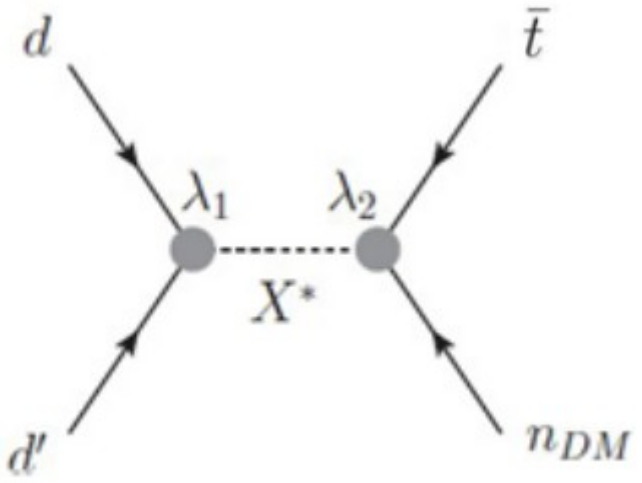
Dark Matter with Monotop + MET (Muon Channel)



Nitish Dhingra

Analysis Workflow

- Madgraph Version: MG_5_v1_5_14

- Process Card:
  import model sm
  define p = g u c d s u~ c~ d~ s~
  import model baryogenX2N1MajFullCouplings_UFO
  define X = X1
  define bquark = b b~
  define muon = mu+ mu-
  define neut_m = vm vm~
  define nDM = n
  generate p p > X > muon neut_m bquark nDM

- Generated 20K events (M_{X1} = 1 TeV, $\lambda_1 = \lambda_2$ = 0.1)

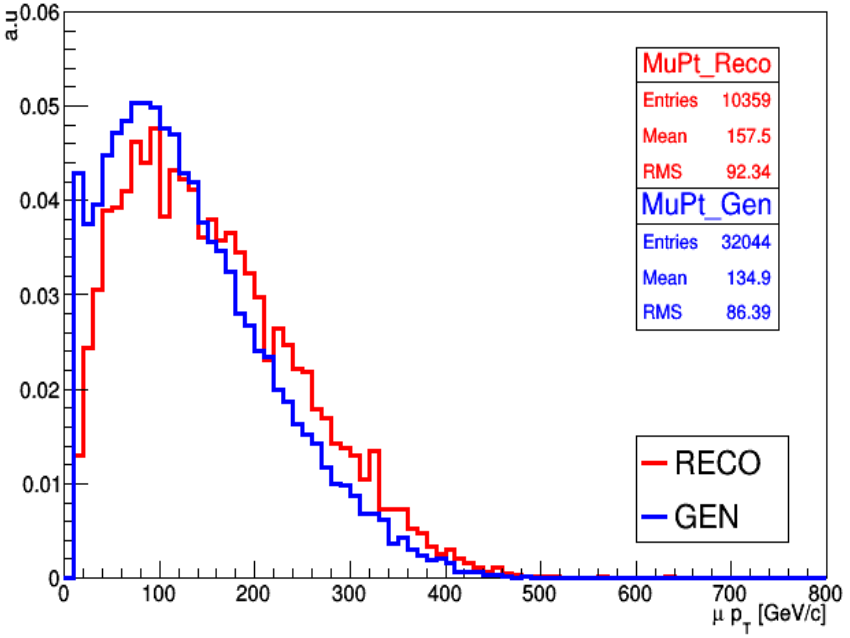
- Processed with Pythia8 for hadronization

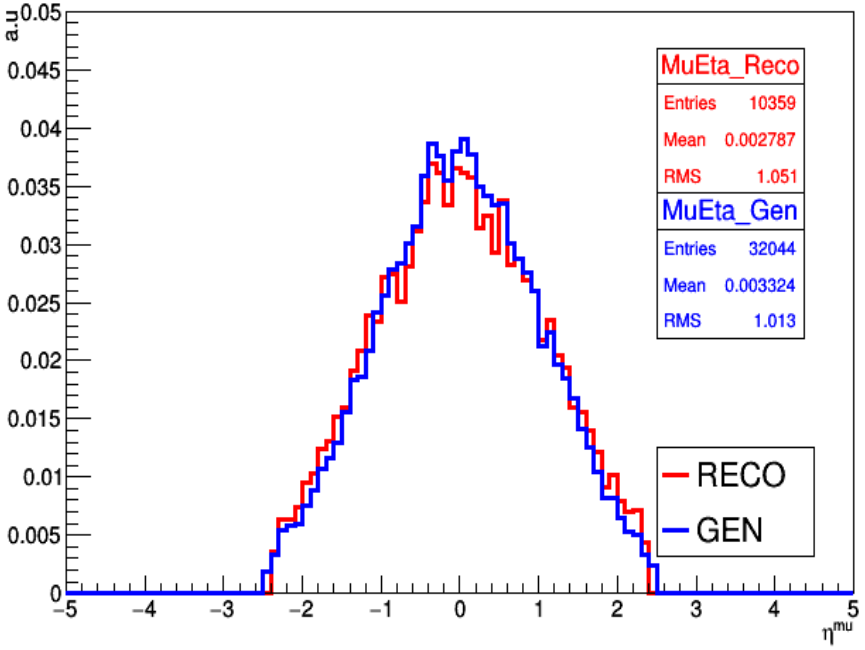
- Detector simulation with Delphes-3.2.0

- Default CMS detector card with following b-tagging efficiency settings:

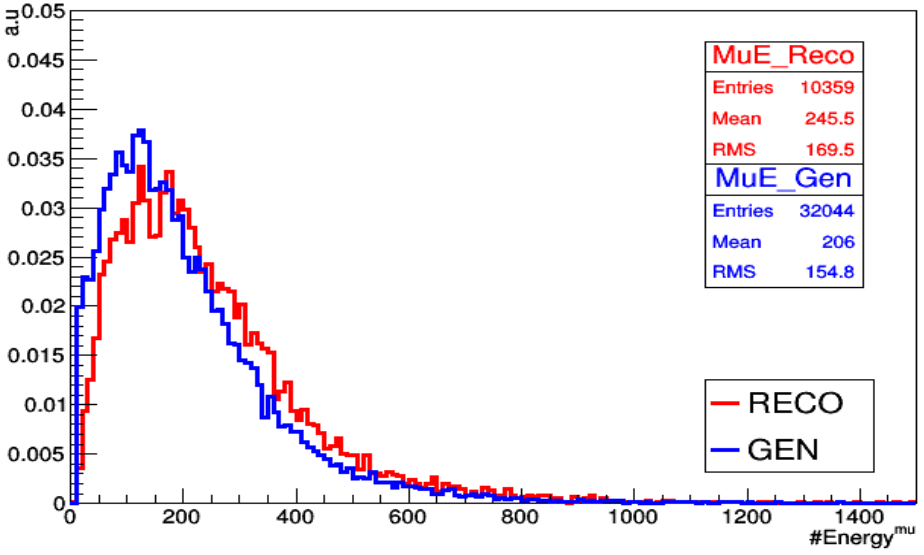
```
 # efficiency formula for b-jets
  add EfficiencyFormula {5} {   (pt <= 15.0) * (0.000) + \
                                (abs(eta) <= 1.2) * (pt > 15.0) * (0.7*tanh(pt*0.01317 - 0.062)) + \
                    (abs(eta) > 1.2 && abs(eta) <= 2.5) * (pt > 15.0) * (0.6*tanh(pt*0.0105 - 0.101))
+ \
                    (abs(eta) > 2.5)  * (0.000)}
}
```

Comparison between GEN & RECO Muons (Preliminary)

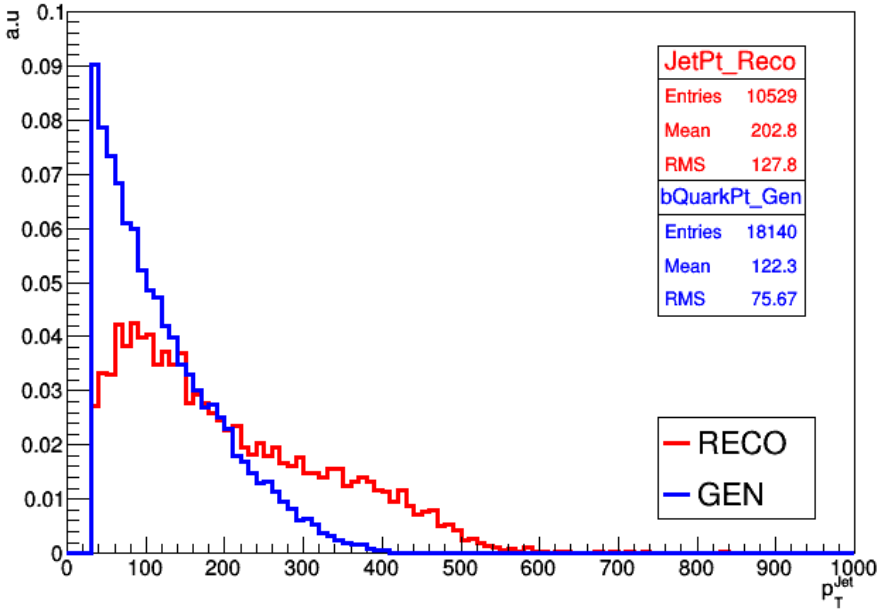


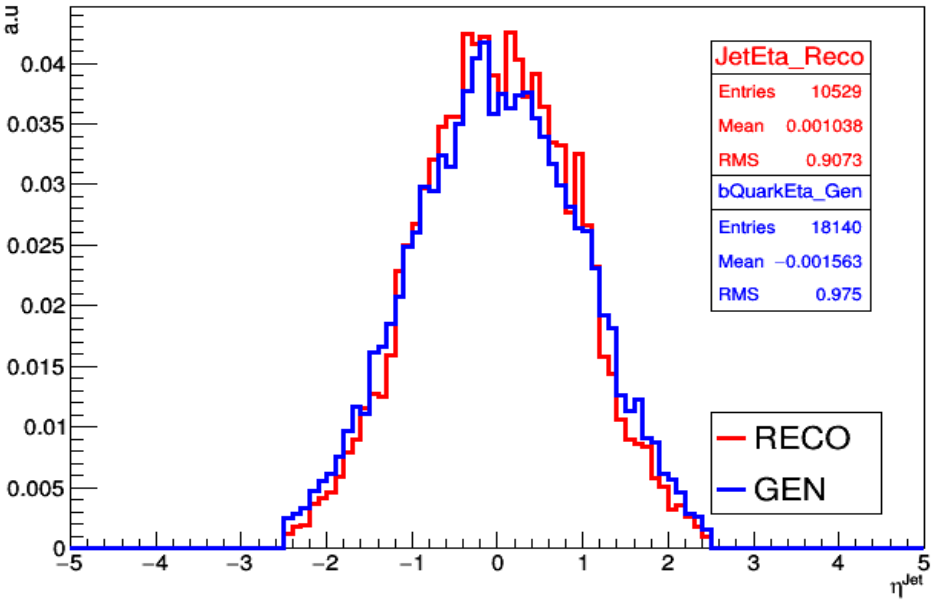


Distributions Normalized to Unity



(a) Comparison between GEN & RECO Jets (b) MET (Preliminary)





Distributions Normalized to Unity

- Harder p_T spectrum for RECO level b-tagged jets
- Substantial MET due to undetected n_{DM} & ν_μ