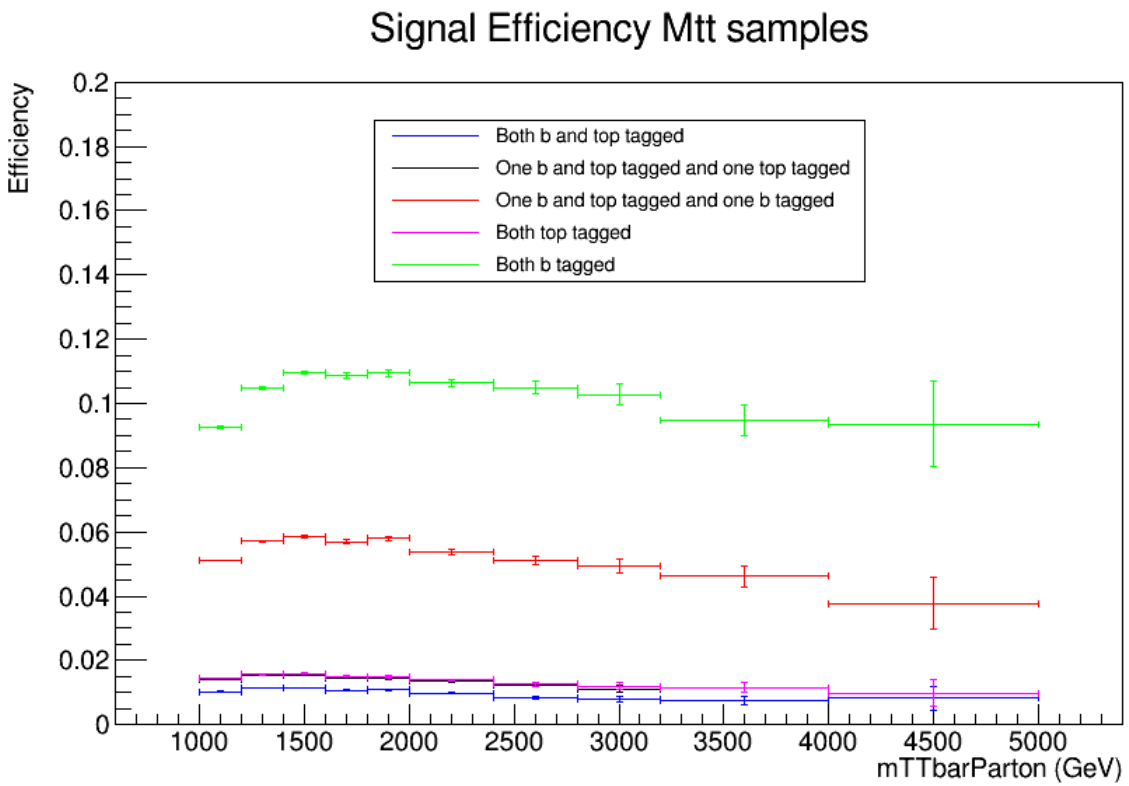
Efficiency vs mTTbarParton

Top tagger cut : 0.8
B-tagging: Loose working point

nominal TT_TuneCUETP8M2T4_13TeV-powherg-pythia8

Mtt Samples



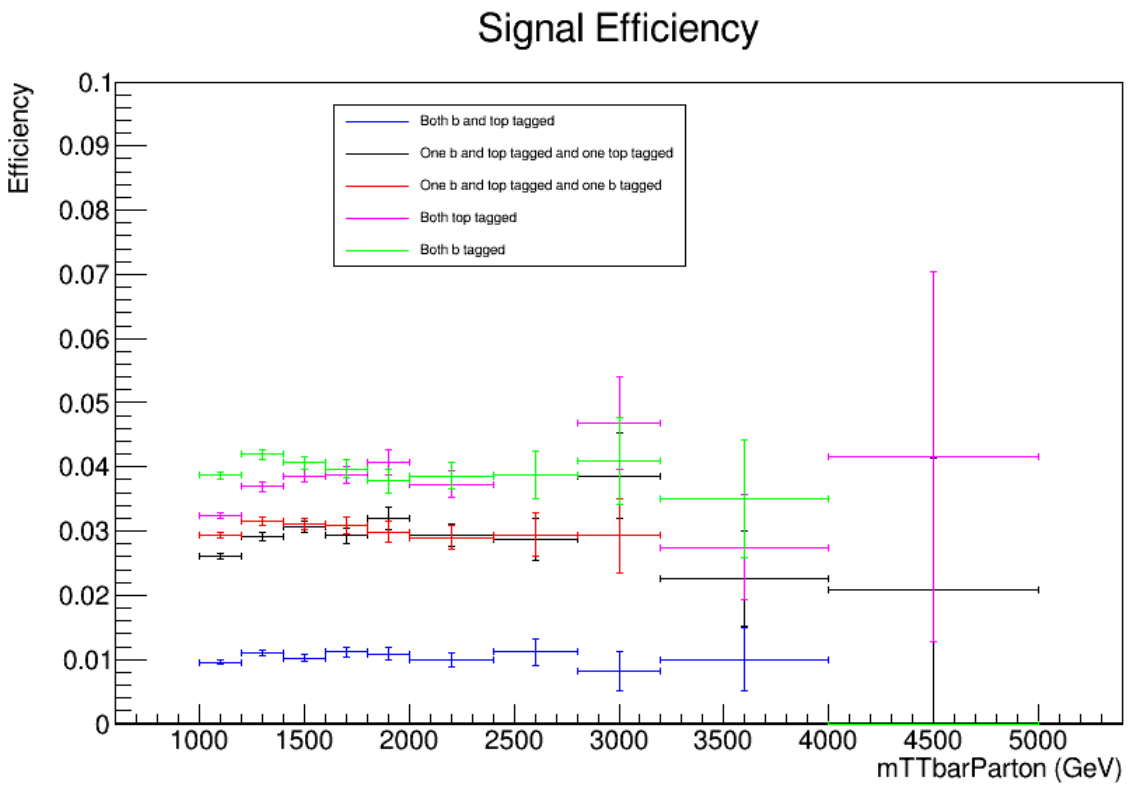


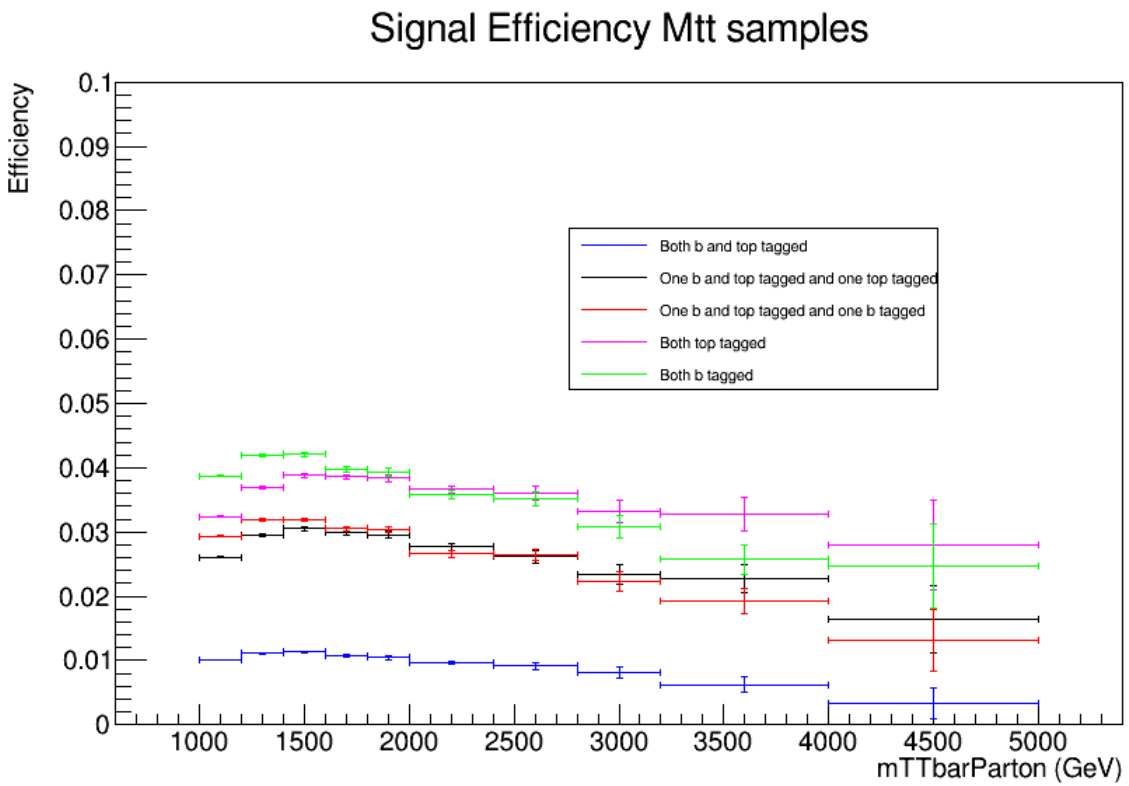
Efficiency vs mTTbarParton

Top tagger cut : 0.6
B-tagging: Medium working point

nominal TT_TuneCUETP8M2T4_13TeV-powherg-pythia8

Mtt Samples

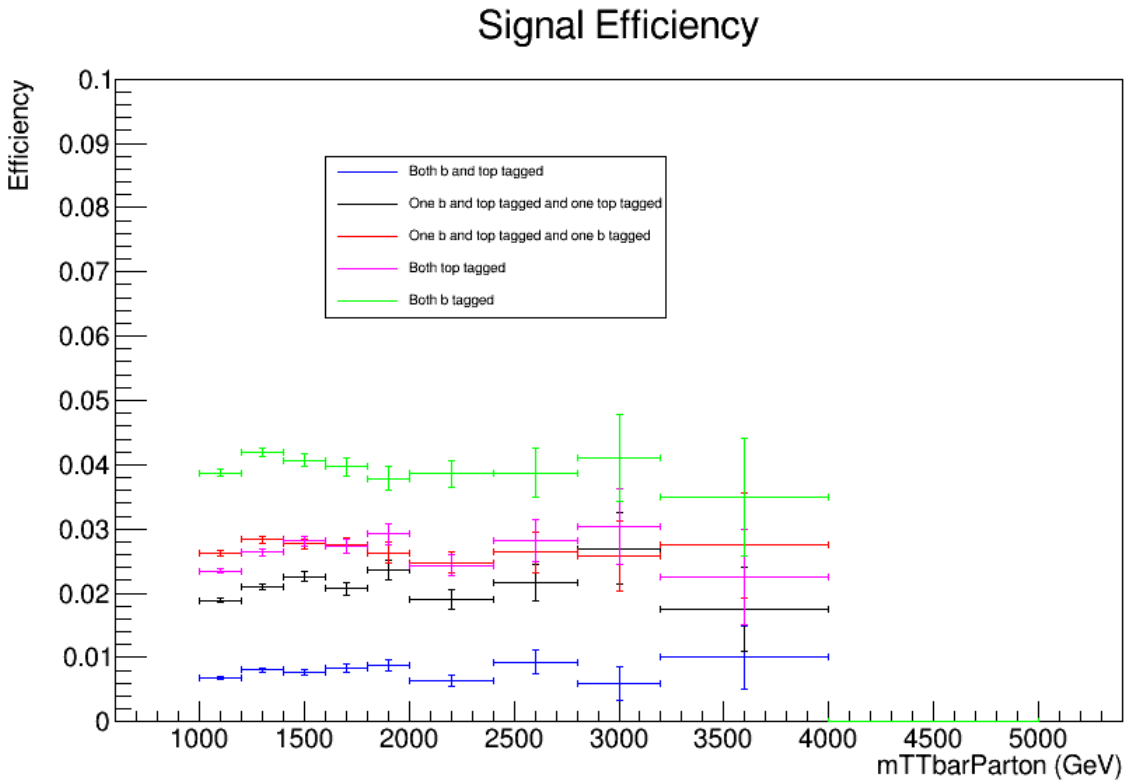




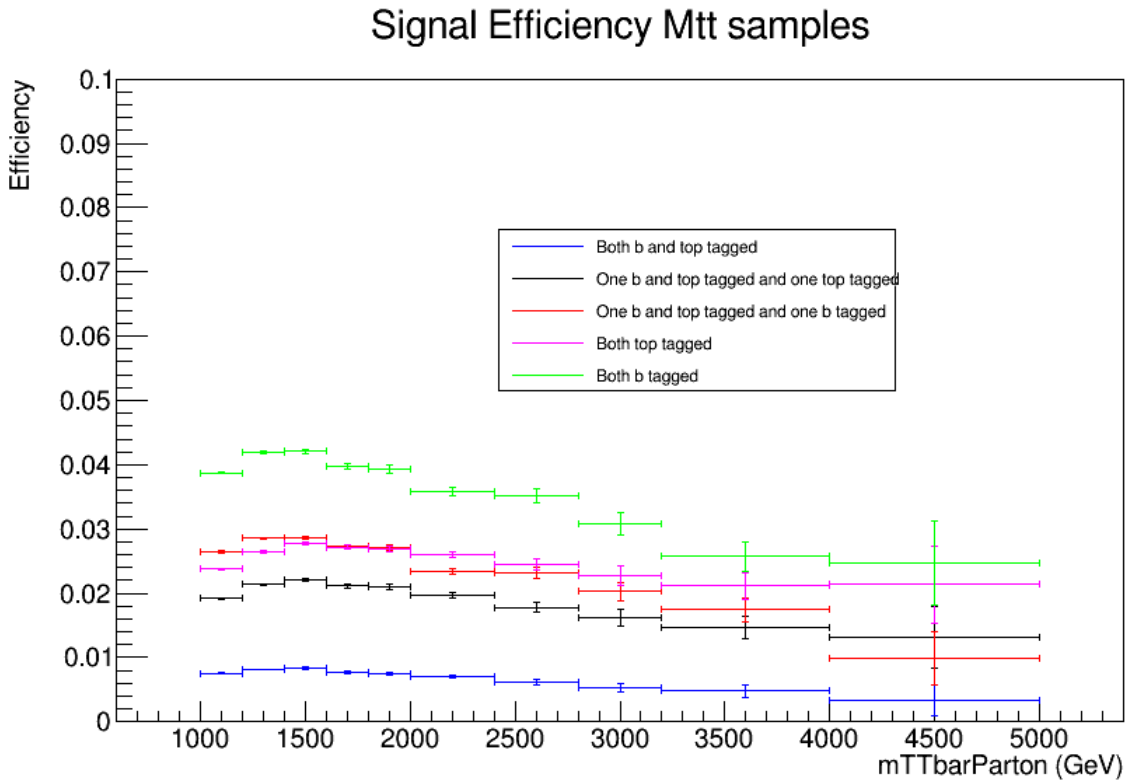
Efficiency vs mTTbarParton

Top tagger cut : 0.7
B-tagging: Medium working point

nominal TT_TuneCUETP8M2T4_13TeV-powherg-pythia8
Over Bkg (All Categories)



Mtt Samples

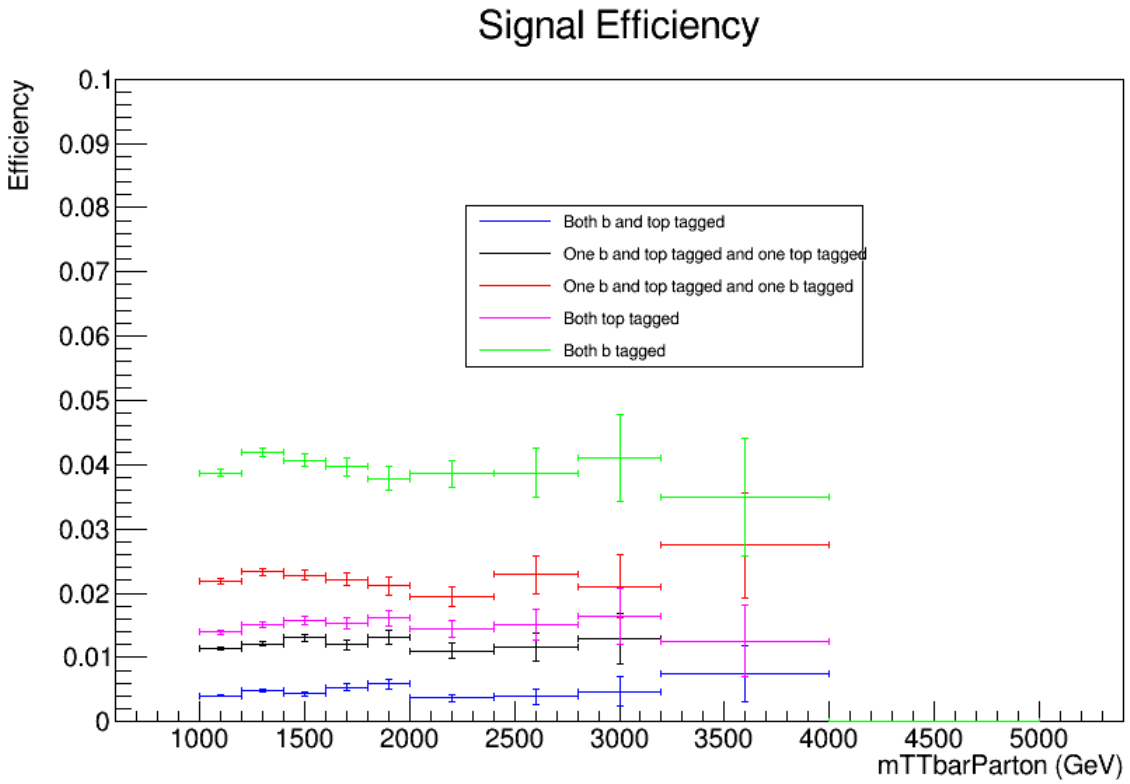


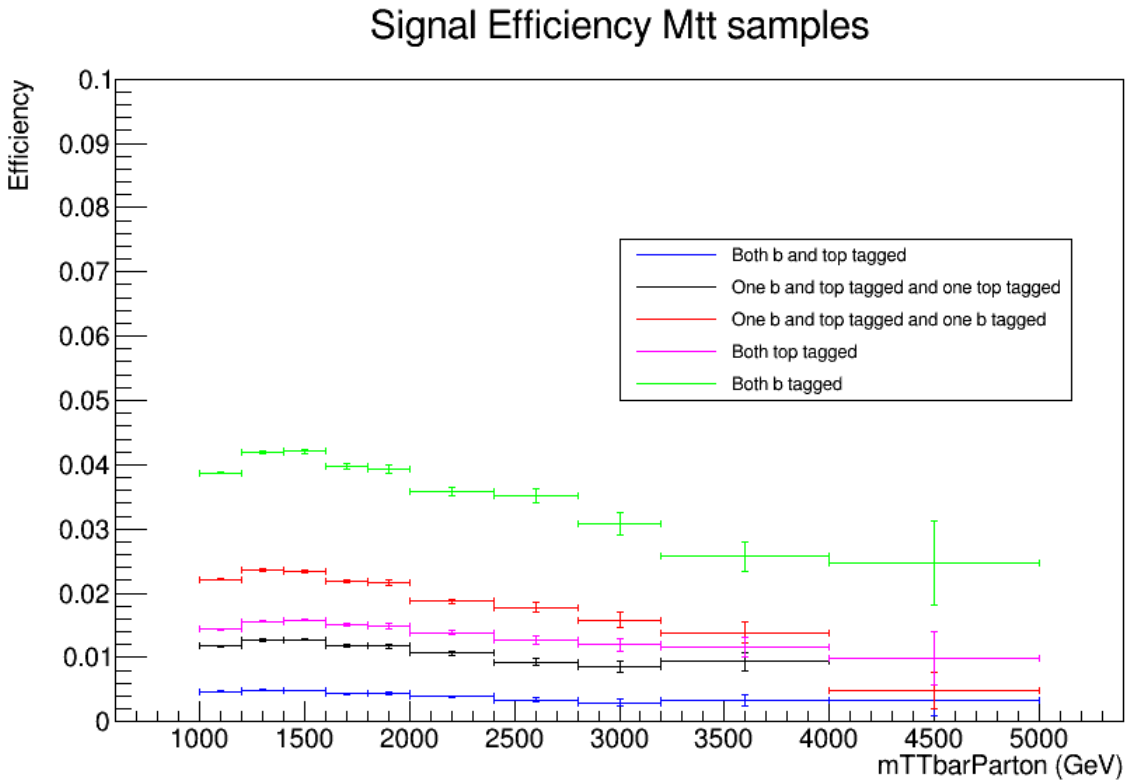
Efficiency vs mTTbarParton

Top tagger cut : 0.8
B-tagging: Medium working point

nominal TT_TuneCUETP8M2T4_13TeV-powherg-pythia8

Mtt Samples

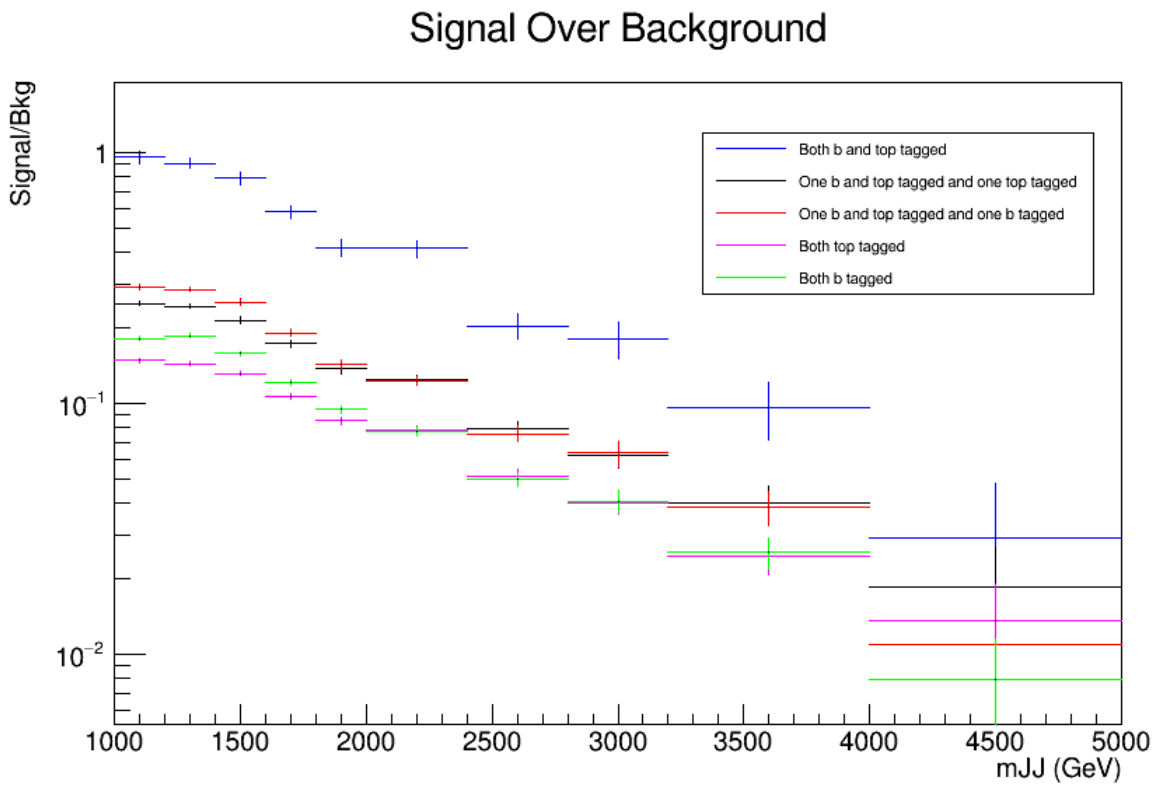




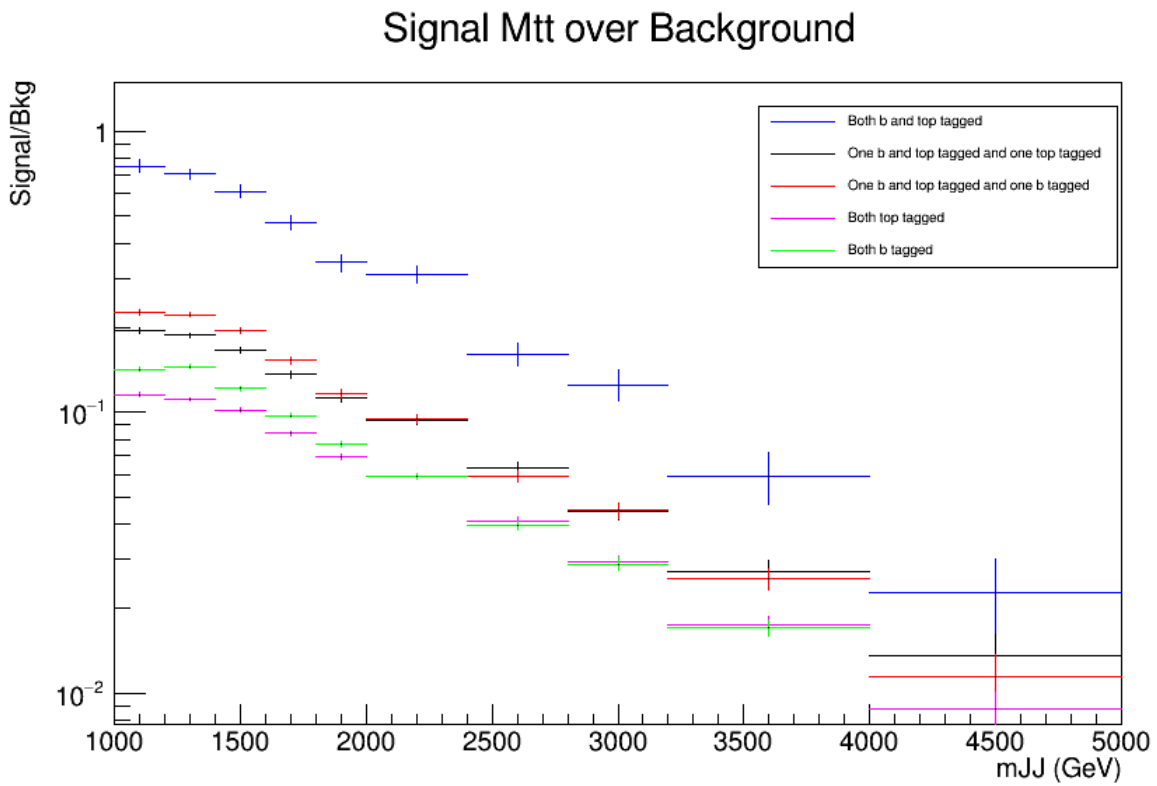
Signal over Bkg for mJJ (reco)

Top tagger cut : 0.0
B-tagging: Loose working point

nominal TT_TuneCUETP8M2T4_13TeV-powherg-pythia8
Over Bkg (All Categories)



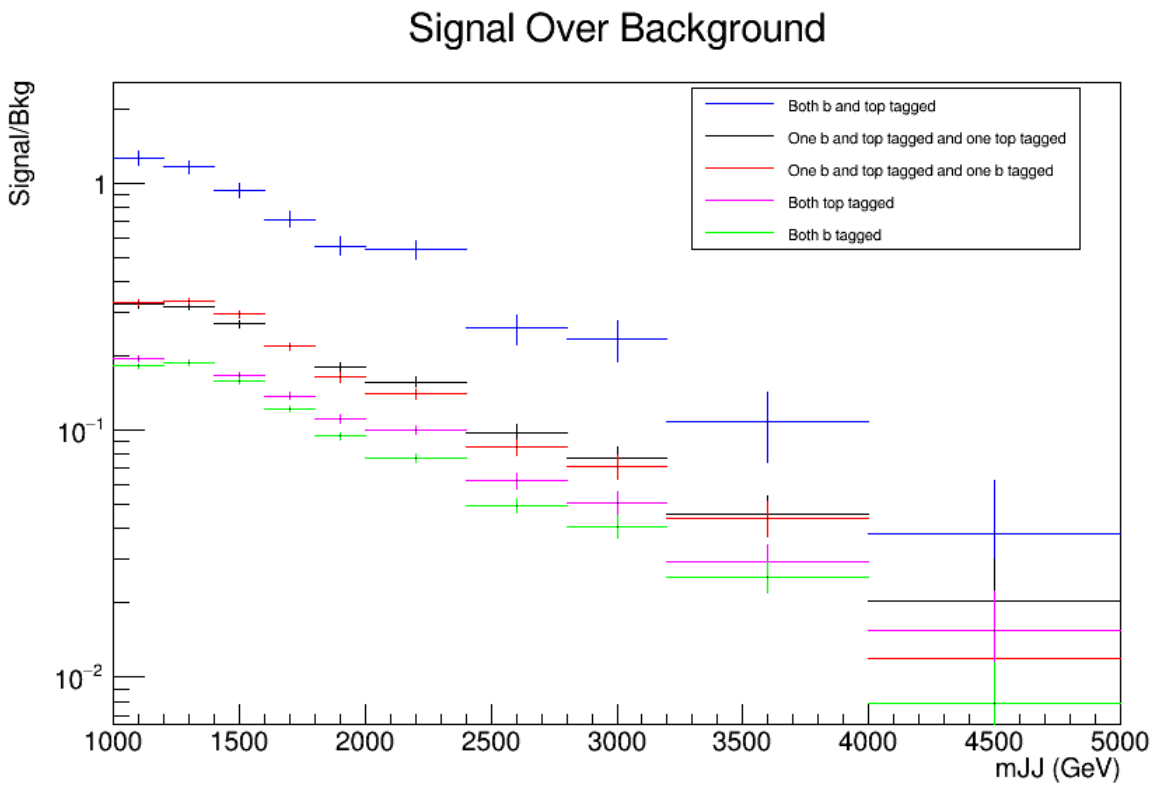
Mtt Samples



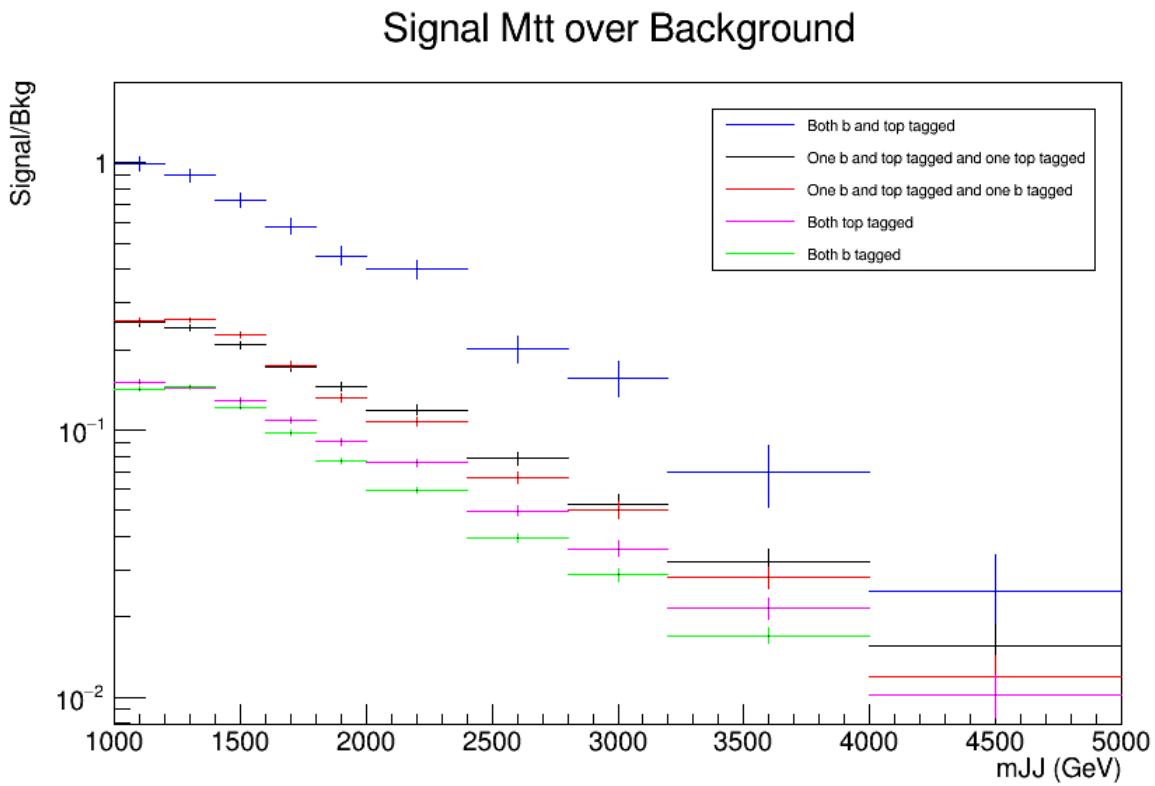
Signal over Bkg for mJJ (reco)

Top tagger cut : 0.1
B-tagging: Loose working point

nominal TT_TuneCUETP8M2T4_13TeV-powherg-pythia8
Over Bkg (All Categories)



Mtt Samples



Signal over Bkg for mJJ (reco)

Top tagger cut : 0.2
B-tagging: Loose working point

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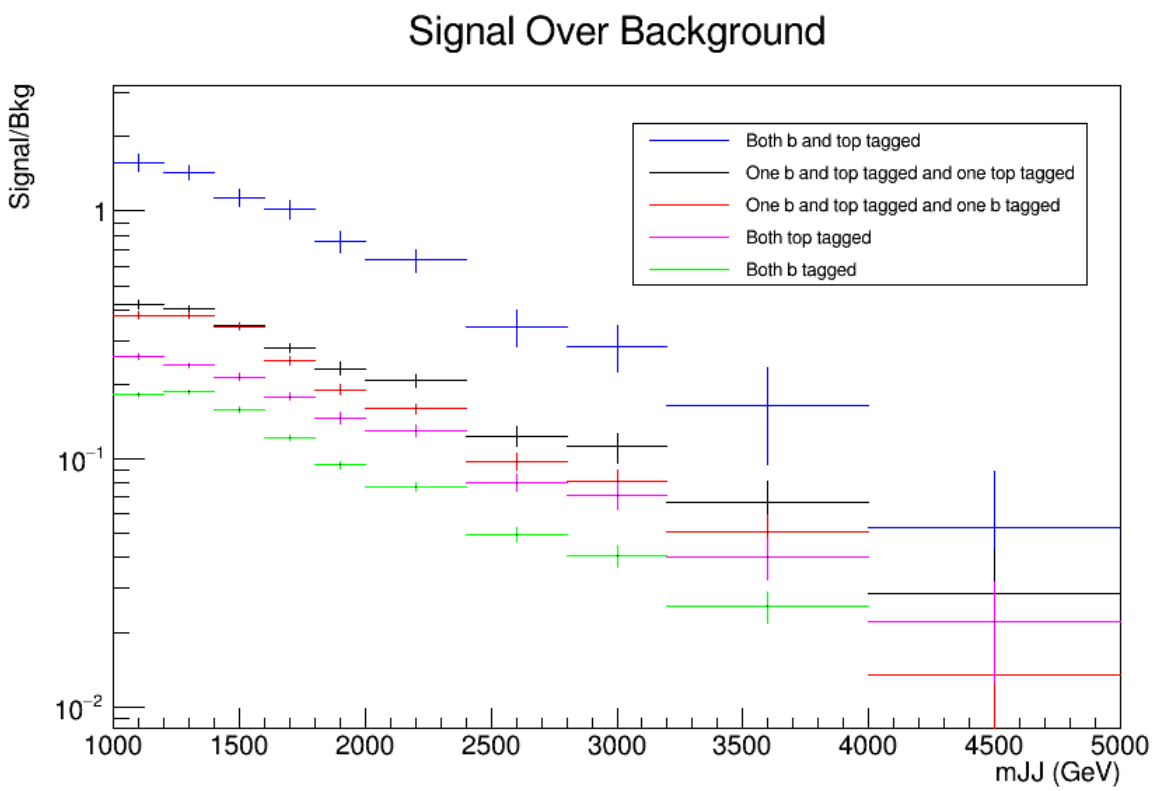
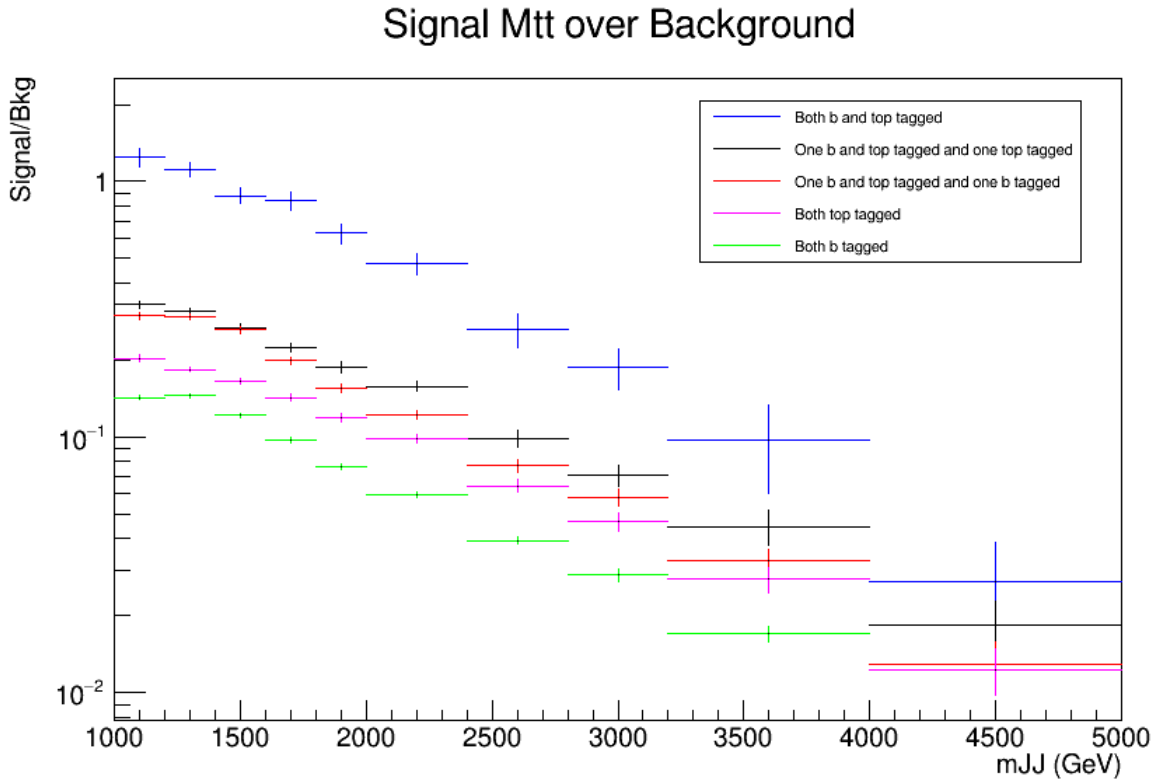
Over Bkg (All Categories)



Mtt Samples



Signal over Bkg for mJJ (reco)

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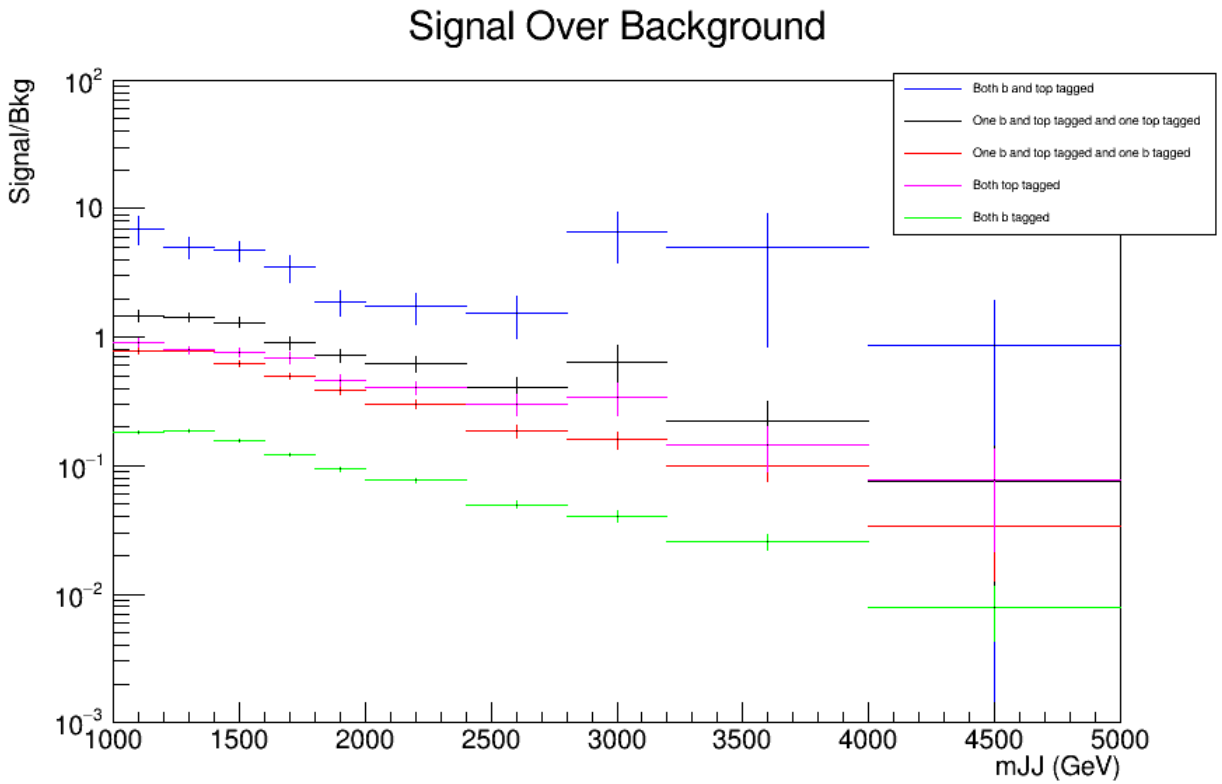
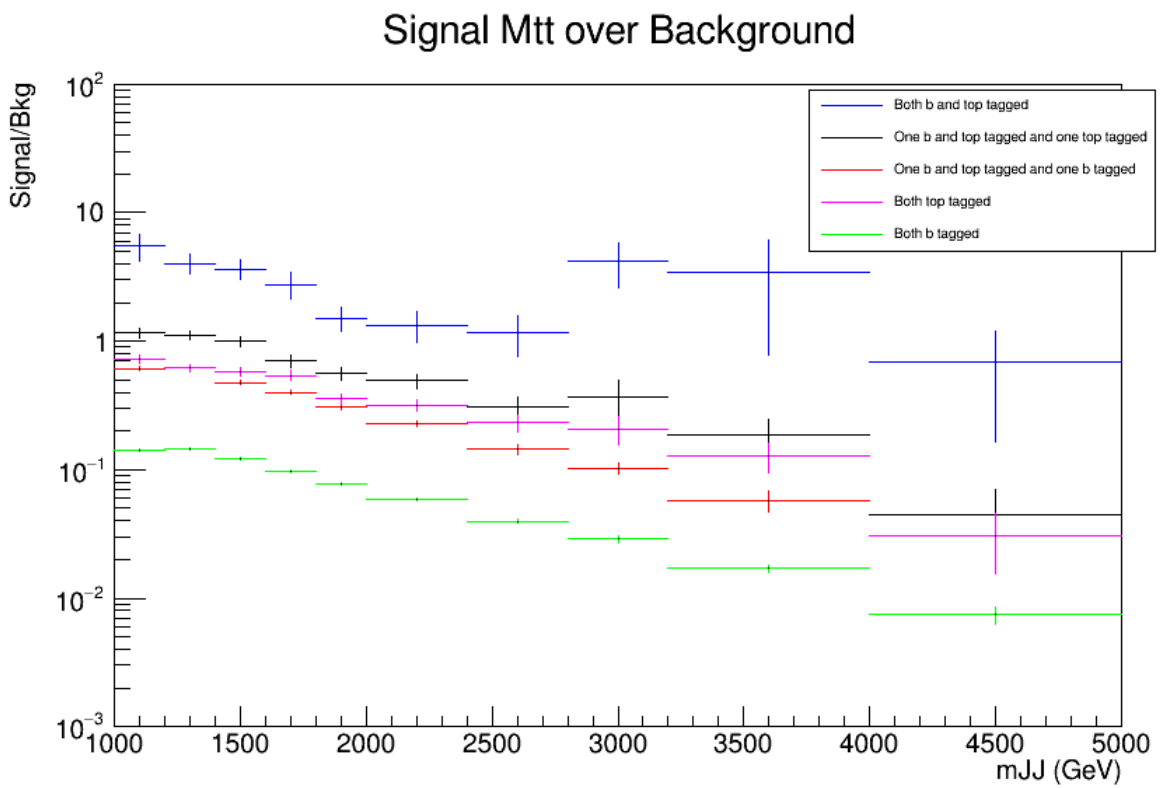
Over Bkg (All Categories)

Mtt Samples





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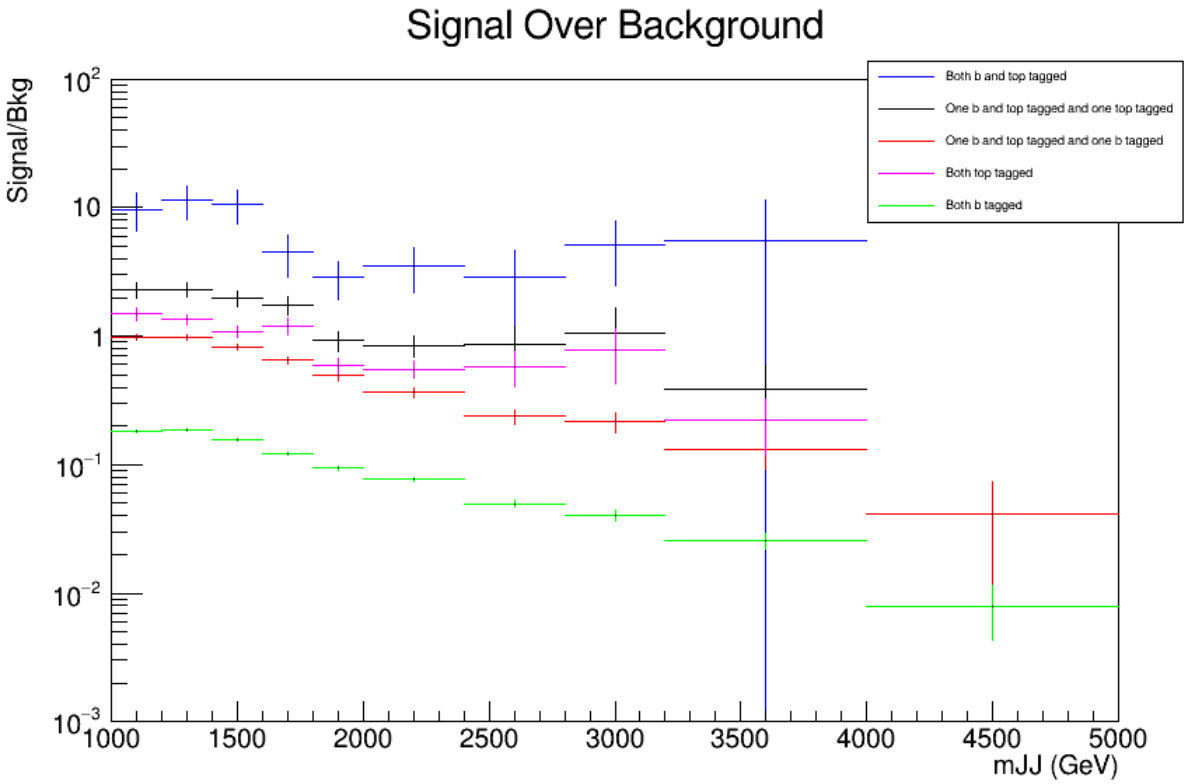
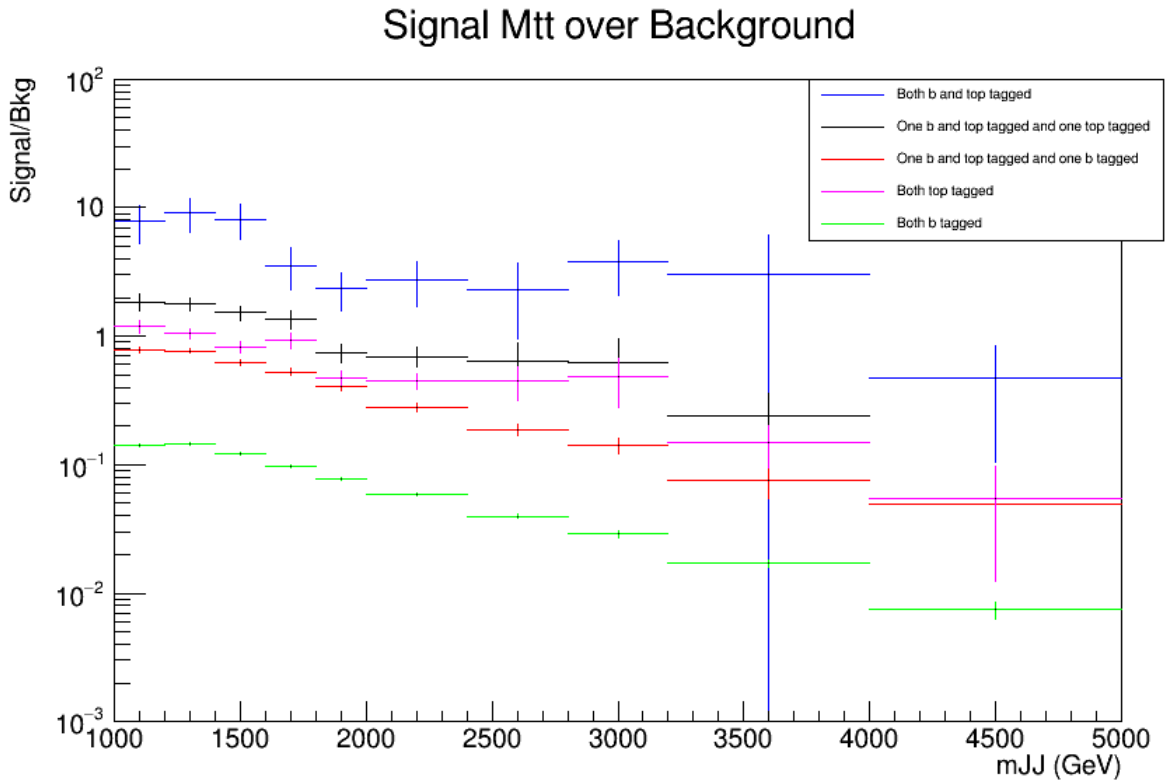
Mtt Samples





Signal over Bkg for mJJ (reco)

Top tagger cut : 0.8
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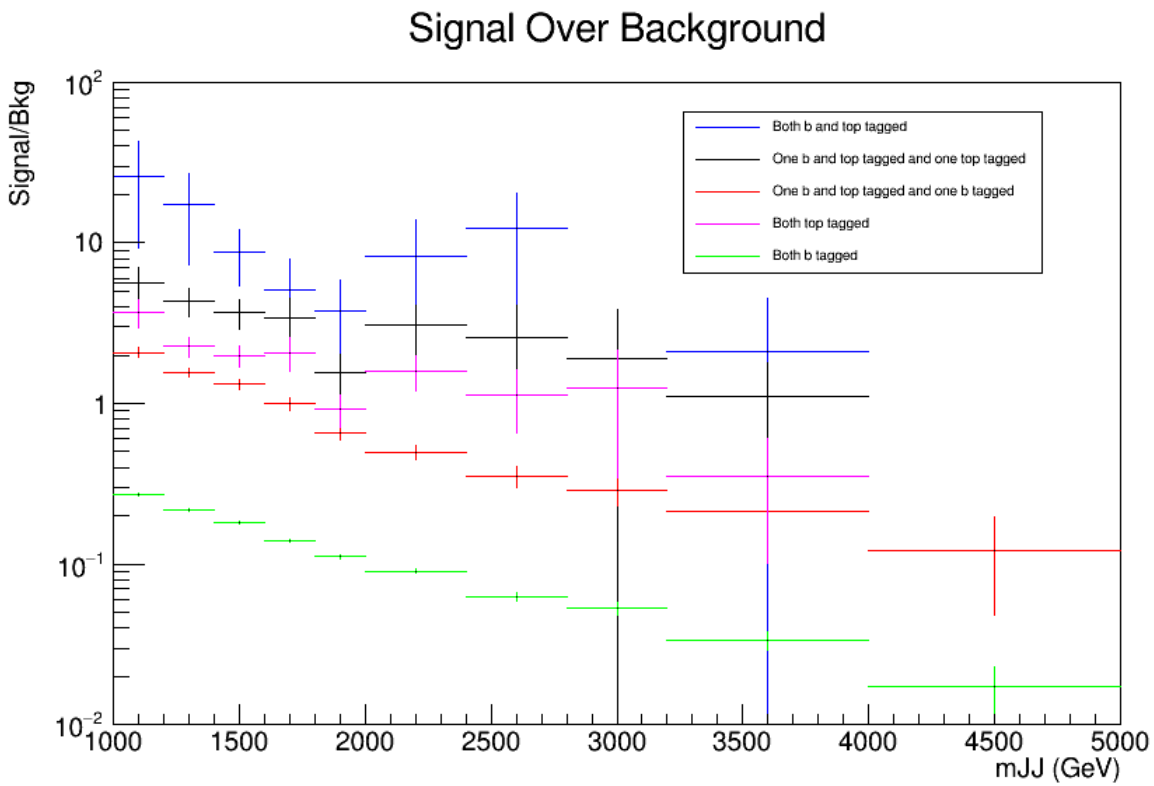
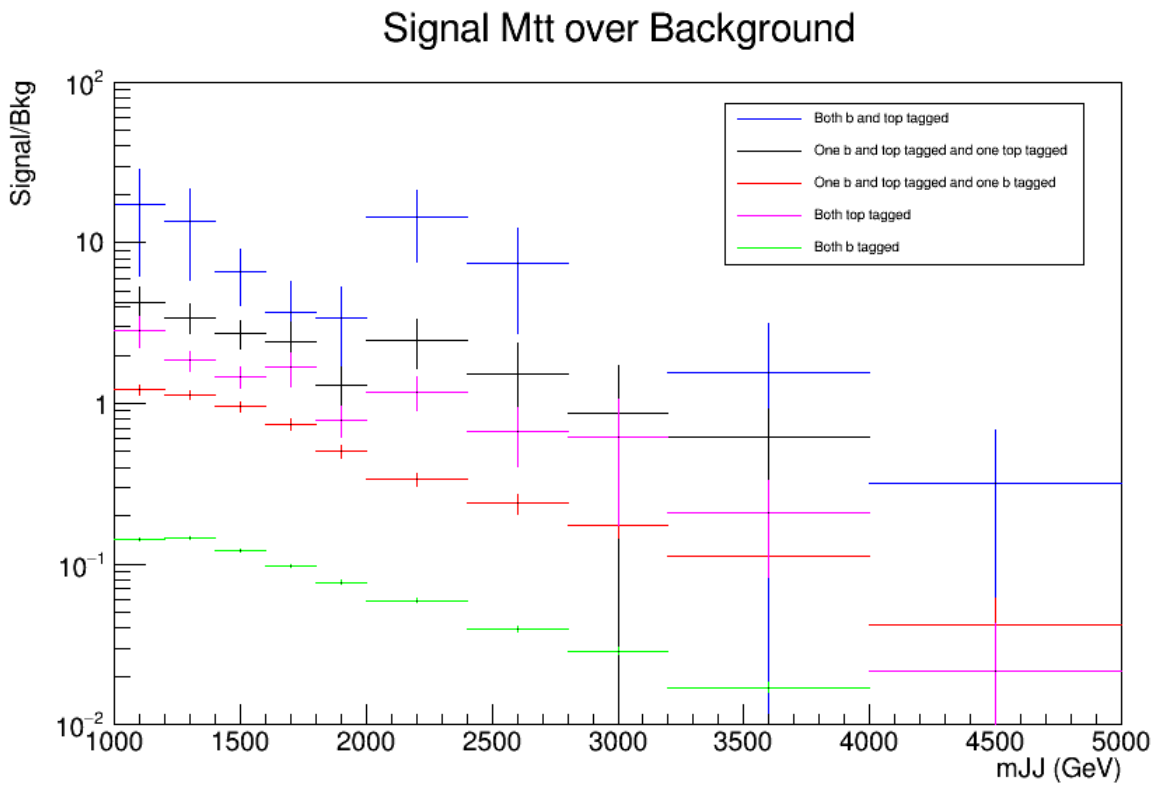
Over Bkg (All Categories)



Mtt Samples



Signal over Bkg for mJJ (reco)

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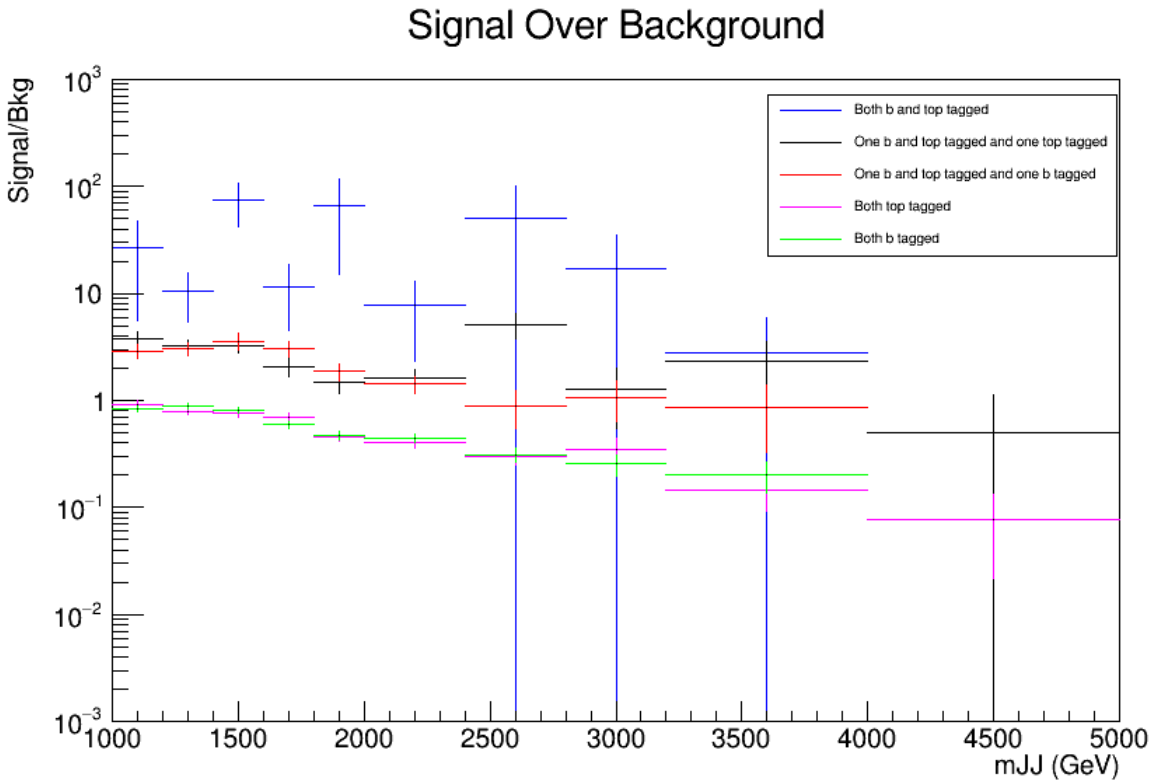
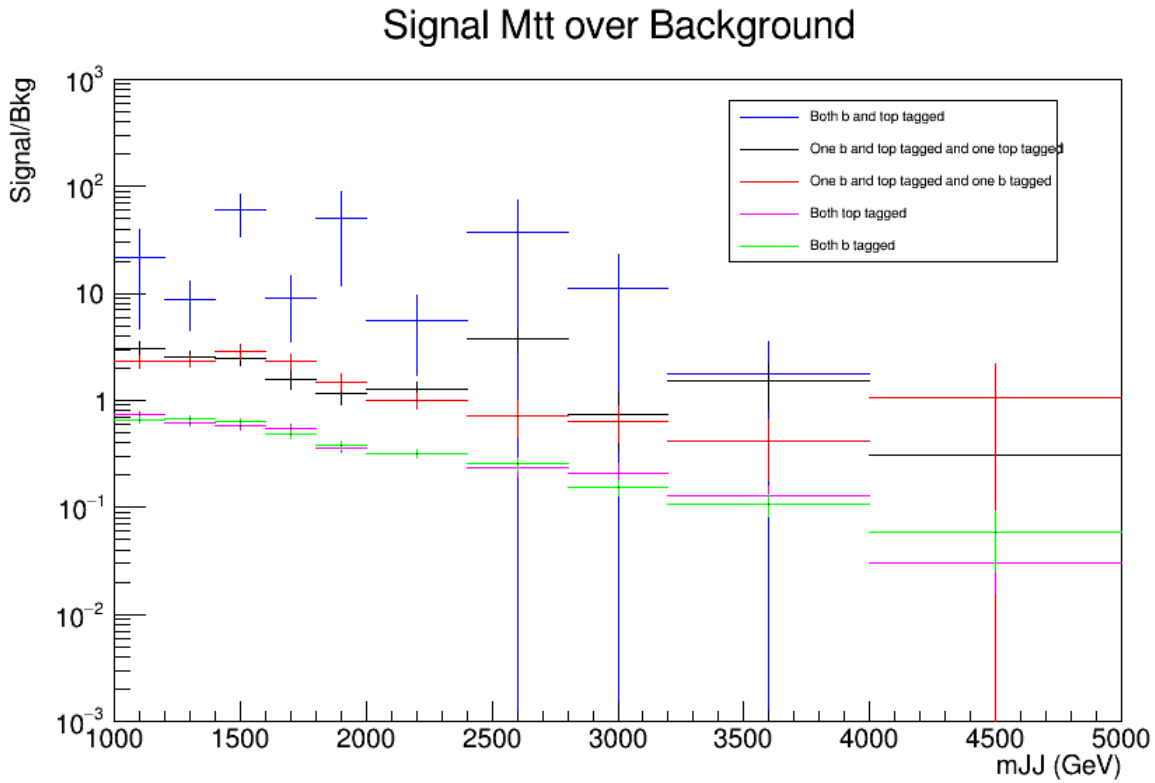


Mtt Samples



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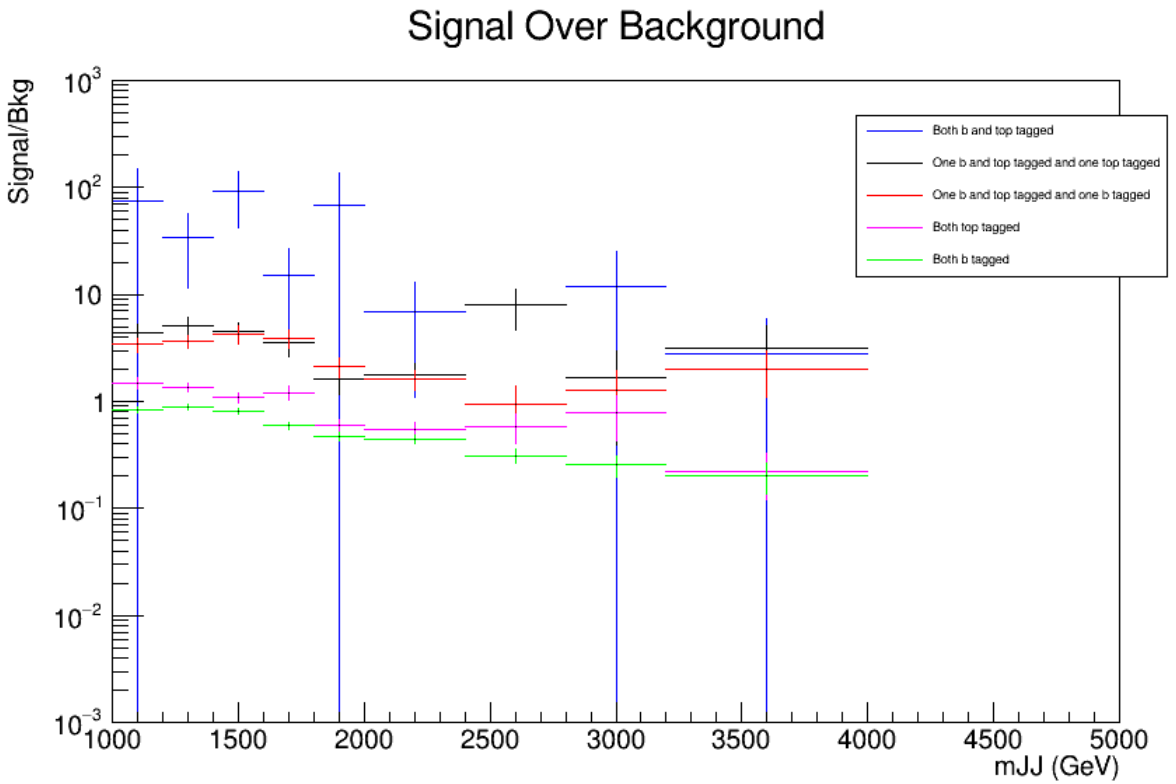
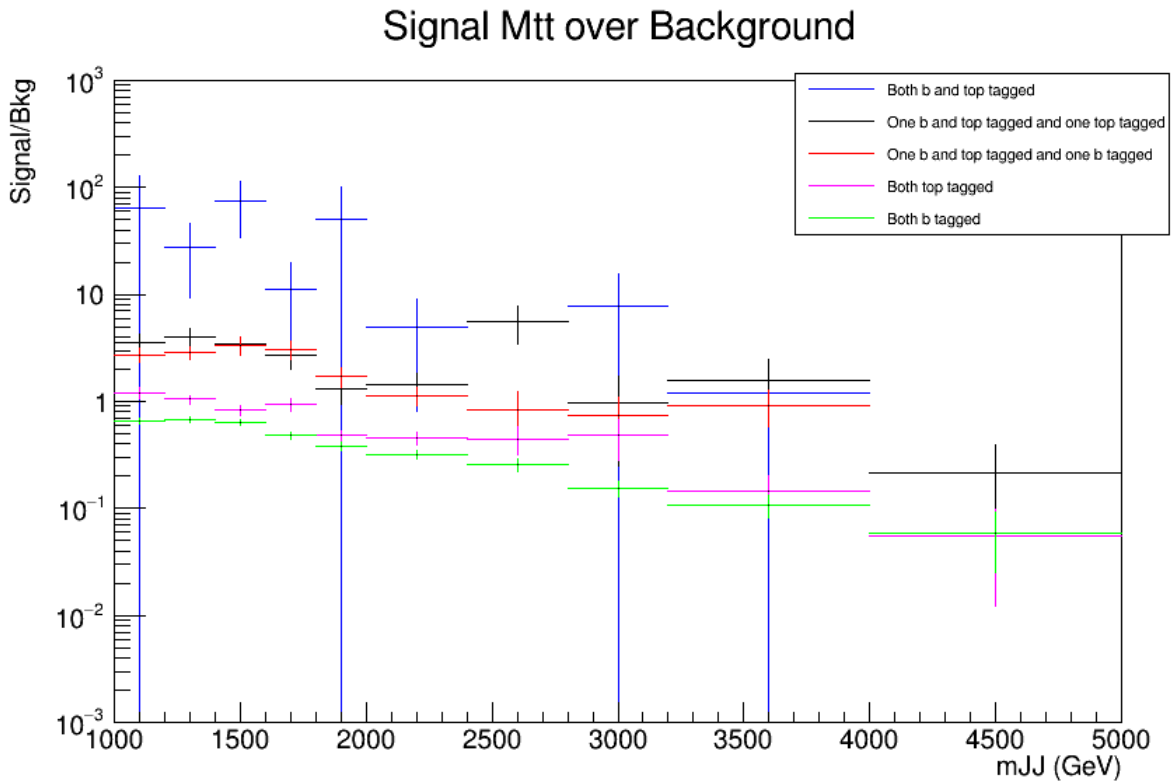


Mtt Samples



Signal over Bkg for mJJ (reco)

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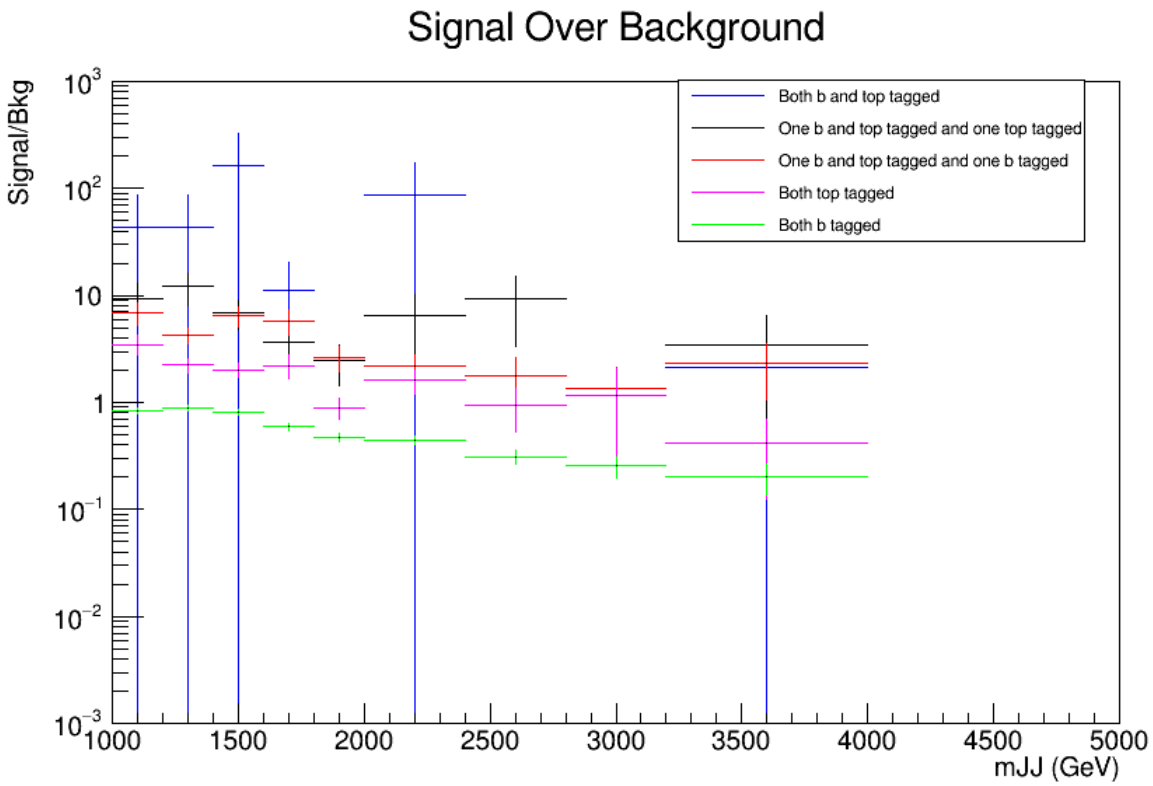
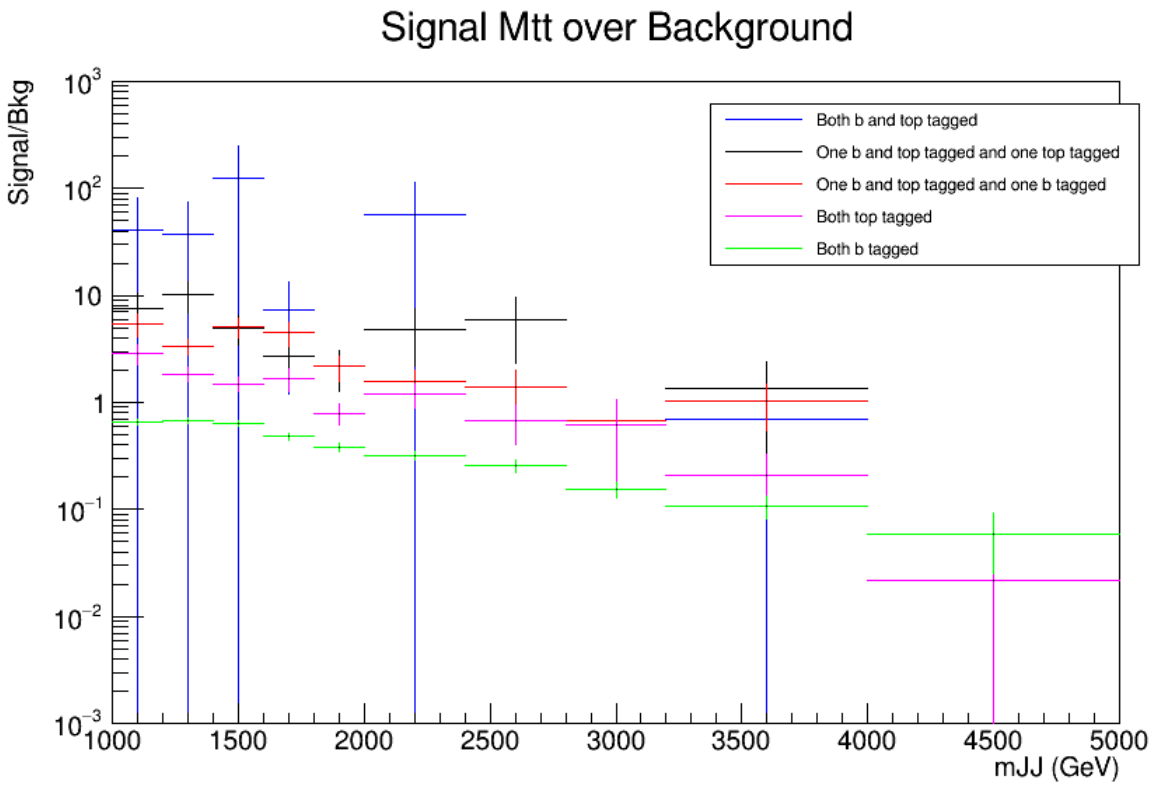
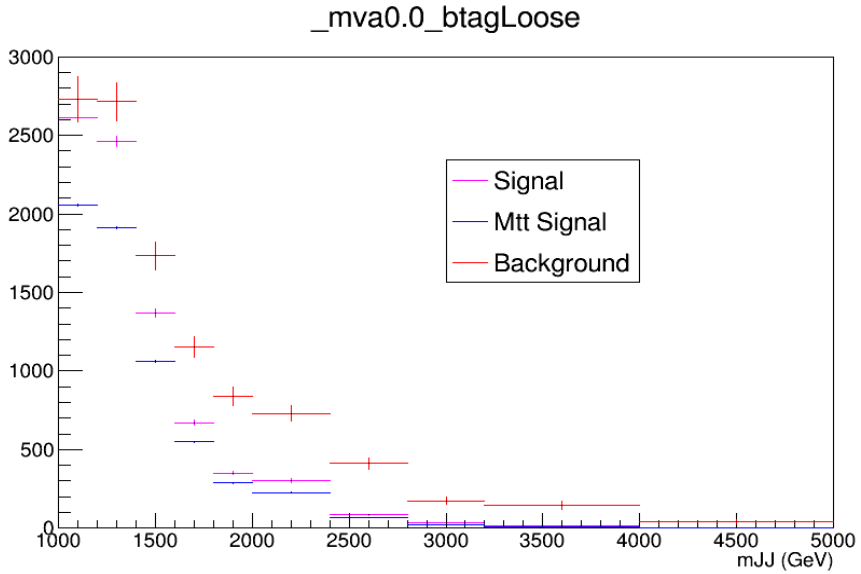
Over Bkg (All Categories)

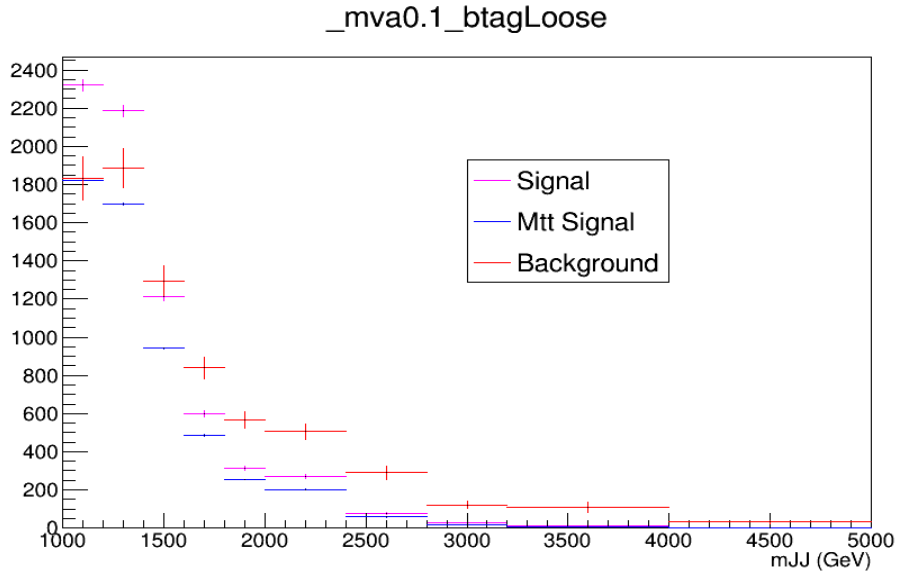
Mtt Samples

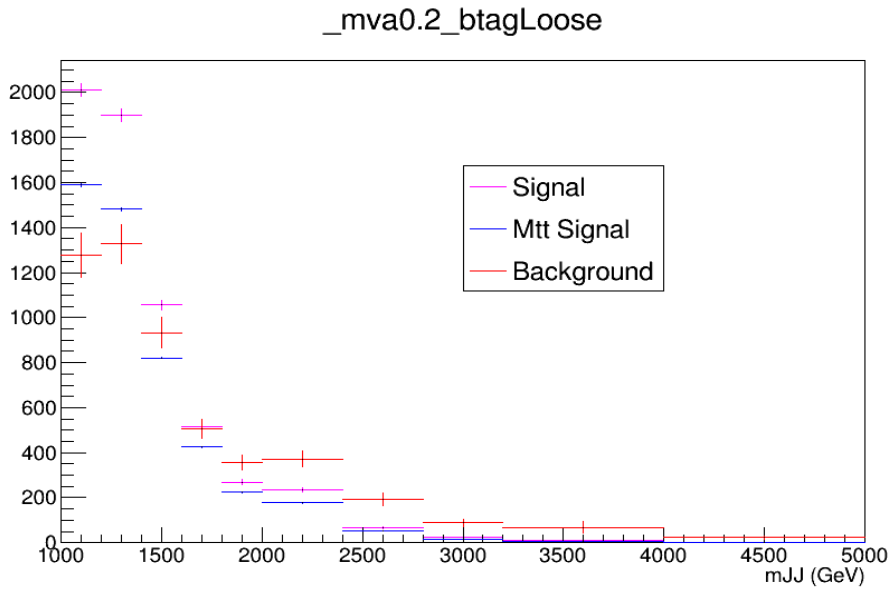




Yields for Combinations of mva and b tagging





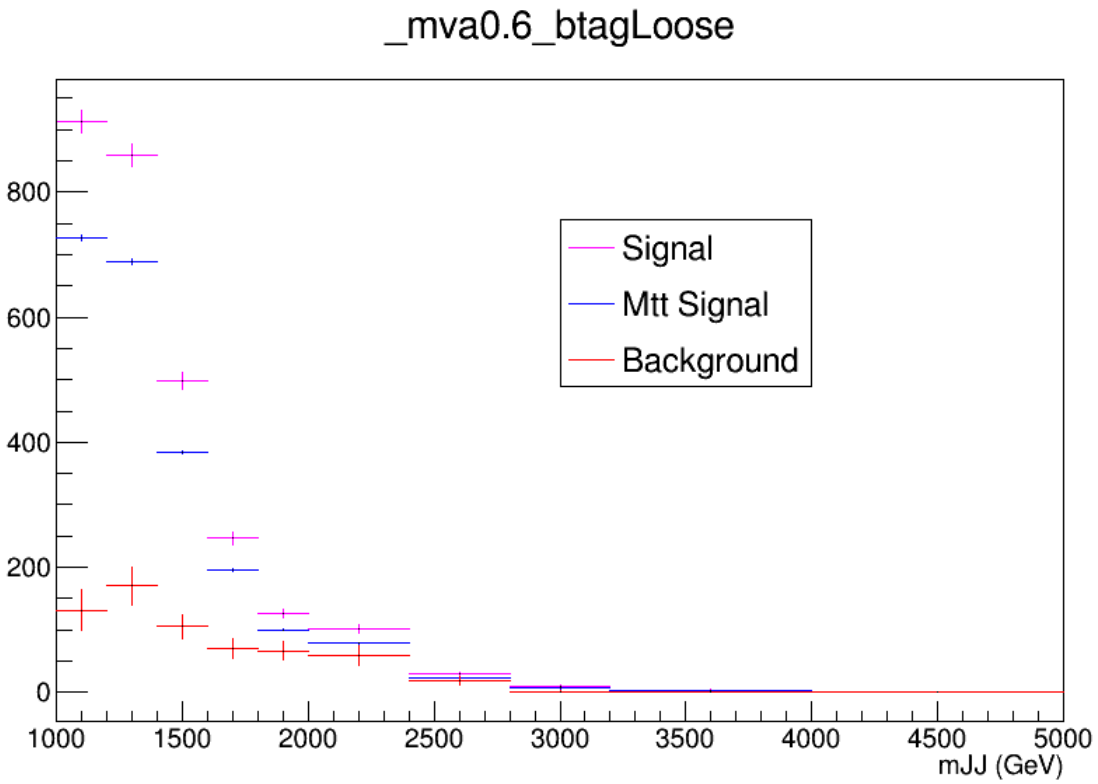


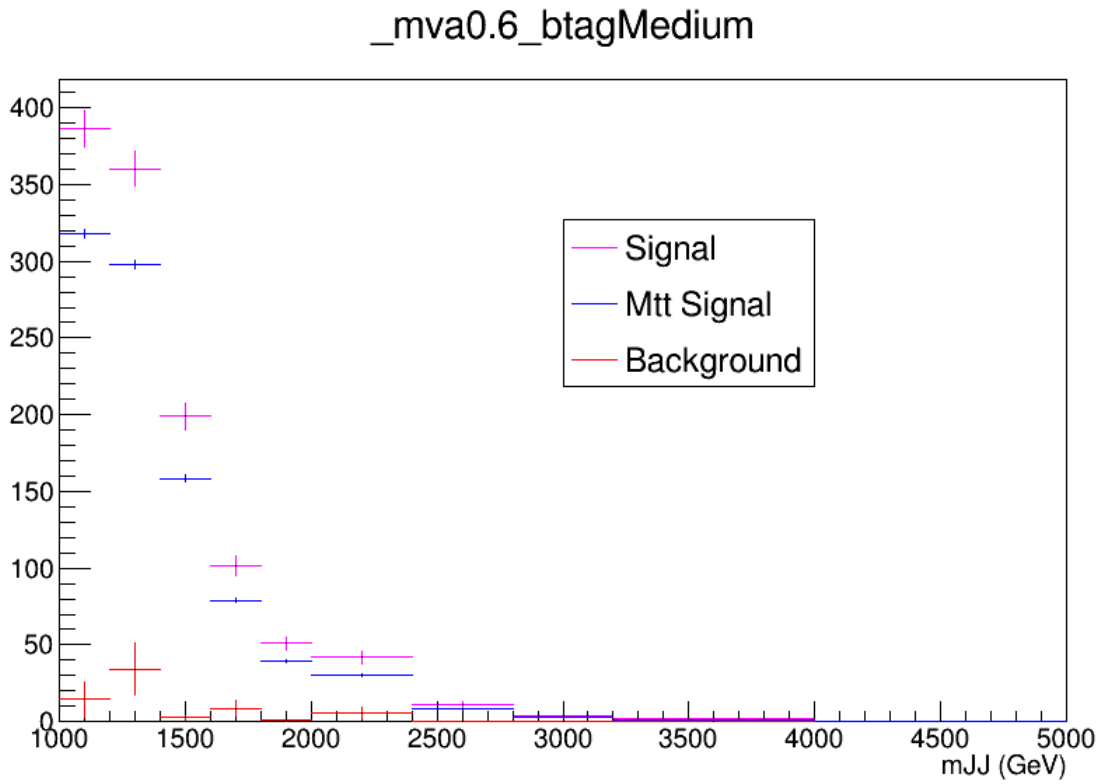
<u>Yield</u> is extracted scaling as:

$$Hist \rightarrow Scale\left(\frac{Lumi\ *XS}{GenEvents}\right)$$

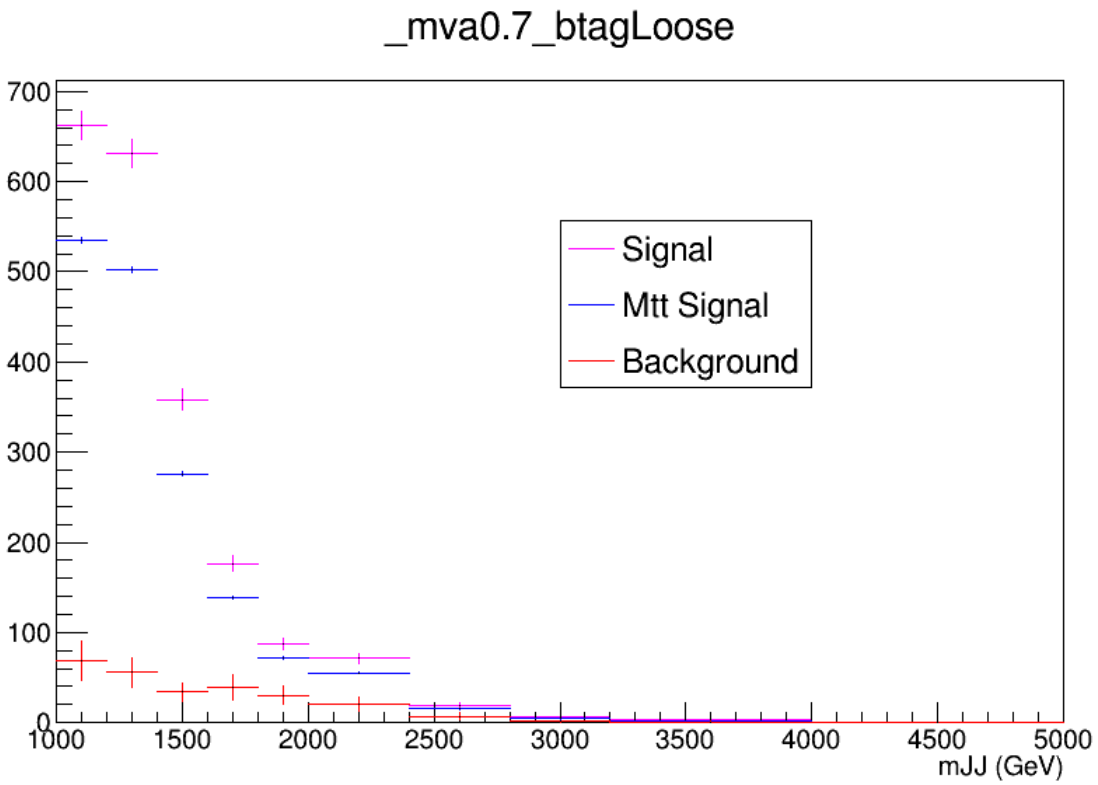
With Lumi = 35.9 fb^{-1}

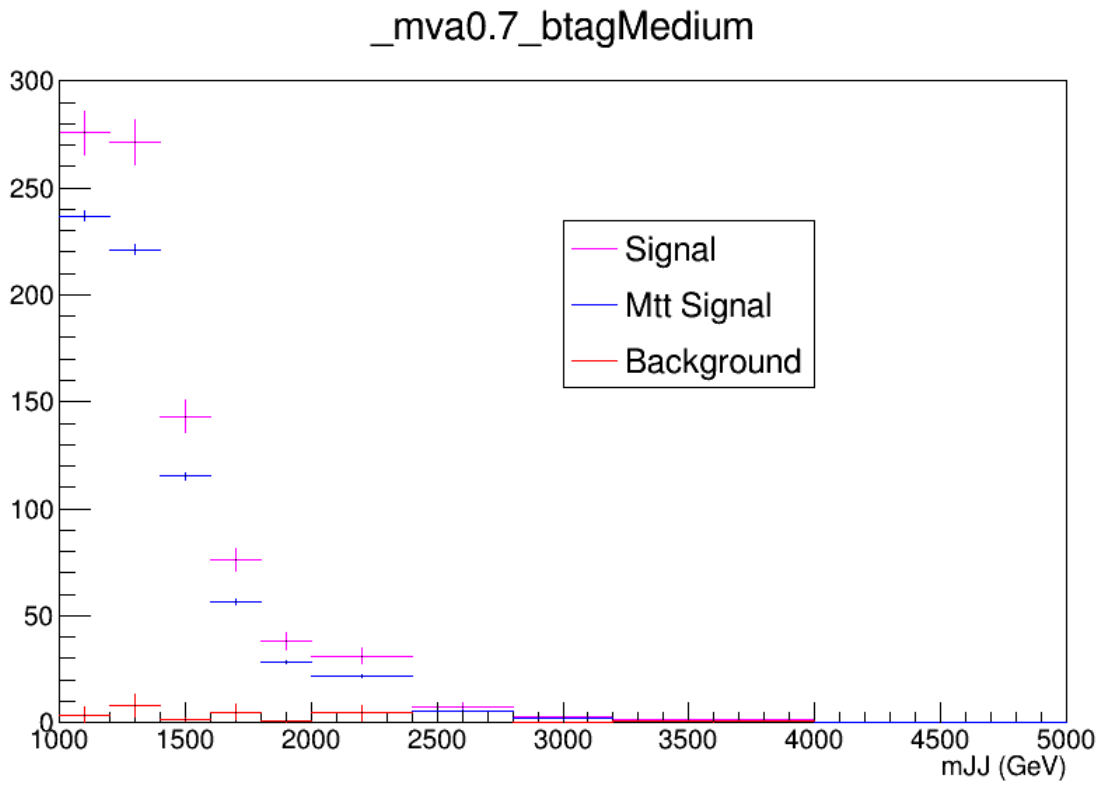
Yields for Combinations of mva and b tagging





Yields for Combinations of mva and b tagging





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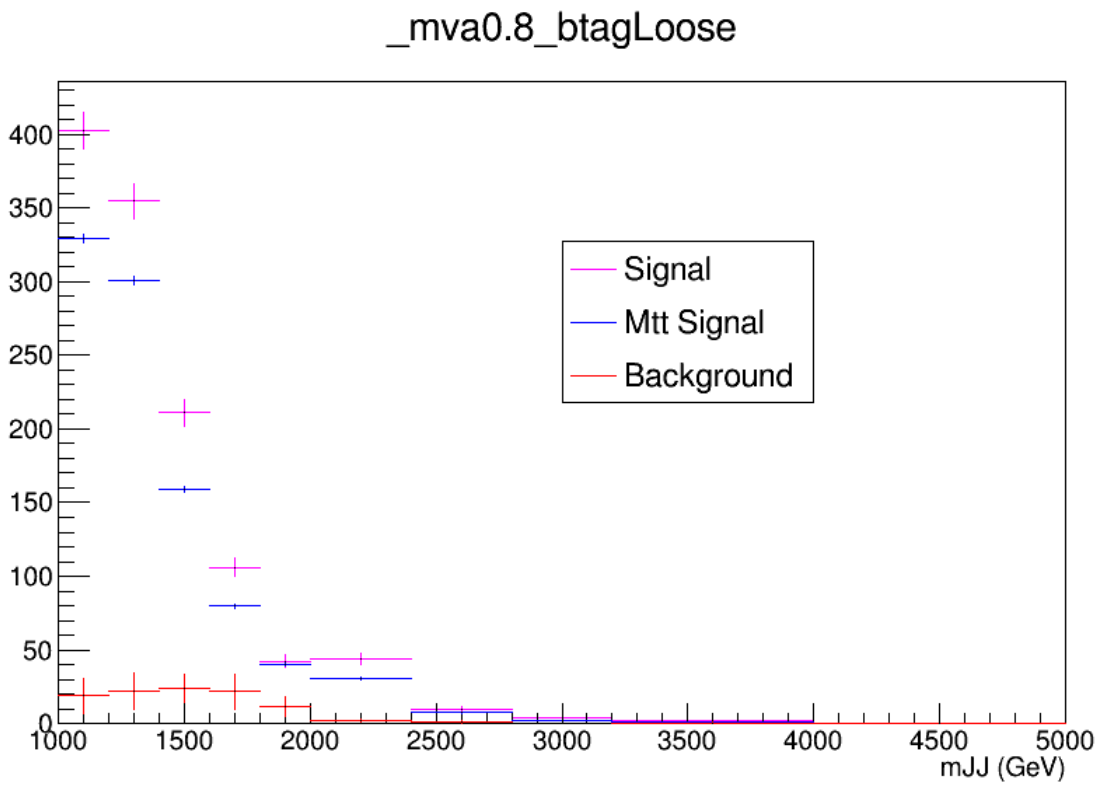
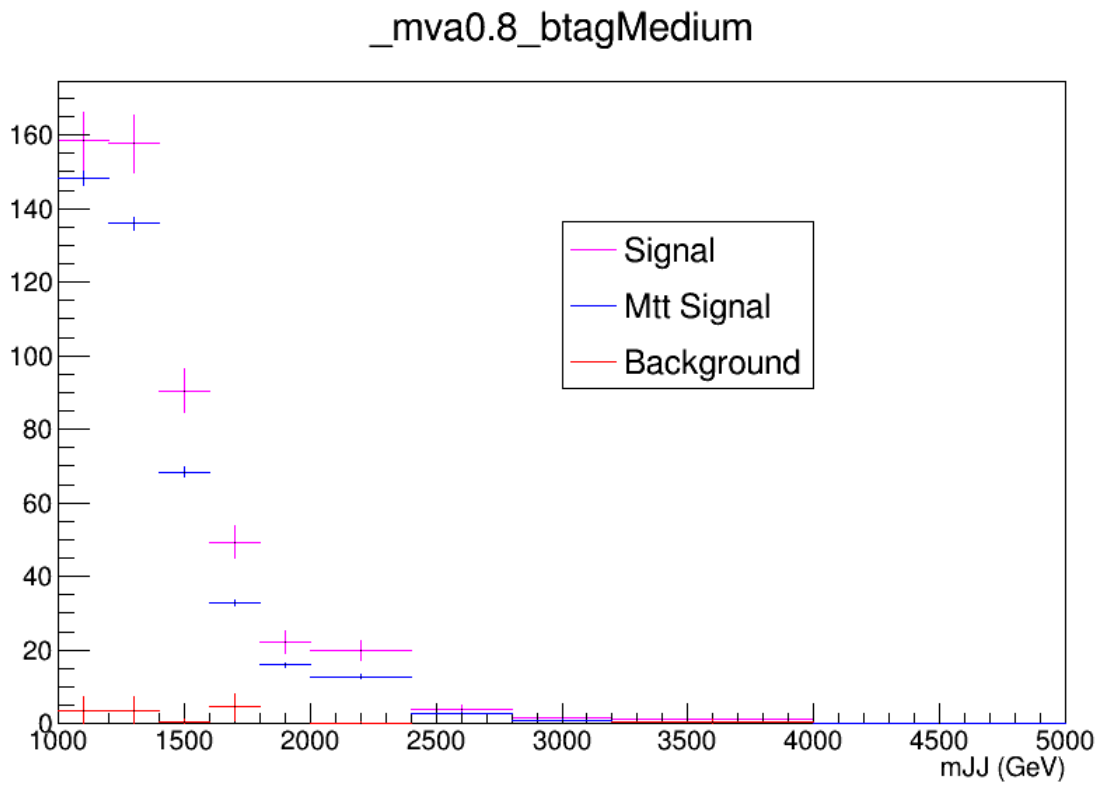
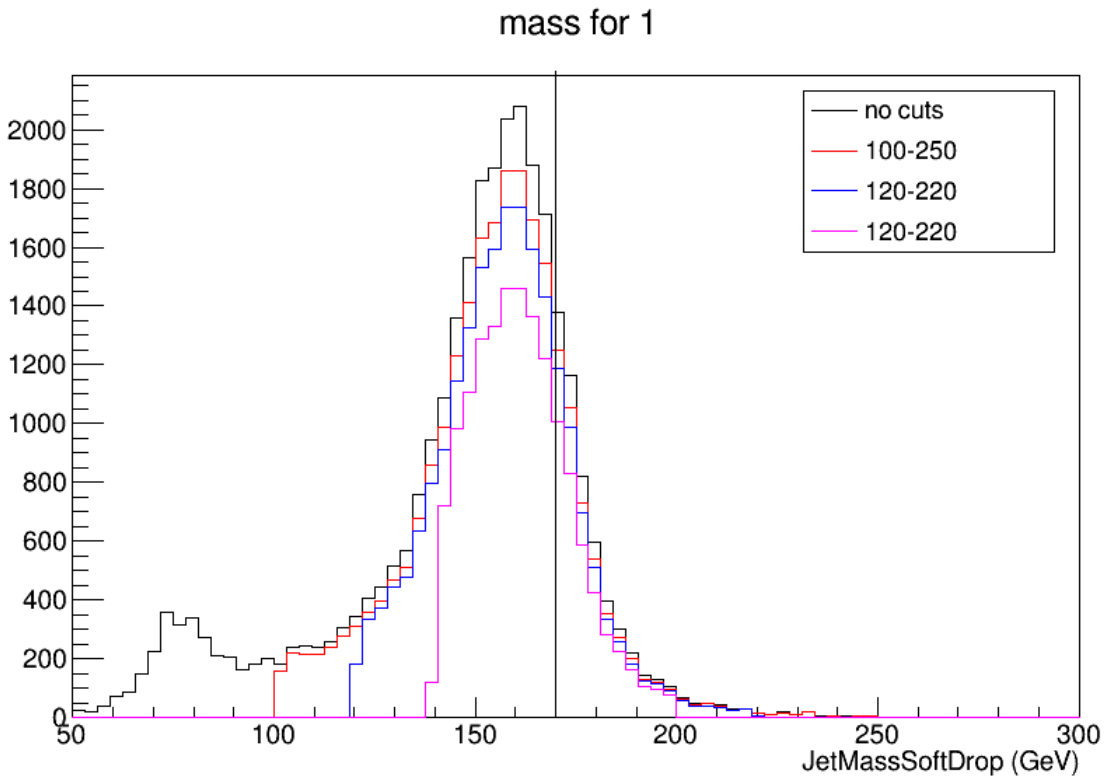
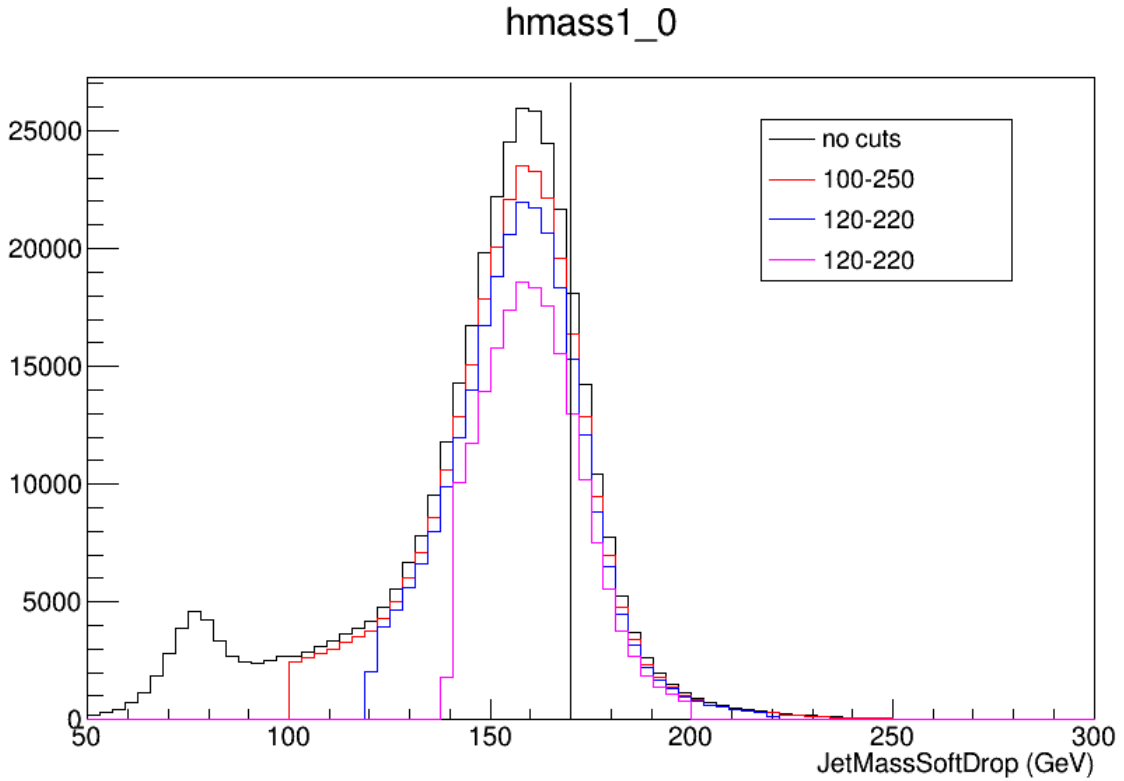




JetMass Soft Drop for different mass windows





The line is located at 170 GeV to show that the mass peak is shifted to the left. (For the nominal Sample):
Mean value with no cuts: 147.509 GeV
Mean value 100-250: 154.766 GeV
Mean value 120-220: 157.318 GeV
Mean value 140-200: 161.227 GeV

For the MTT sample:
Mean value with no cuts: 147.531 GeV
Mean value 100-250: 154.693 GeV
Mean value 120-220: 157.377 GeV
Mean value 140-200: 161.126 GeV