Jet Muon Analysis

권 우 연

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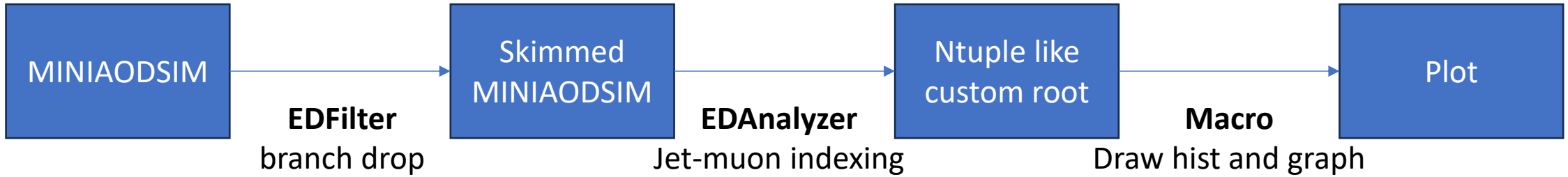
Workflow

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



Object Definition

Generator Object

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

Object Definition

Reconstructed Object

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

For AK4 PUPPI jets				
PF Jet ID	|η| <= 2.6	2.6 < |η| <= 2.7	2.7 < |η| <= 3.0	3.0 < |η| <= 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 : $(p_t > 30\ GeV\ \&\&\ |\eta| \leq 2.5)\ or\ (p_t > 50\ GeV\ \&\&\ 2.5 < |\eta| < 3.0)$

- **muon** : packedPFCandidates*(slimmed PFCandidates with pdgID = ±13 (muon))*

MC Samples

MC era : Run3Summer22

ttbar to semi leptonic : TTtoLNu2Q_TuneCP5_13p6TeV_powheg-pythia8

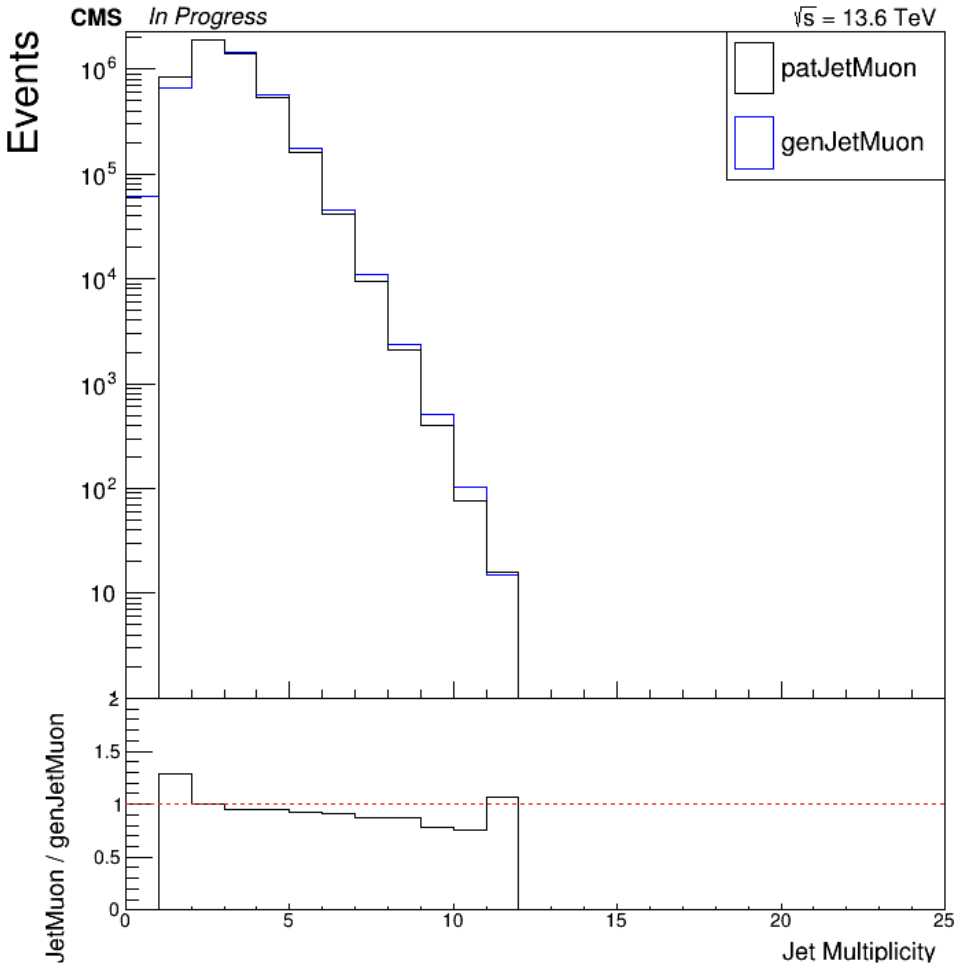
Event Selection

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

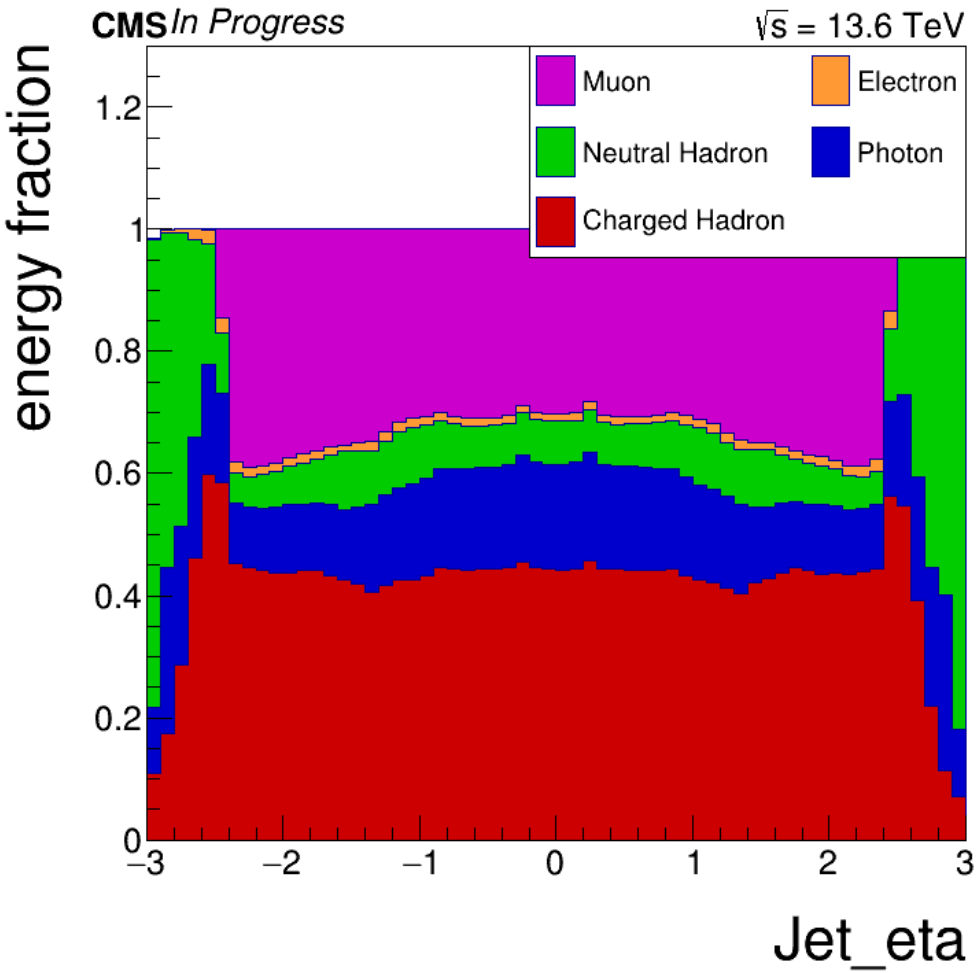
ttbar to SL jet distribution

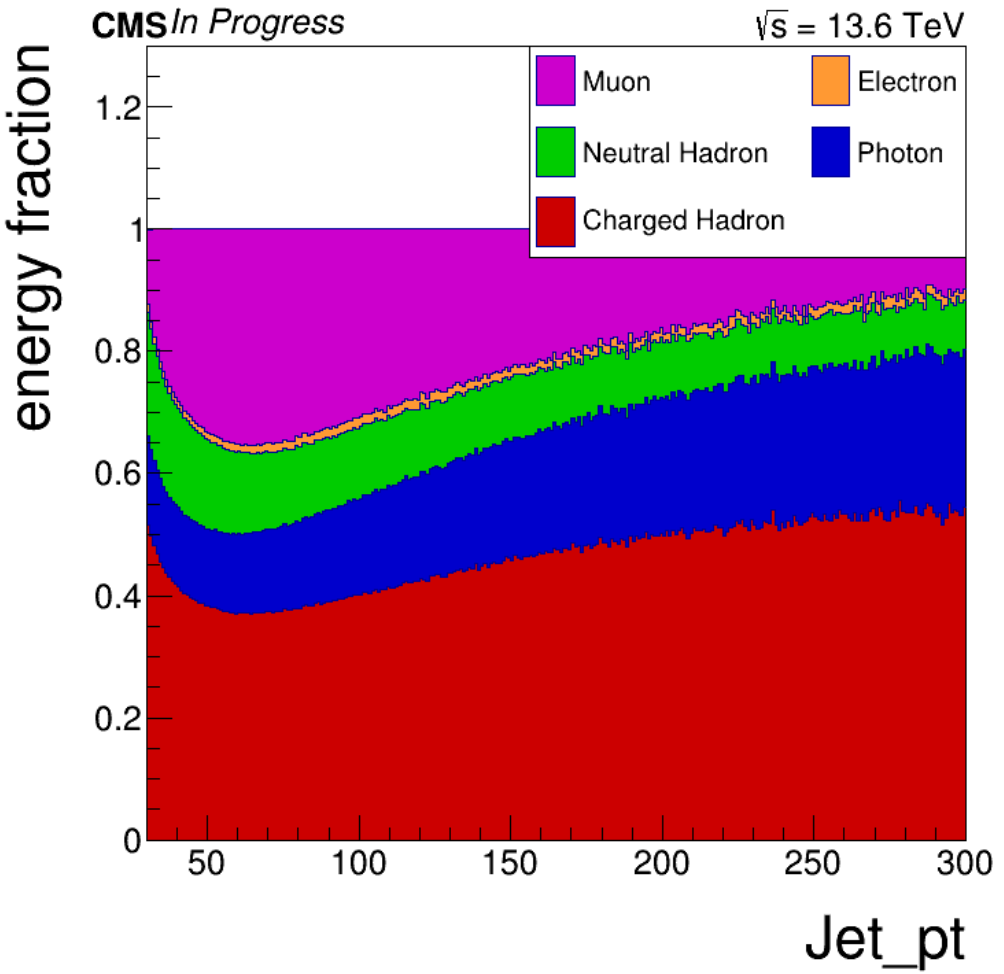
Jet Multiplicity

total number of events : 4,885,902

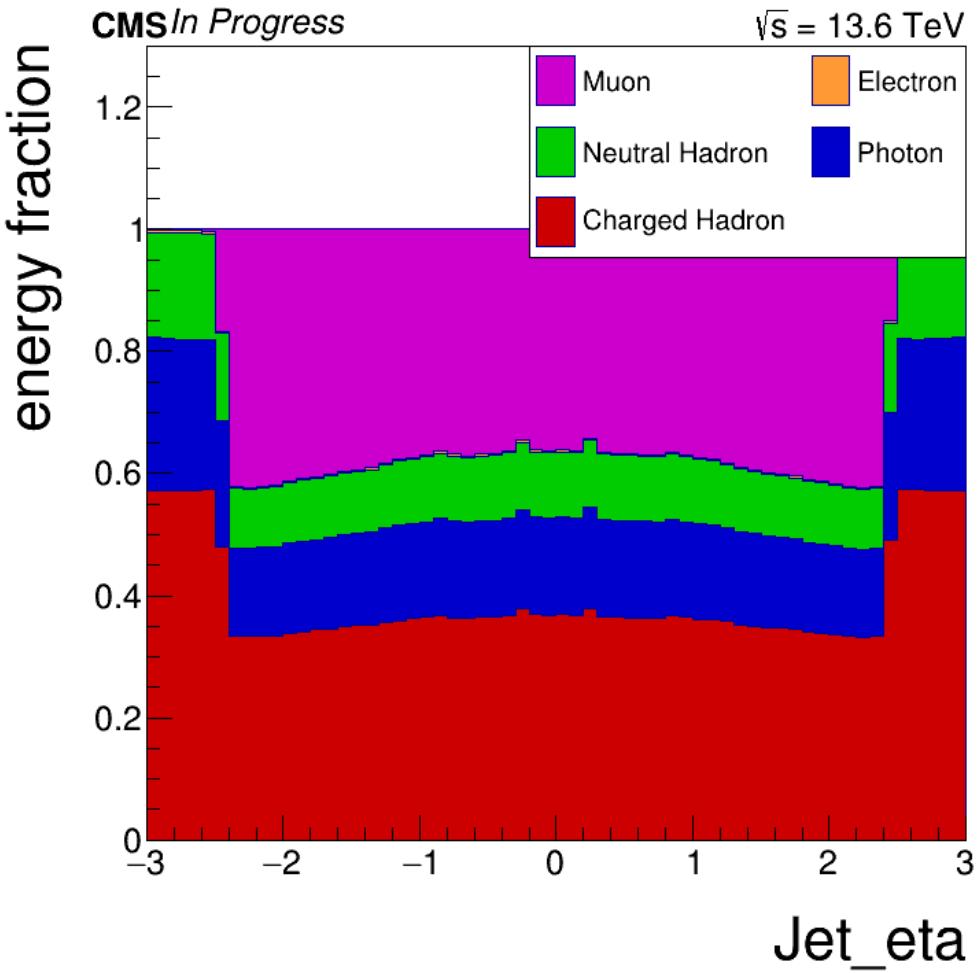


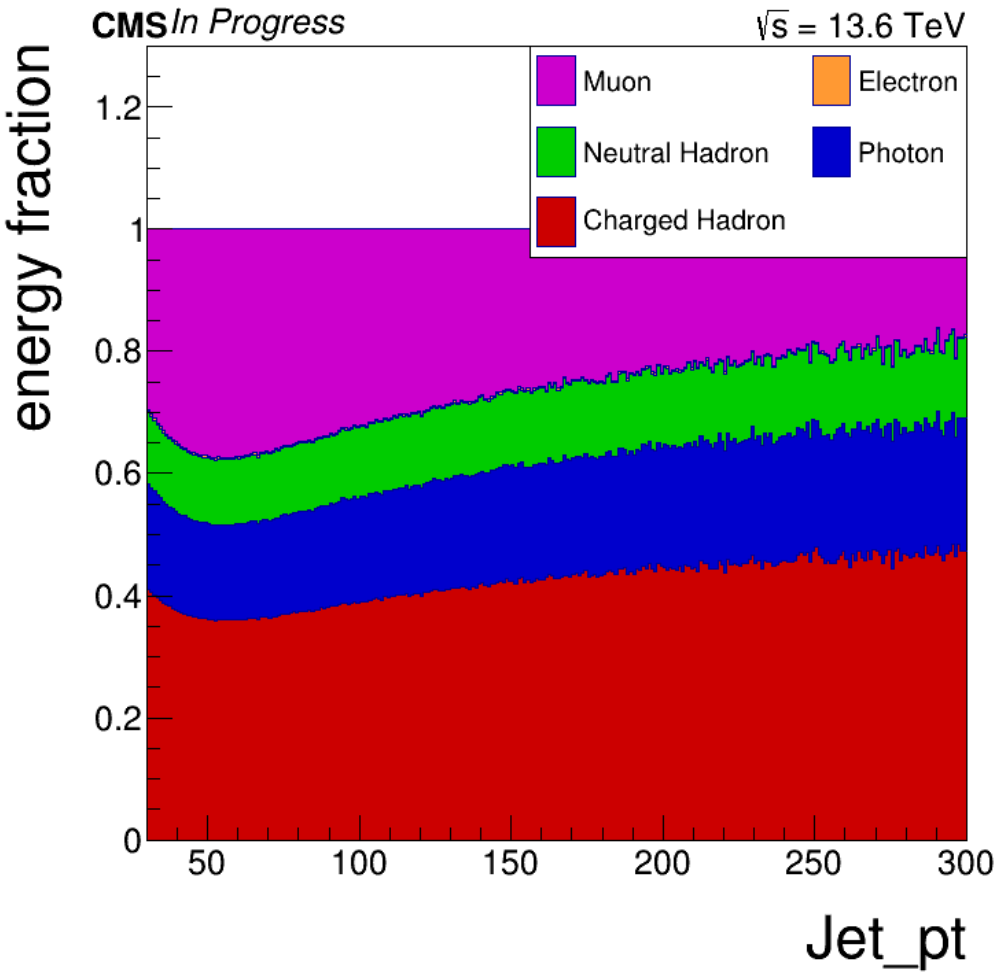
Jet energy fraction ratio





genJet energy fraction ratio





backup - ttbar toSL Jet distribution

[RunIIINanov12/Nanov15] Data/MC disagreement in 2.5 <|eta| < 3

Edit

Open Issue created 5 months ago by **Anna Benecke**

This issue is there in order to collect material and ideas for the horns in 2.5 < |eta| < 3 that are more pronounced in MC than in data, and are present in Nanov12 and Nanov15 for 22-24.

We are having a first kick-off meeting to collect feedback and also to identify person power to work on this on the 18.11.24 [indico].

▼ **[long-term] Where the spikes comes from:**

- The HCAL response in this eta region is too low and therefore the spikes are only seen in MC and not in data
- In addition, the HCAL noise thresholds are too low since the IsoTrack method might be impacted by PU/noise
- We plan to fix this with dedicated HE calibrations in 25 data taking
- Neutral hadrons show a more or less constant offset, however, charged hadron fraction (Tracker) shows a slope in pT [reference]

https://gitlab.cern.ch/cms-jetmet/coordination/coordination/-/issues/113