



Jet Muon Analysis



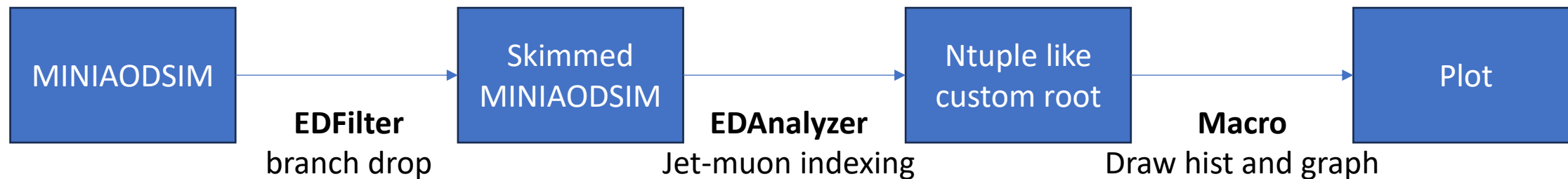
권 우 연

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Purpose : Looking into the PFjet and the muons inside it. Comparing with gen level info.



Generator Object

- **genJet** : `slimmedGenJets`(*reconstructed gen jet with anti-kt $R=0.4$*)
- **genMuon** : `packedGenParticles`(*slimmed gen particle with $pdgID = \pm 13$ (muon)*)

Reconstructed Object

- **Jet** : `slimmedJetsPuppi(ak4PFPuppiJets)`

- **JetID** :

For AK4 PUPPI jets				
PF Jet ID	$ \eta \leq 2.6$	$2.6 < \eta \leq 2.7$	$2.7 < \eta \leq 3.0$	$3.0 < \eta \leq 5.0$
Neutral Hadron Fraction	< 0.99	< 0.90	< 0.99	-
Neutral EM Fraction	< 0.99	< 0.99	-	< 0.4
Number of Constituents	> 1	-	-	-
Charged Hadron Fraction	> 0.01	-	-	-
Charged Multiplicity	> 0	-	-	-
Number of Neutral Particles	-	-	-	≥ 2

- **Jet Selection** : $(p_t > 30 \text{ GeV} \ \&\& \ |\eta| \leq 2.5)$ or $(p_t > 50 \text{ GeV} \ \&\& \ 2.5 < |\eta| < 3.0)$
- **muon** : `packedPFCandidates(slimmed PFCandidates with pdgID =  $\pm 13$  (muon))`

MC era : Run3Summer22

ttbar to semi leptonic : **WWtoLNu2Q_TuneCP5_13p6TeV_powheg-pythia8**

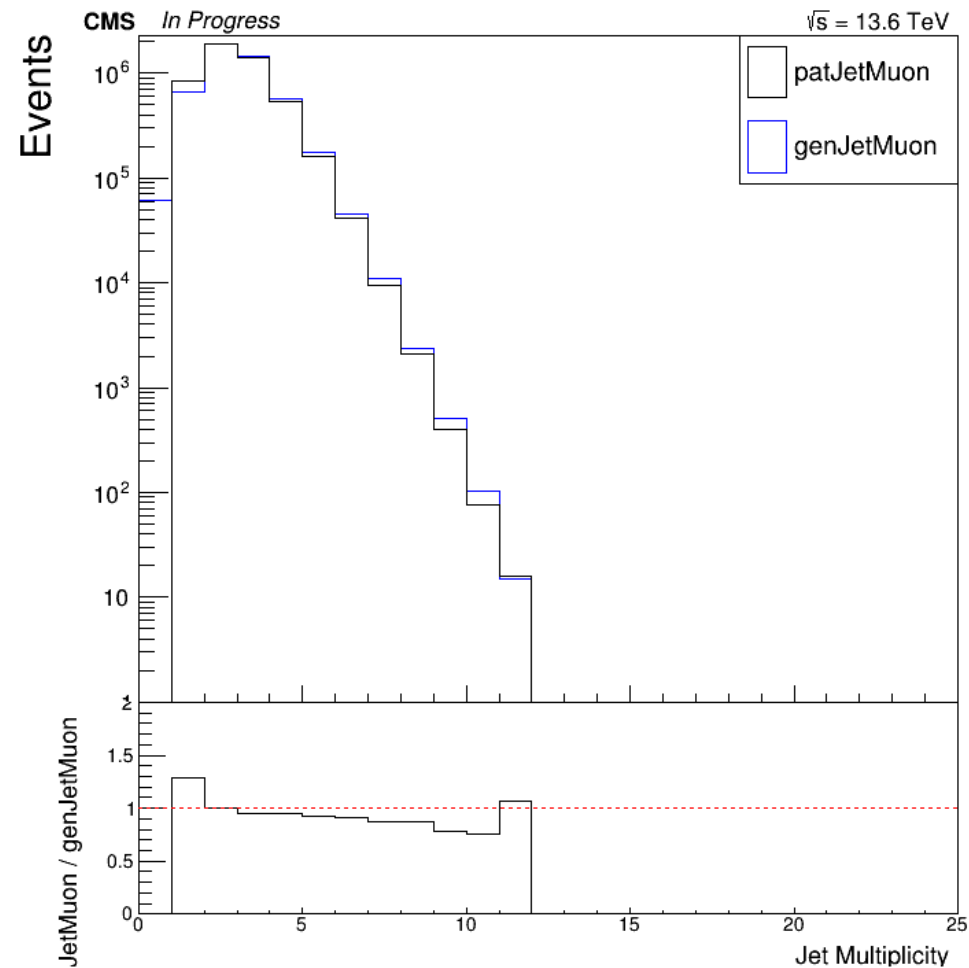
Event Selection

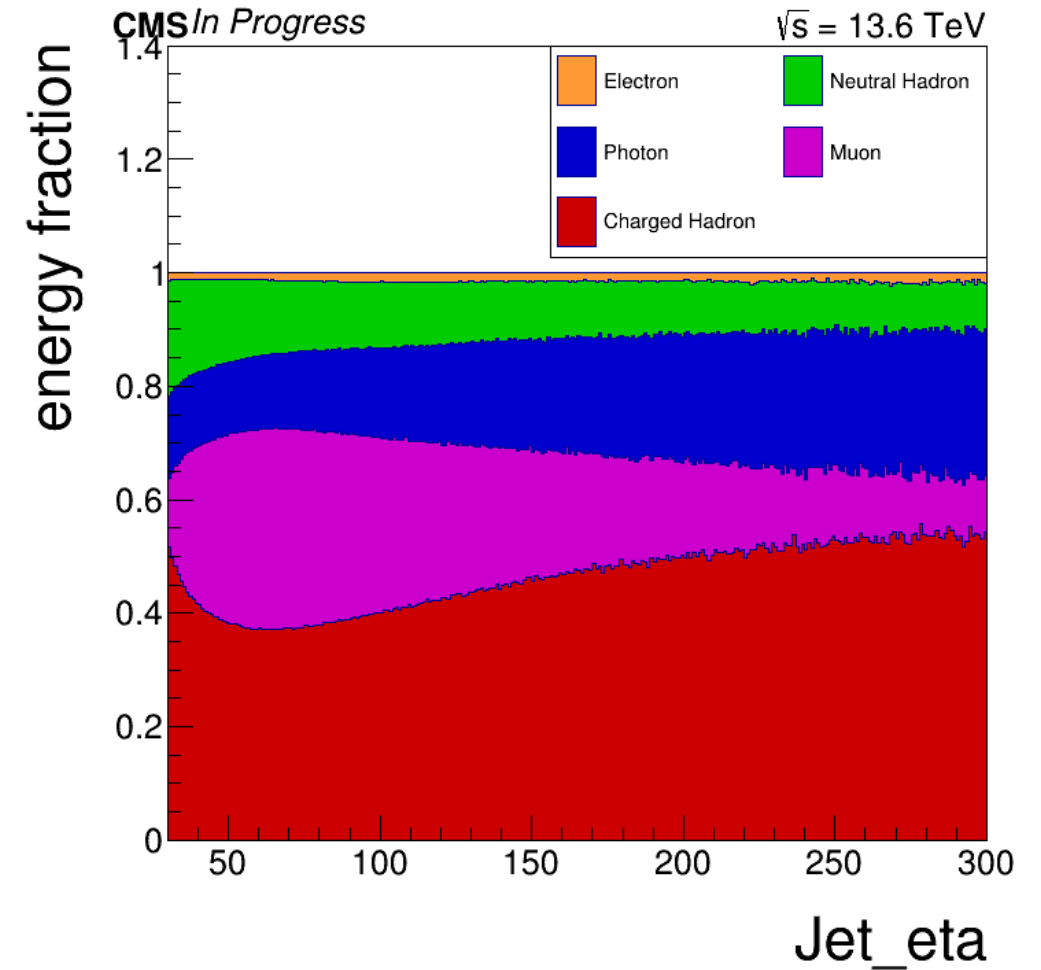
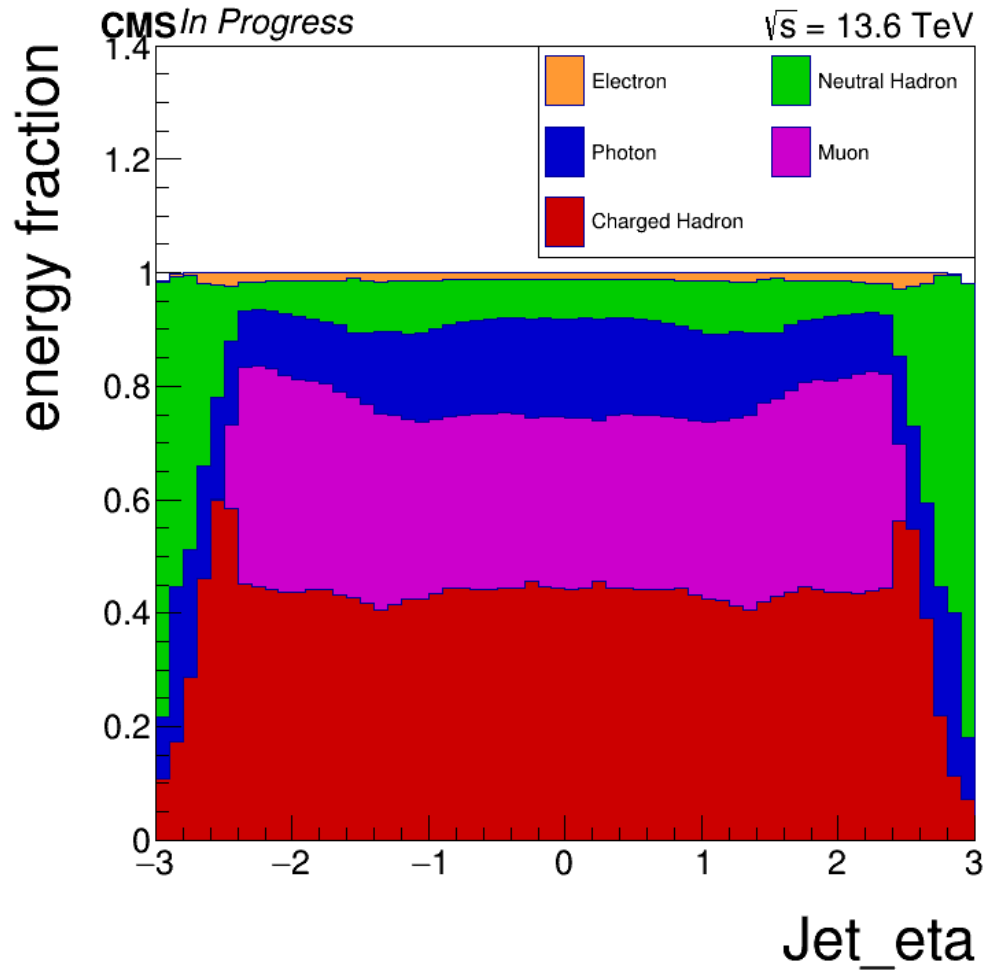
- Exact 1 prompt lepton
 - prompt lepton criteria
 - PAT electron
 - $p_t > 30 \text{ GeV}$
 - mva electron ID tight (egmGsfElectronIDs:mvaEleID-RunIIIWinter22-iso-V1-wp90)
 - $\text{mva_Isolated} > 0.9$ (Multivariate Analysis based isolation score)
 - PAT muon
 - $p_t > 24 \text{ GeV}$
 - muon Tight ID (Cut based ID Tight)
 - Tight PF Isolation ($\text{Iso}_{PF}^{Rel} < 0.15, R=0.4$)
- At least one jet which is $p_t > 30 \text{ GeV} \ \&\& \ |\eta| \leq 2.4$

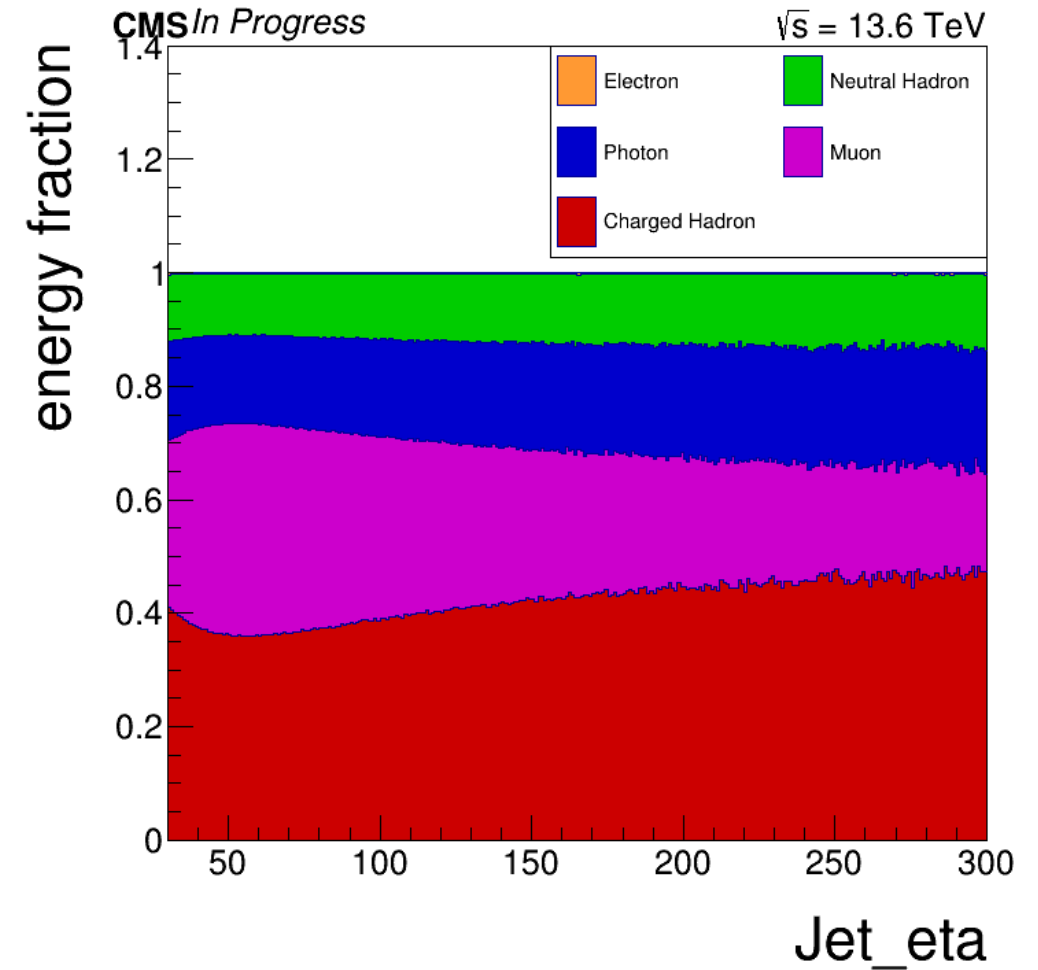
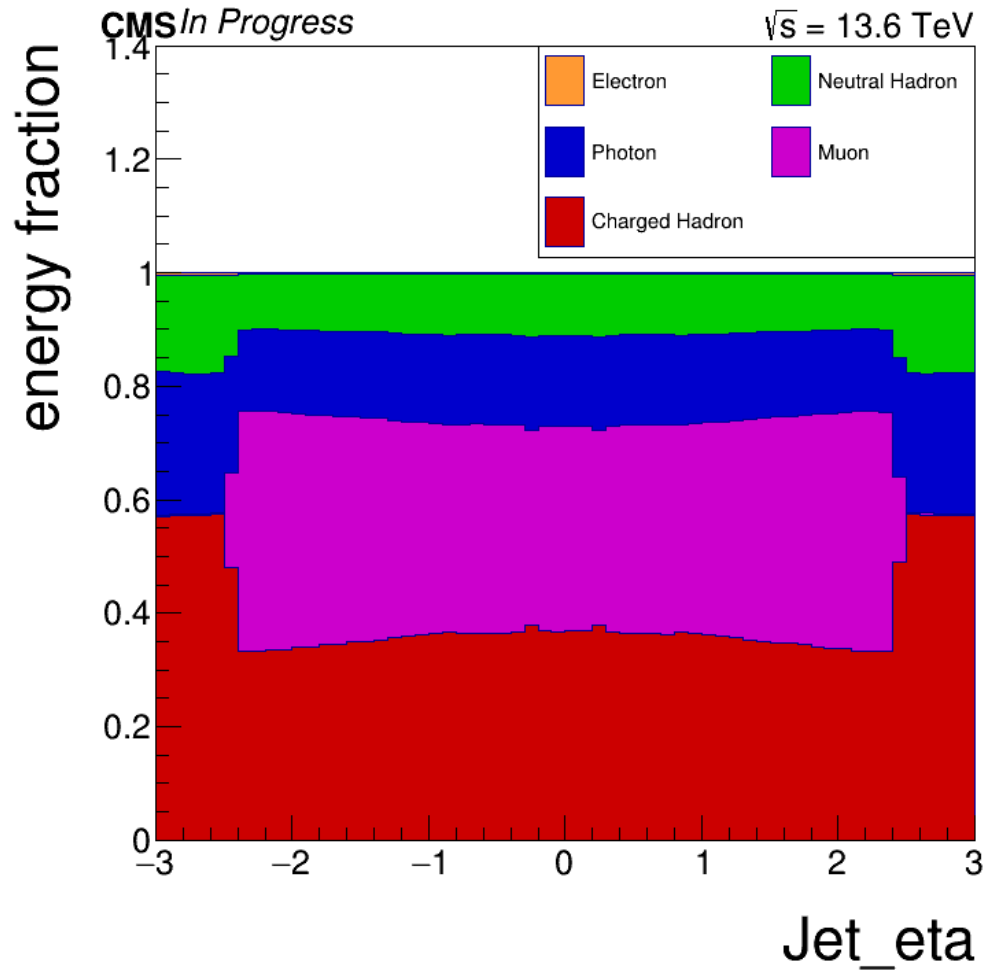
June 16, 2025.

Jet Multiplicity

total number of events : 4,885,902







MC era : Run3Summer22

QCD : QCD-4Jets_HT-40to70_TuneCP5_13p6TeV_madgraphMLM-pythia8

Jet Selection

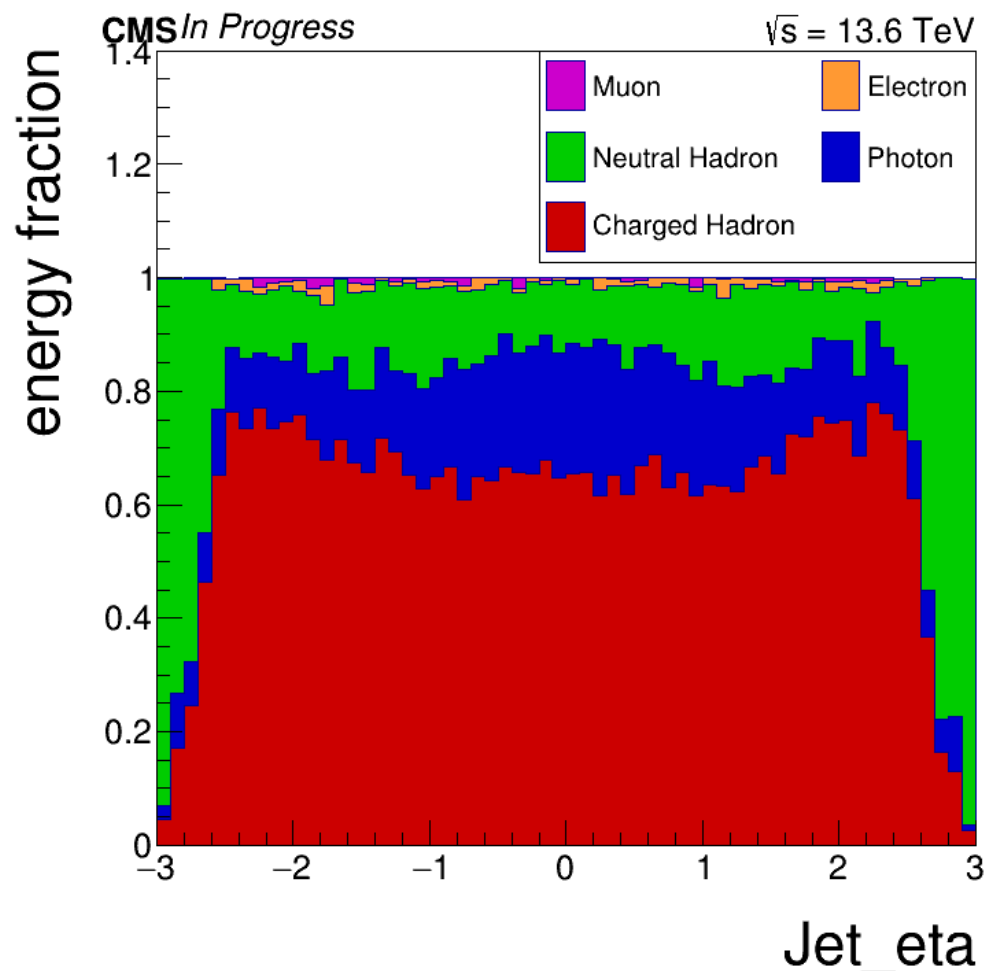
- ak4PFPuppiJets
- Tight and Tight lep veto ID (jetId == 6)
- $p_t > 40 \text{ GeV} \ \&\& \ p_t < 70 \text{ GeV} \ \&\& \ |\eta| \leq 2.5$
- Back to back dijet ($\Delta\phi > 2.7$)

Event Selection

- At least one back to back dijet pair

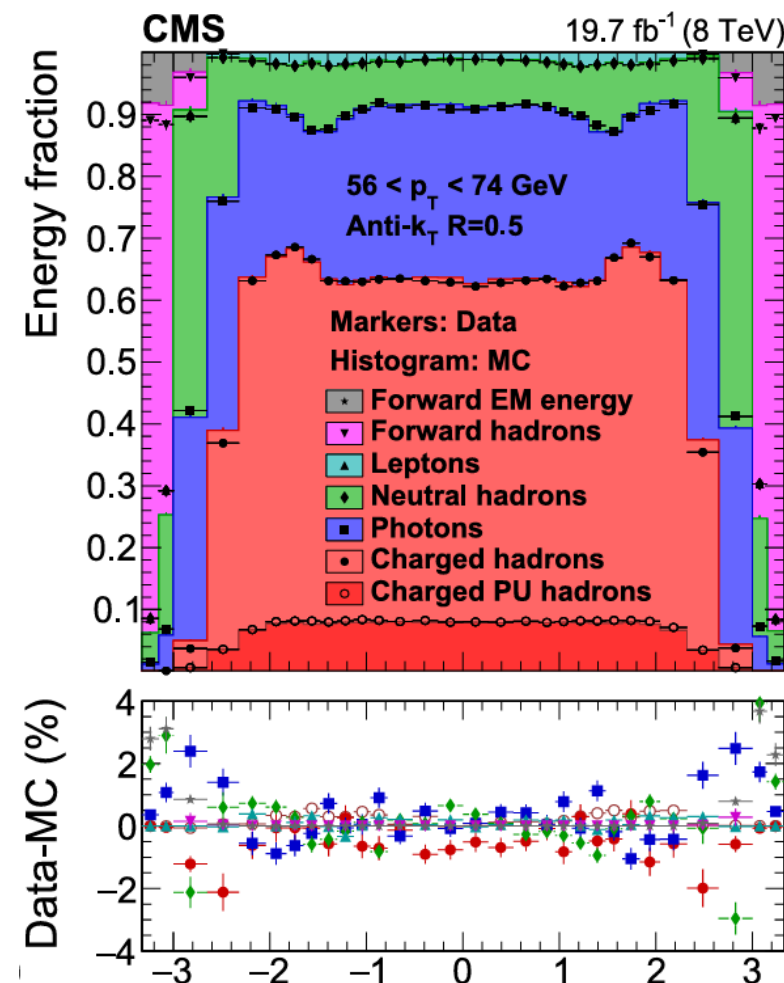
QCD back to back dijet at 13.6 TeV

($p_T > 40 \text{ GeV}$ & $p_T < 70 \text{ GeV}$)



The CMS particle flow algorithm

epjconf_quarks2018_02016. fig 14



MC era : Run3Summer22

ttbar to semi leptonic : **TTtoLNu2Q_TuneCP5_13p6TeV_powheg-pythia8**

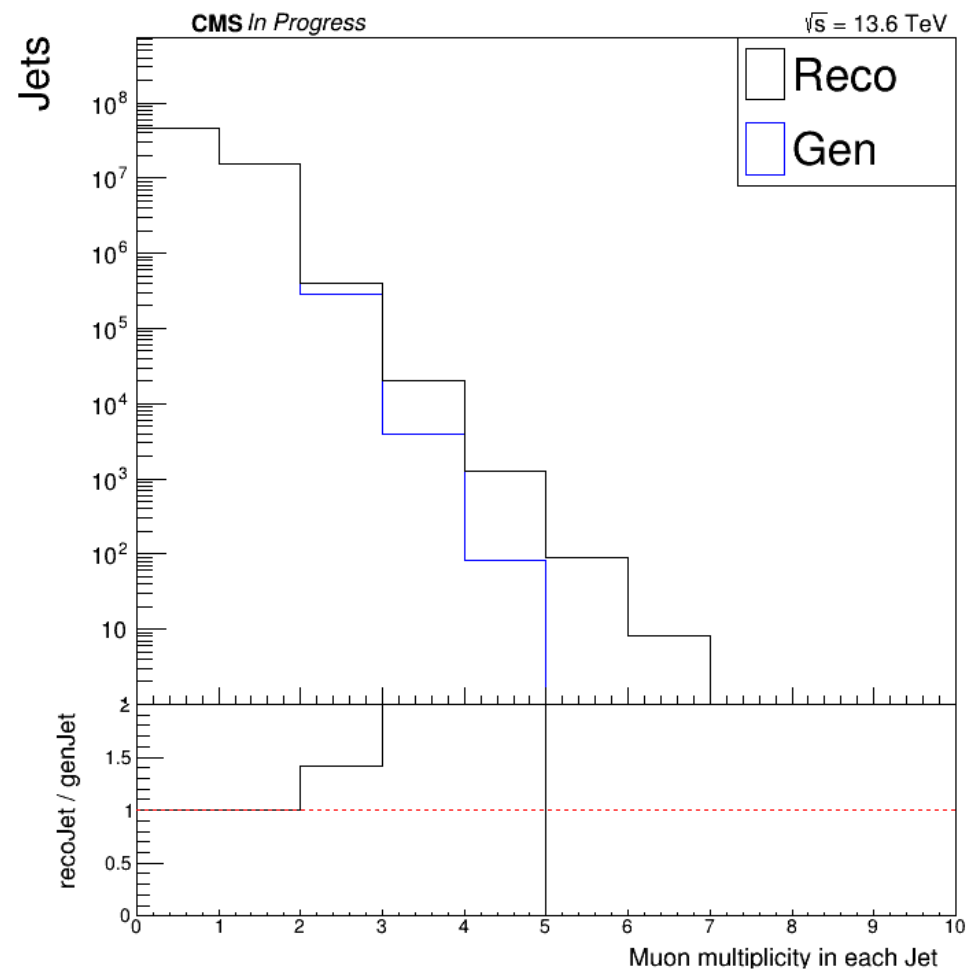
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Jet Multiplicity

total number of events :



MC era : Run3Summer22

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