

Jet Muon Analysis



권 우 연

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- In high Eta range Jet, checking out results of the jet muon reconstructions.
- Check the distribution of Jet muons in the eta bin range and their 4-momentum
- Next step, we will study how to improve jet muon reconstruction.





MC era : Run3Summer22

QCD samples : QCD-4Jets_HT-*_TuneCP5_13p6TeV_madgraphMLM-pythia8 (for all HT range) *WW to semi leptonic : WWtoLNu2Q_TuneCP5_13p6TeV_powheg-pythia8 (on going...)*



NanoAOD branches



- Jet_MuonIdx only show up to 2 muons
- However, Muon_jetIdx also exist.
- We can find out which jet the muon came from
- Also, we have 4-momentum information of the muon

X Jet definition in NANOAOD

:ak4 PFJets Puppi with JECs applied, after basic selection (pt > 15)

root [18] tree->Show(42656)		
=====> EVENT:42656		
nJet	= 7	
Jet_nMuons	= 0,	
-	2, 0, 0, 0, 1, 0	
Jet muonIdx1	= -1,	
-	0, -1, -1, -1, 2, -1	
Jet muonIdx2	= -1,	
_	1, -1, -1, -1, -1, -1	
Jet_muEF	= 0,	
—	0.158203, 0, 0, 0, 0.269531,	
	0	
nMuon	= 4	
Muon jetIdx	= 1,	
	1, 5, -1	
Muon pt	= 4.27121,	
_'	4.16957, 4.13201, 3.01763	
Jet genJetIdx	= 1,	
_0	0, -1, 2, -1, 4, 3	
nGenJet	= 6	
nGenPart	= 17	
Muon genPartIdx	= -1,	
	15, 12, -1	
GenPart_pt	= 0,	
	0, 26.4375, 26.4375, 1.16406, 2.58594,	
	9,40625, 5,5, 13,1875, 11,6562, 15,	
	2,38281, 4,03125, 0,179199, 14,1875, 4,125,	
	0.354492	



MC matching

Event selection

nJet > 0 && nMuon > 0

Matching Method

- Select muon whose "Muon_genPartIdx" != -1 1. (muon matching)
- Find the "Muon_jetIdx" of the muon. And select if 2. the "Muon_jetIdx != -1" (jet muon checking)
- Check the "Jet_genJetIdx[Muon_jetIdx] != -1" (jet 3. *matching*)

I select jet muons both matched muon and matched jet



root [18] tree->Show(42656)		
=====> EVEN1:42	556	
njet	= /	
Jet_nMuons	= 0,	
2	(2, 0, 0, 0, 1, 0)	
Jet_muonidxi	= -1,	
2. t	0, -1, -1, -1, 2, -1	
Jet_muoniax2	= -1,	
lat muEE	1, -1, -1, -1, -1, -1	
Jet_muEF		
	0.138203, 0, 0, 0, 0.209331,	
nMuon	- 4	
nmuon Muon iotTdv	= 4	
Muon_jetiax		
Muon nt	(L) 3, -1 . - A 27121	
Muon_pt	- 4.2/121, A 16057 A 12201 2 01762	
lat applatIdy	4.10957, 4.15201, 5.01705	
Conlat	6, -1, 2, -1, 4, 5	
nGonDart	- 0	
Muon gonDortIdy	- 1/	
nuon_genrai crux	$\begin{bmatrix} -5 \\ 15 \end{bmatrix}^{1}$	
GenDart nt	- 0	
ochirare_pc	0. 26 4375. 26 4375. 1 16406. 2 58594	
	9,40625, 5,5, 13,1875, 11,6562, 15	
	2.38281, 4.03125, 0.179199, 14,1875, 4,125	
	0.354492	



QCD jet muon distribution











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