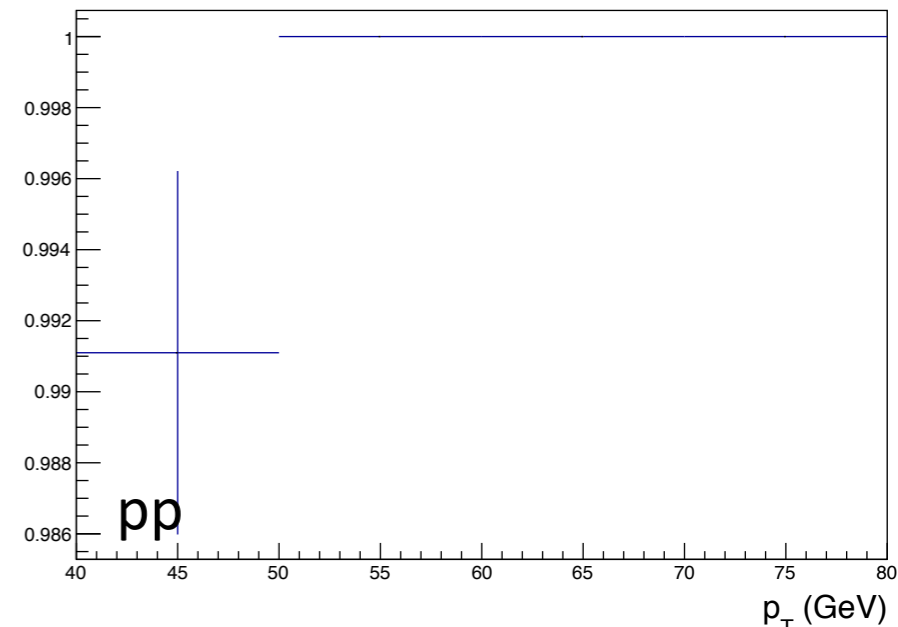
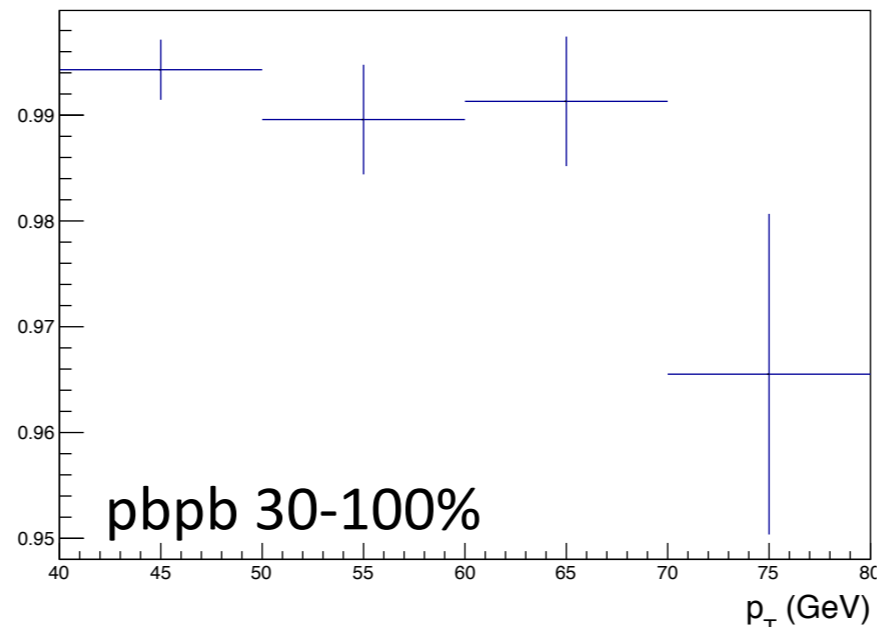
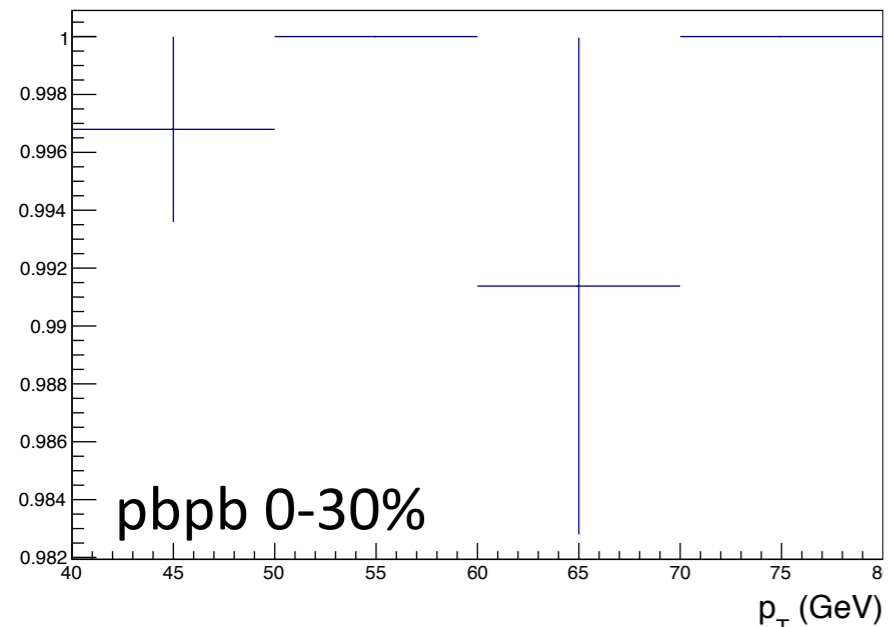


- ◉ **gamma-jet analysis**
 - manpower : Yeonju, Alex, Kaya
 - photon spectra check
 - photon reconstruction issue : “hotspot”
 - HIEgamma meeting will re-start in 1~2 weeks.

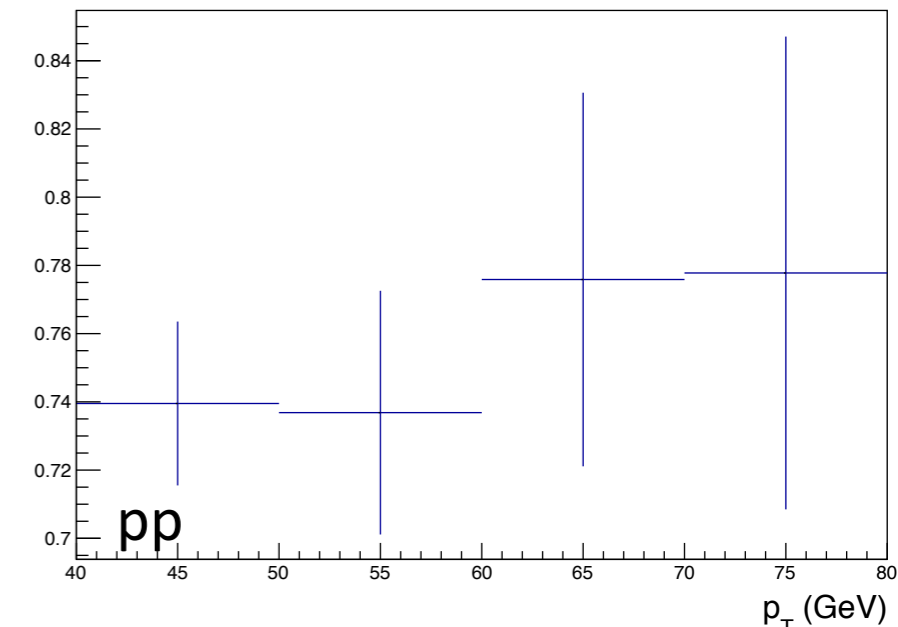
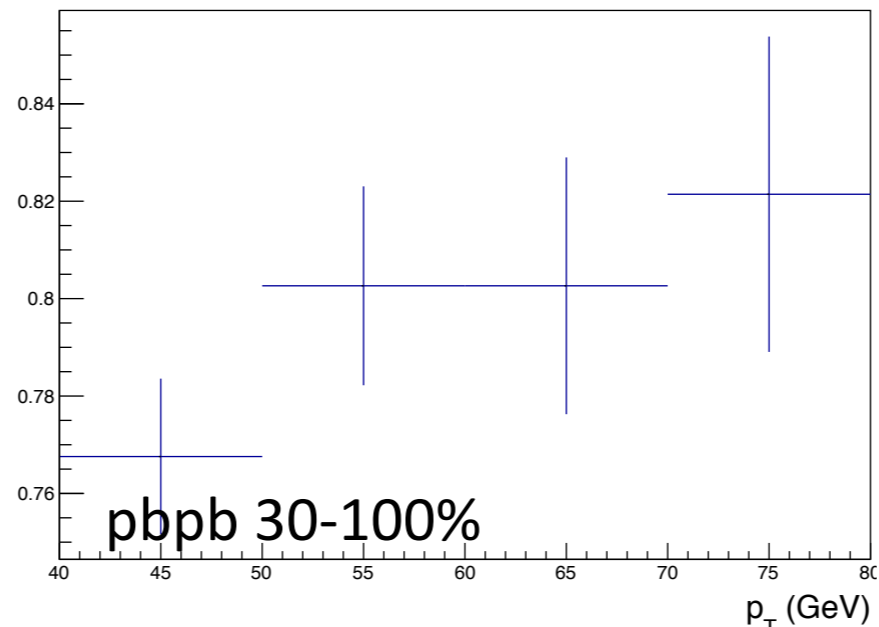
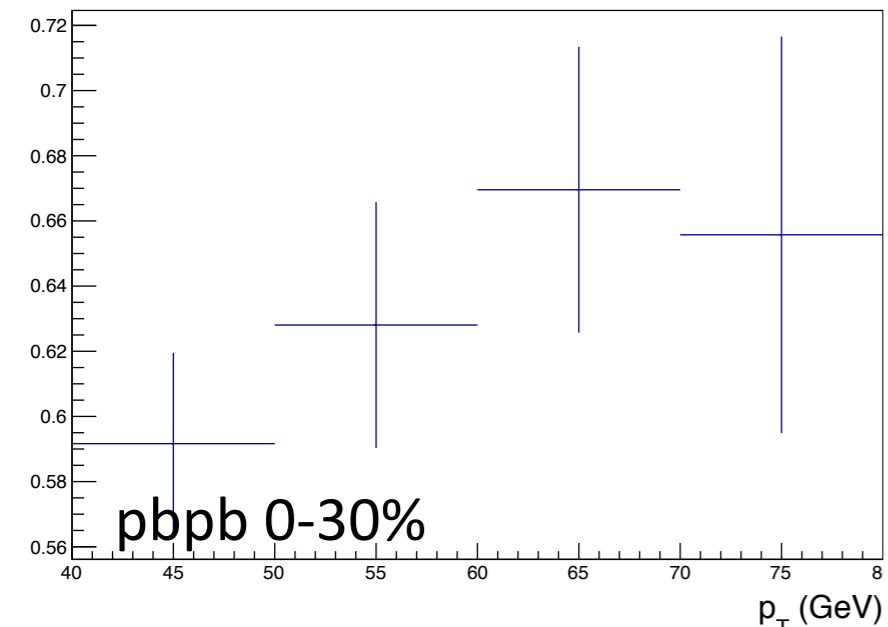
- ◉ **isolated photon Raa**
 - JETPHOX prediction
 - purity
 - efficiency

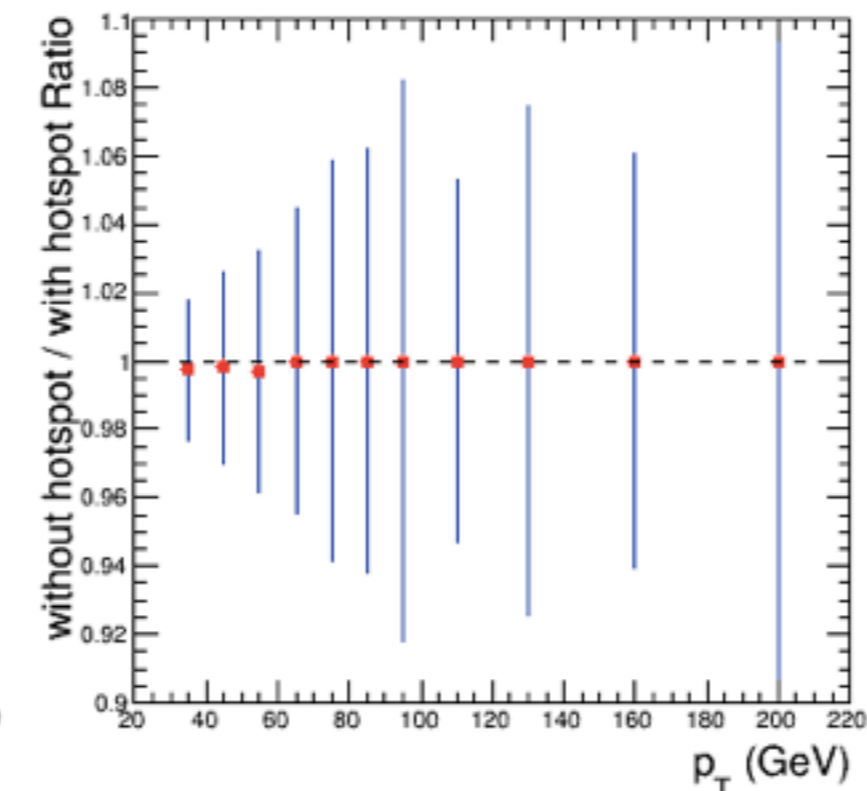
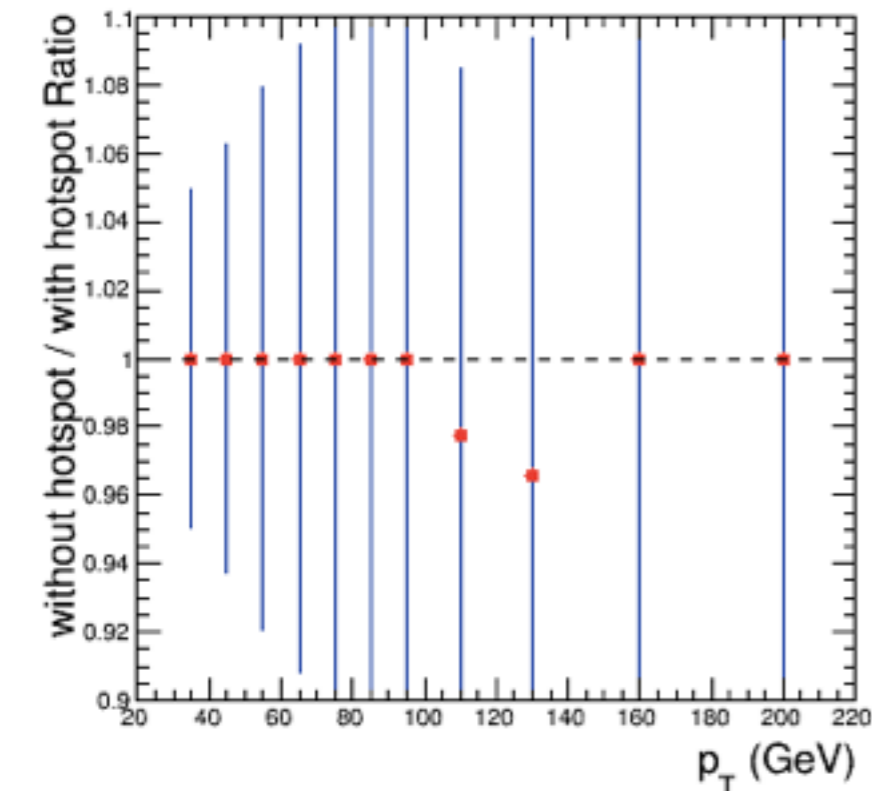
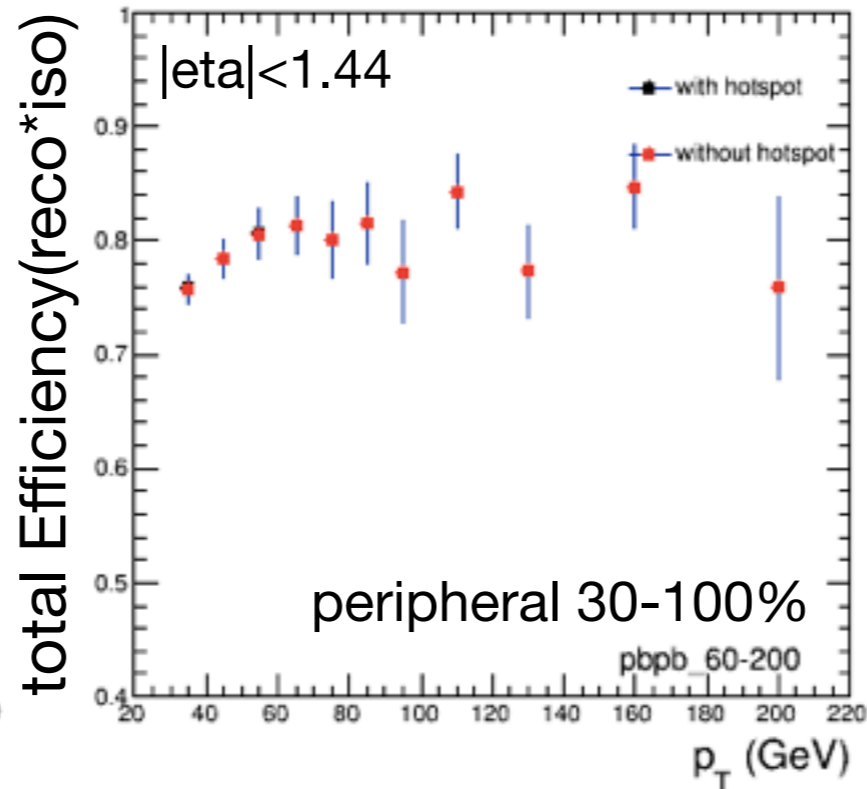
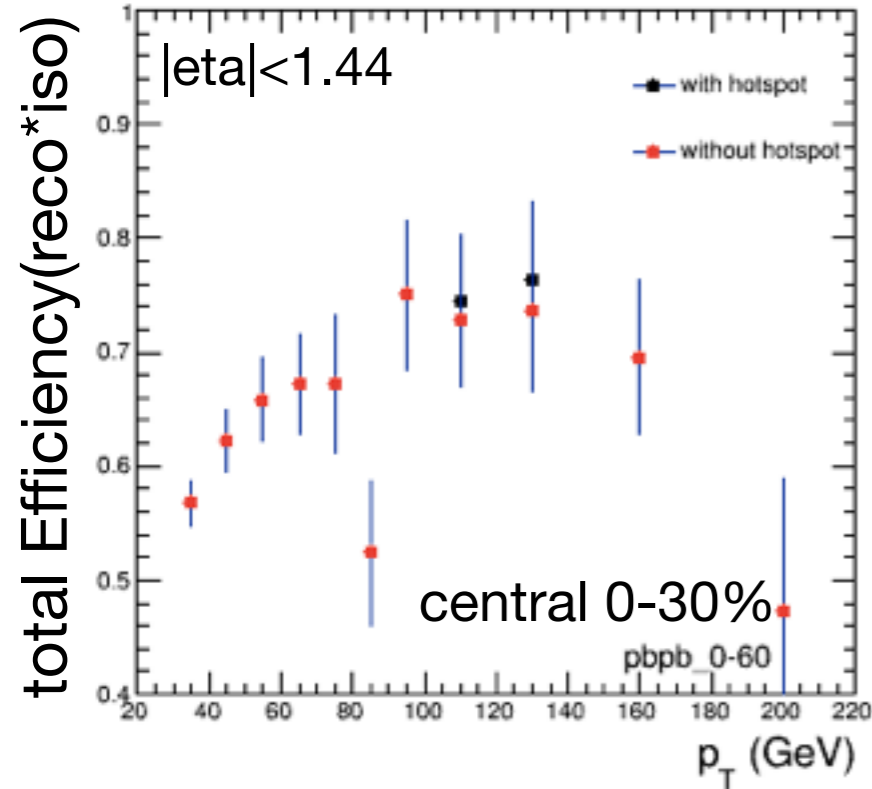
- ◉ **MC status**
 - pbpb EmEnrichedDijet FOREST done yesterday
 - pp RECO done several days ago.
 - pp is FORESTing by Alex

Reconstruction efficiency



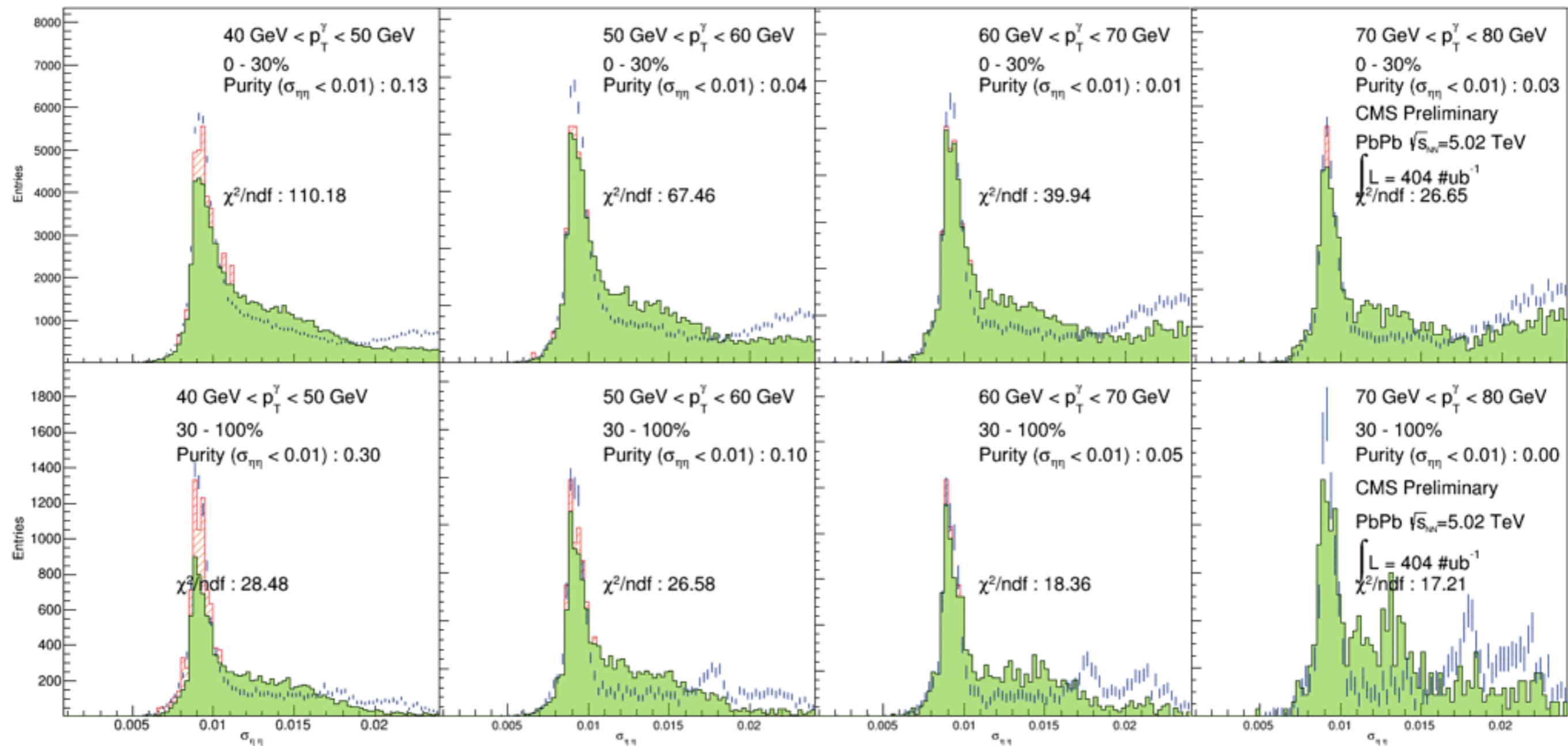
Isolation efficiency



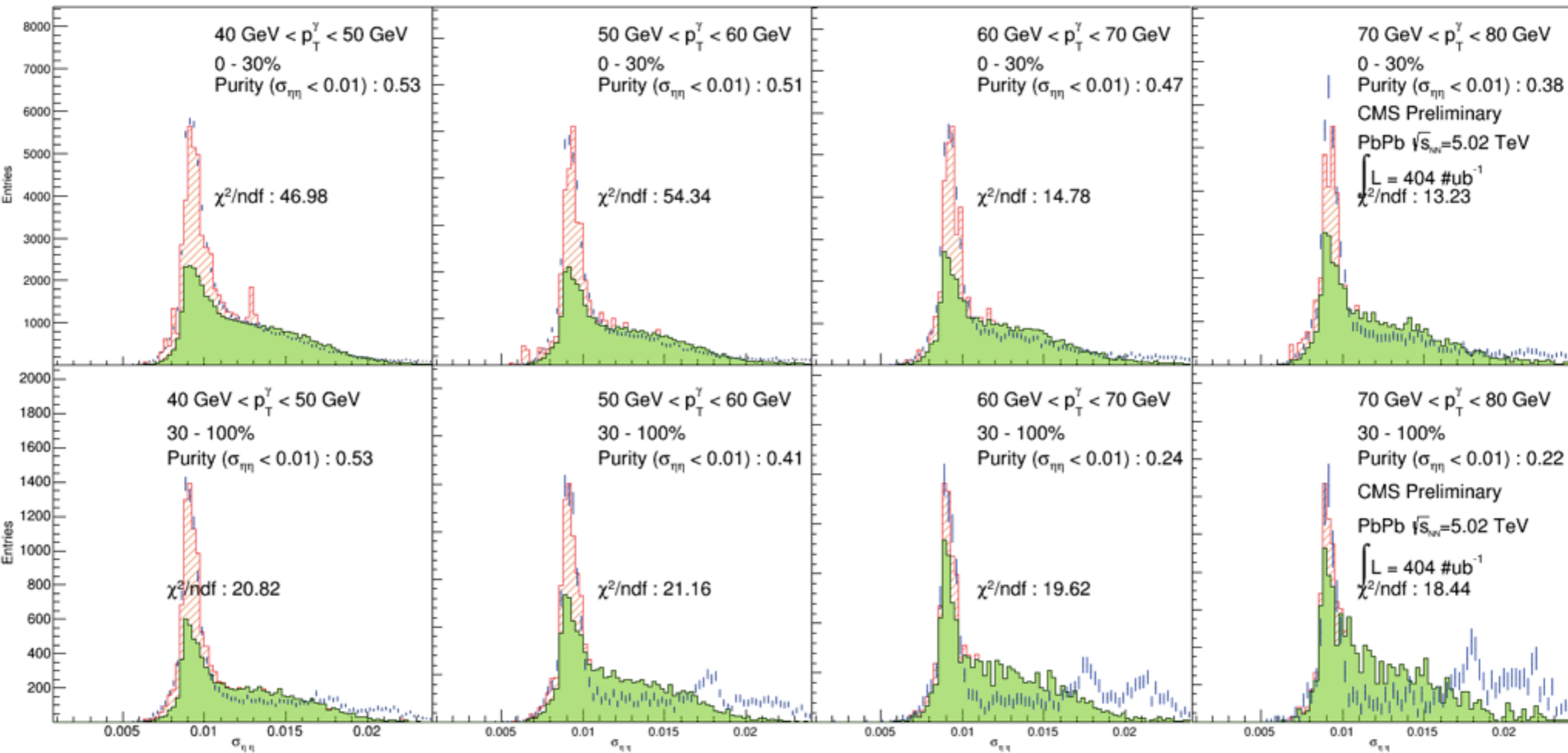


- little changes in both central and peripheral
- datasets : 2015-PbPb-MC/ AllQCDPhoton15,30,50,80,120
- hotspot rejection

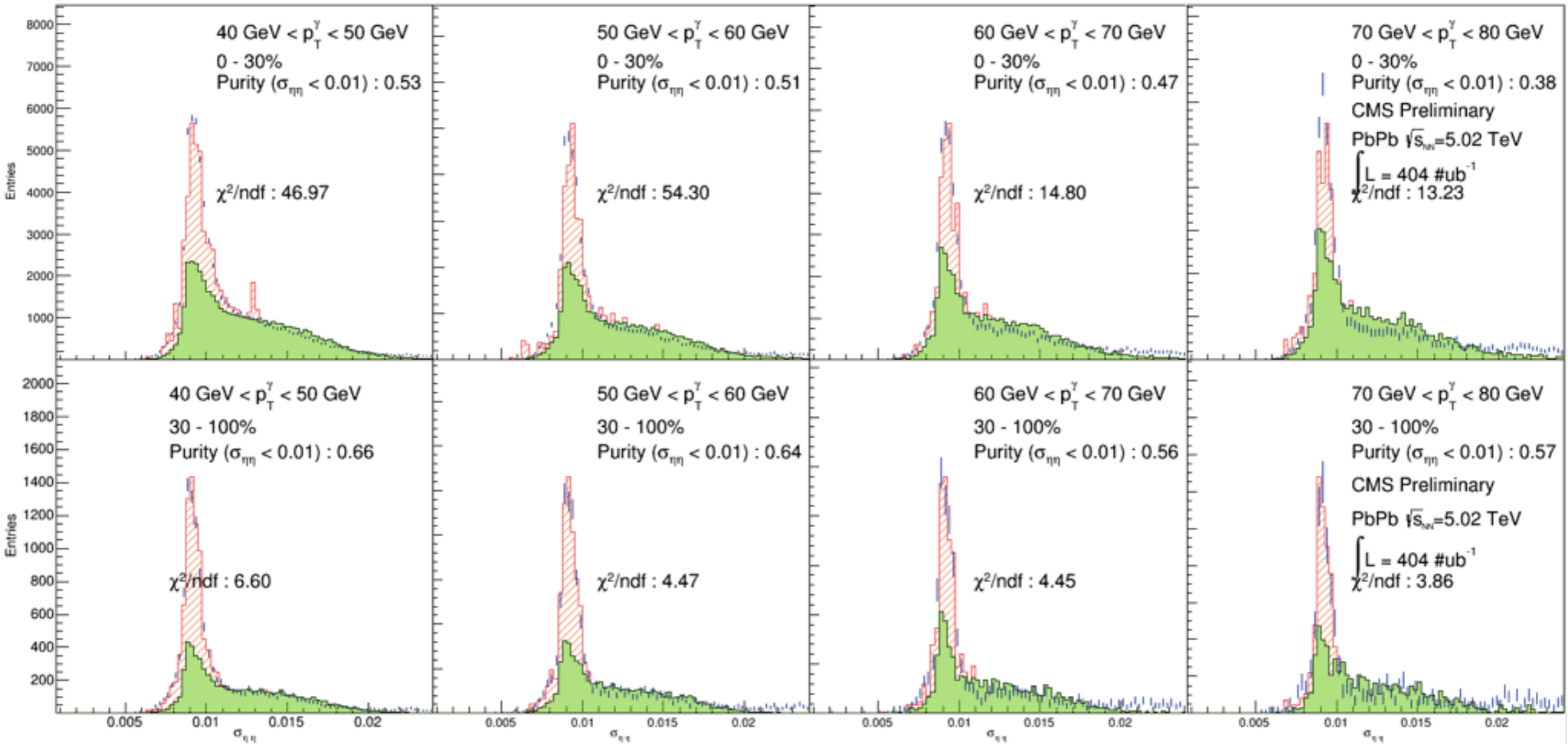
$((\text{phoSCeta} > -1.194 \ \&\& \ \text{phoSCeta} < -1.169) \ \&\& \ (\text{phoSCPhi} > -1.211 \ \&\& \ \text{phoSCPhi} < -1.162)) \ \parallel$
 $((\text{phoSCeta} > -0.935 \ \&\& \ \text{phoSCeta} < -0.910) \ \&\& \ (\text{phoSCPhi} > 2.036 \ \&\& \ \text{phoSCPhi} < 2.065)) \ \parallel$
 $((\text{phoSCeta} > -0.850 \ \&\& \ \text{phoSCeta} < -0.819) \ \&\& \ (\text{phoSCPhi} > -1.723 \ \&\& \ \text{phoSCPhi} < -1.676)) \ \parallel$
 $((\text{phoSCeta} > -0.764 \ \&\& \ \text{phoSCeta} < -0.723) \ \&\& \ (\text{phoSCPhi} > -0.786 \ \&\& \ \text{phoSCPhi} < -0.720)) \ \parallel$
 $((\text{phoSCeta} > -0.237 \ \&\& \ \text{phoSCeta} < -0.210) \ \&\& \ (\text{phoSCPhi} > 0.106 \ \&\& \ \text{phoSCPhi} < 0.147)) \ \parallel$
 $((\text{phoSCeta} > -0.062 \ \&\& \ \text{phoSCeta} < -0.036) \ \&\& \ (\text{phoSCPhi} > 0.860 \ \&\& \ \text{phoSCPhi} < 0.931)) \ \parallel$
 $((\text{phoSCeta} > 0.973 \ \&\& \ \text{phoSCeta} < 1.035) \ \&\& \ (\text{phoSCPhi} > 0.623 \ \&\& \ \text{phoSCPhi} < 0.697)) \ \parallel$
 $((\text{phoSCeta} > 1.075 \ \&\& \ \text{phoSCeta} < 1.108) \ \&\& \ (\text{phoSCPhi} > -3.114 \ \&\& \ \text{phoSCPhi} < -3.054)) \ \parallel$
 $((\text{phoSCeta} > 1.426 \ \&\& \ \text{phoSCeta} < 1.447) \ \&\& \ (\text{phoSCPhi} > 2.744 \ \&\& \ \text{phoSCPhi} < 2.774)) \ \parallel$
 $((\text{phoSCeta} > 0.915 \ \&\& \ \text{phoSCeta} < 0.930) \ \&\& \ (\text{phoSCPhi} > 1.69 \ \&\& \ \text{phoSCPhi} < 1.72))$



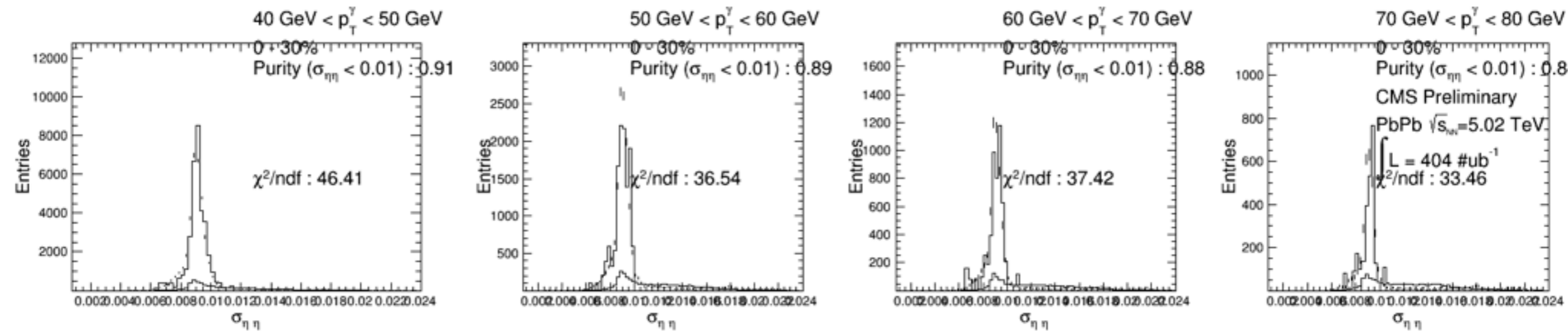
- **pbpb_purity.root**
 - before spike rejection
 - before collision event selection



- **pbpb_purity_v1.root**
 - after spike rejection
 - before collision event selection



- **pbpb_purity_v2.root**
 - after spike rejection
 - after collision event selection

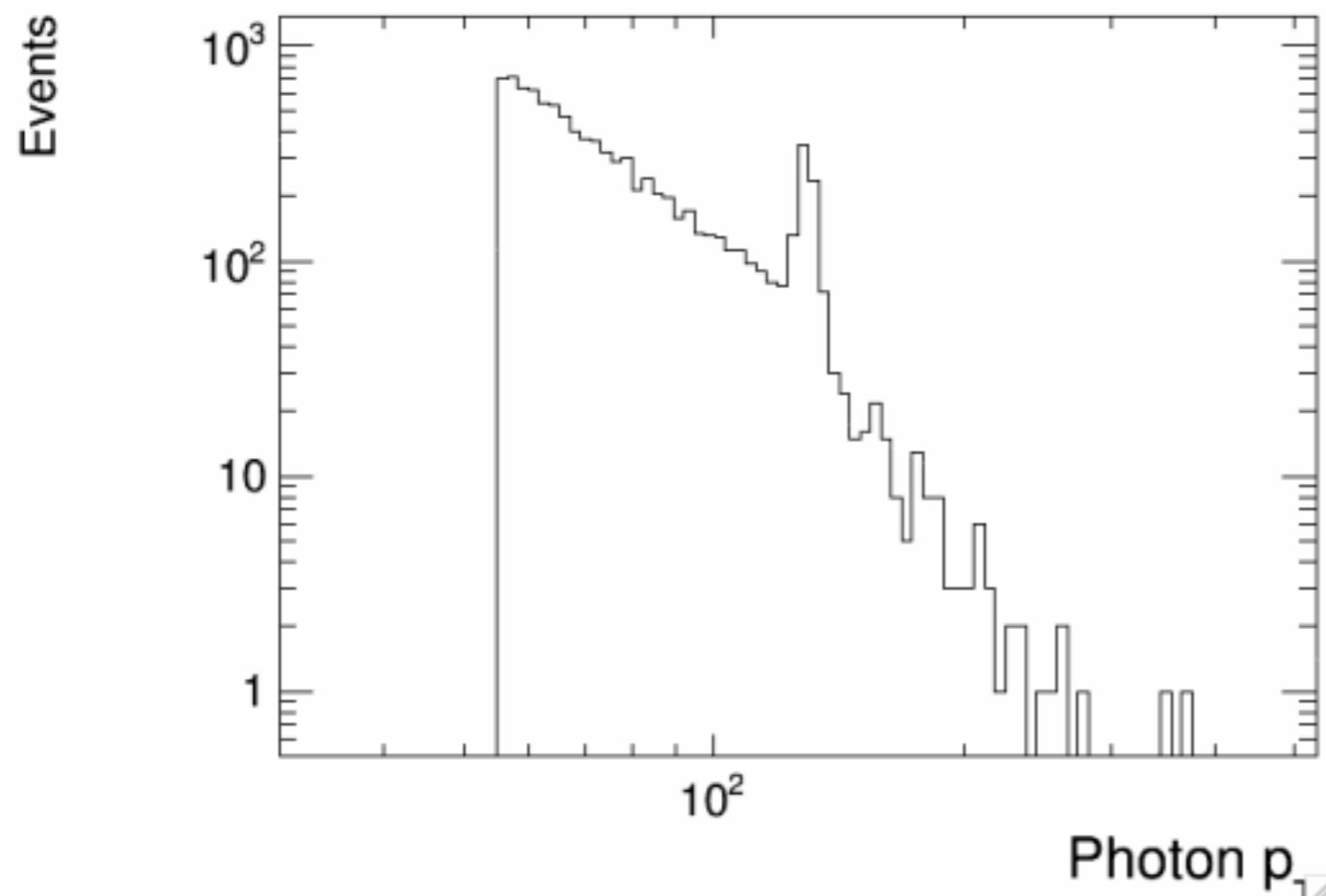


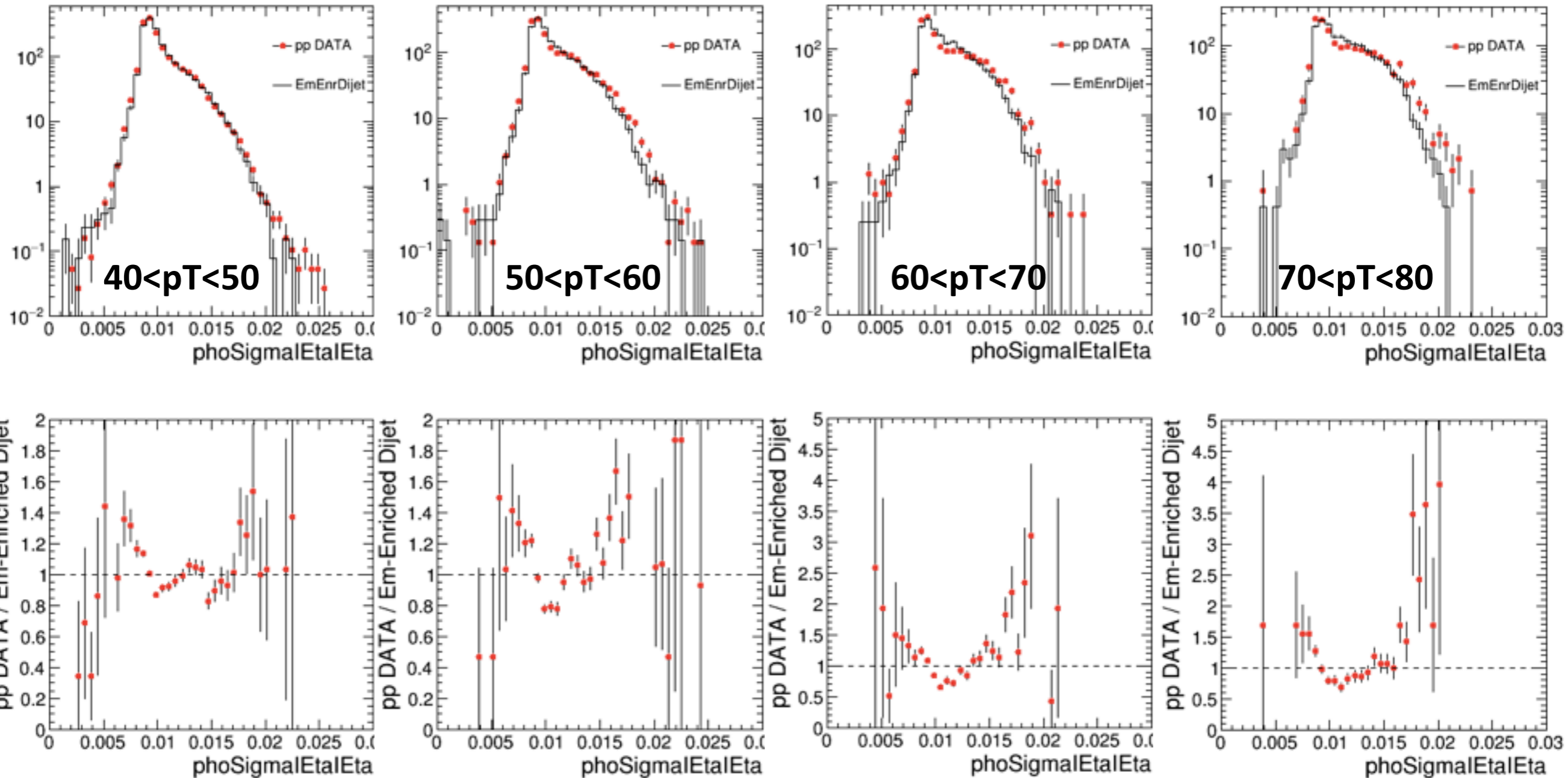
- **pp_purity.root**

- after spike rejection
- after collision event selection



BACKUP



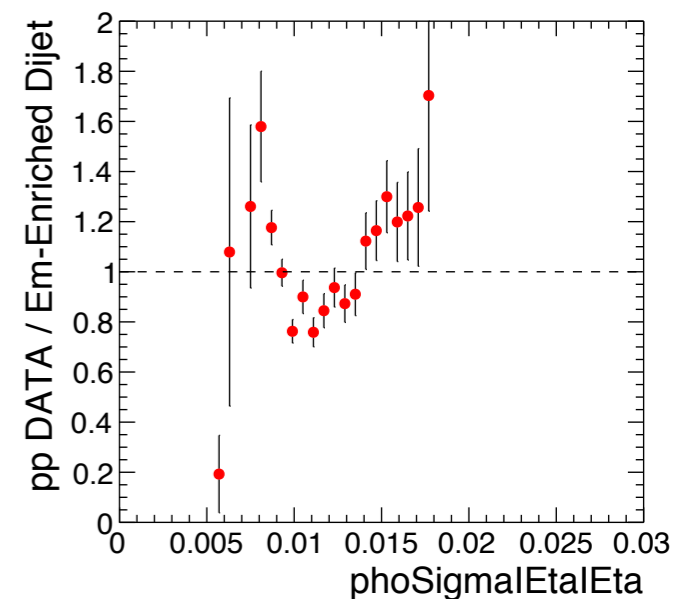
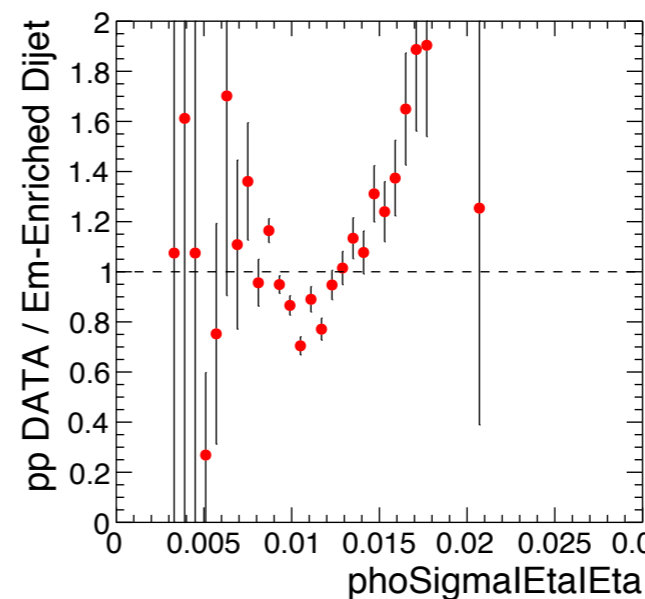
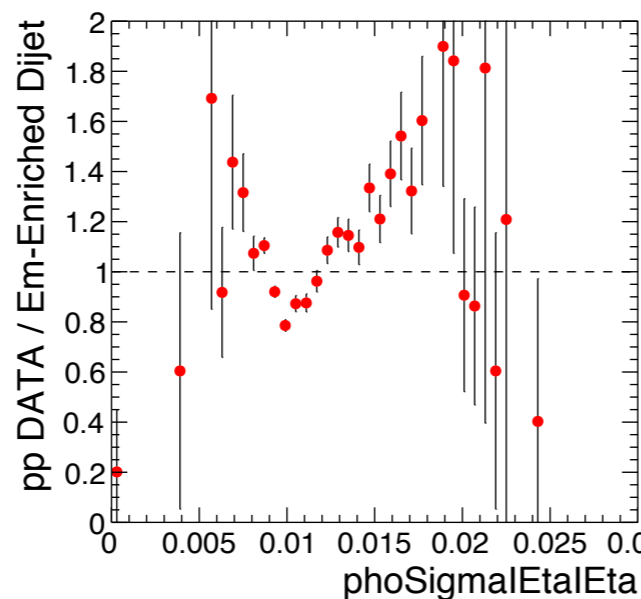
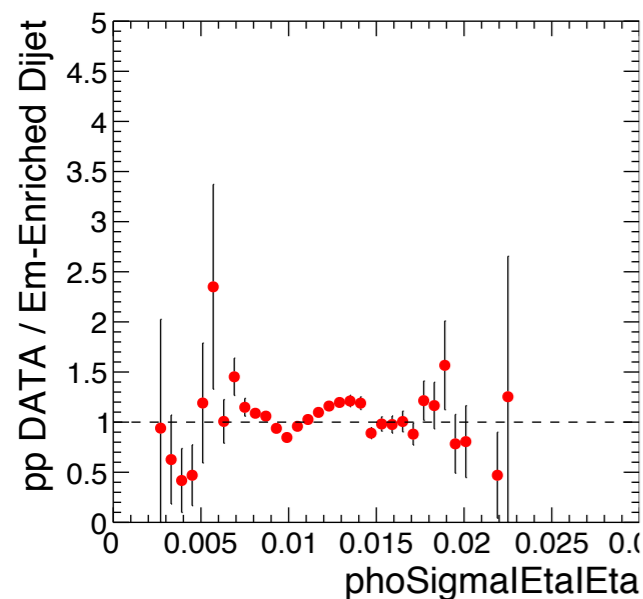
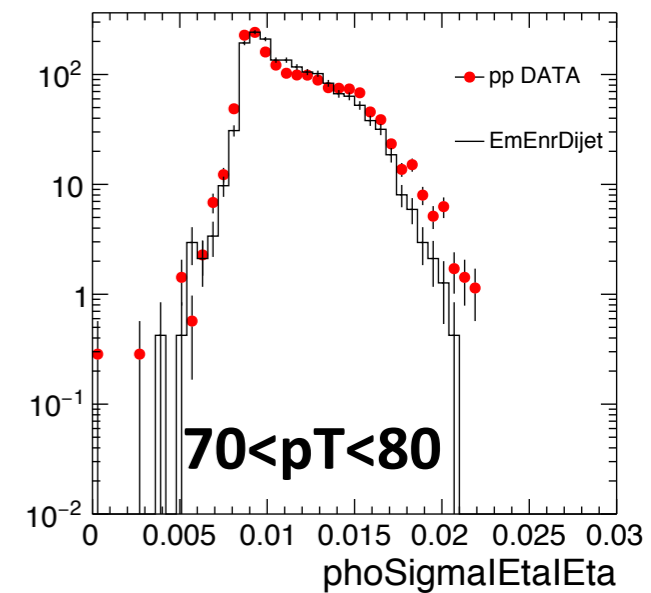
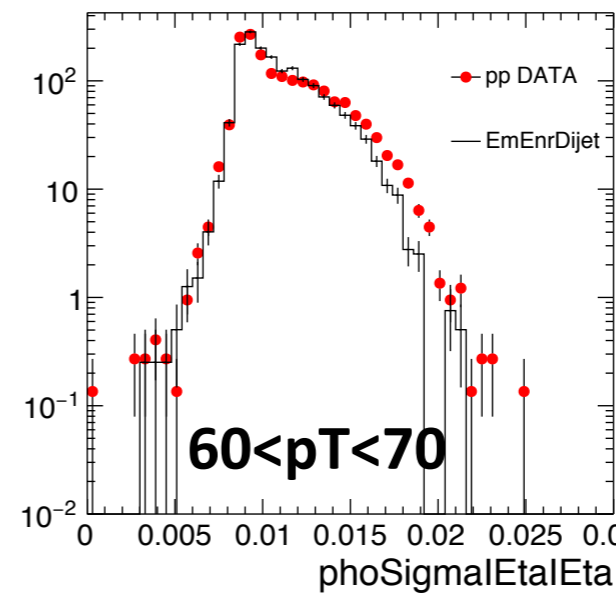
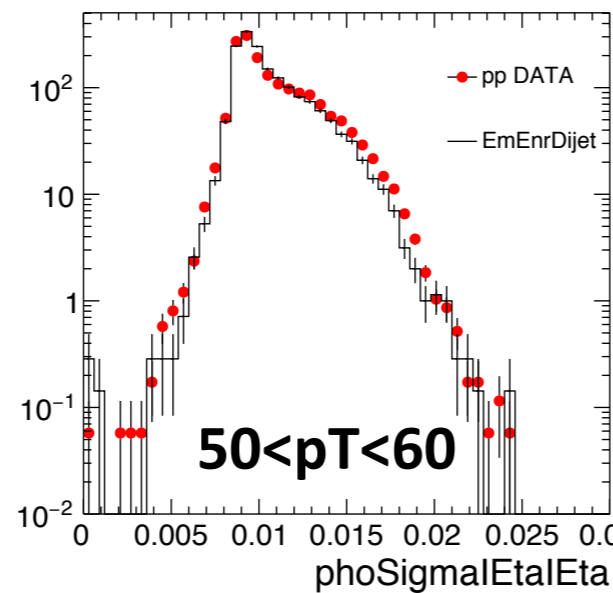
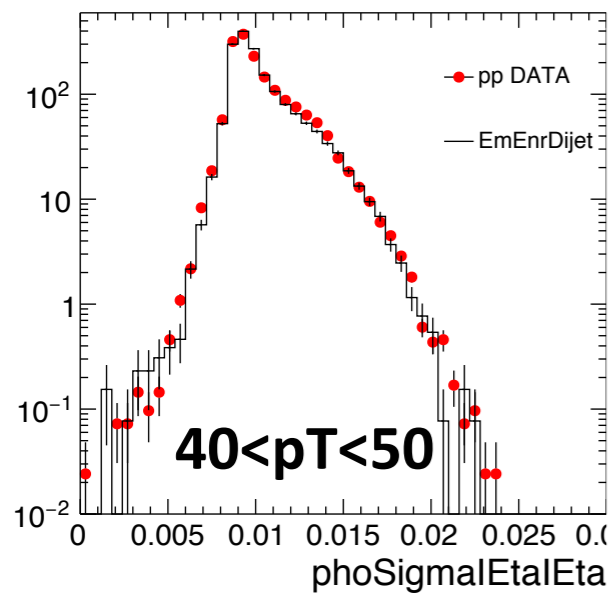


● **DATA Cuts**

- $|\eta| < 1.44$
- pBeamScrapingFilter && pPPrimaryVertexFilter && pVertexFilterCutEandG
- Spike rejection
- Sideband cut : (sumIso > 5) && (sumIso < 10) && phoHoverE < 0.1

● **MC Cuts**

- genMatched
- $!(mcCallsoDR04 < 5 \ \&\& \ abs(mcPID) \leq 22)$



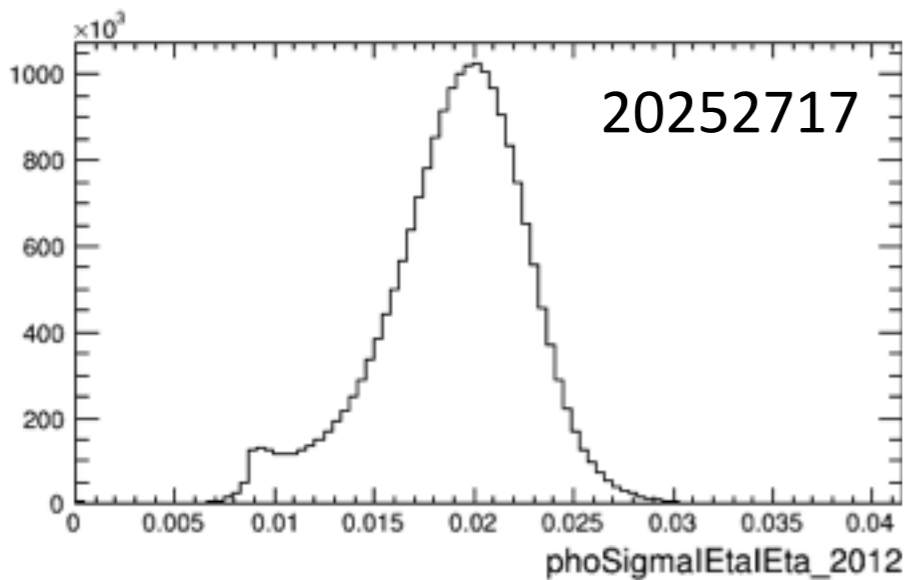
● **DATA Cuts**

- $|\eta| < 1.44$
- pBeamScrapingFilter && pPPrimaryVertexFilter && pVertexFilterCutEandG
- Spike rejection
- Sideband cut : (sumIso > 10) && (sumIso < 20) && phoHoverE < 0.1

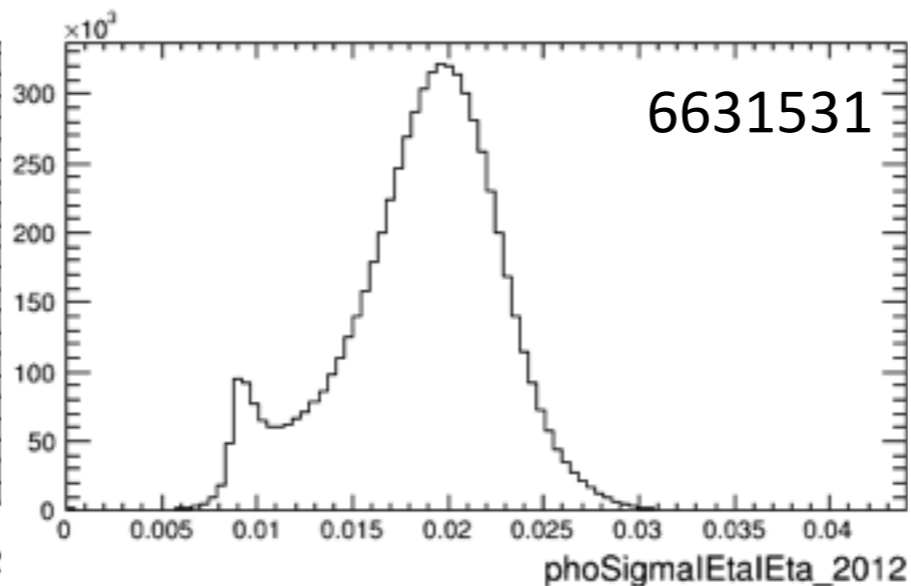
● **MC Cuts**

- genMatched
- $!(mcCallsoDR04 < 5 \ \&\& \ \text{abs}(mcPID) \leq 22)$

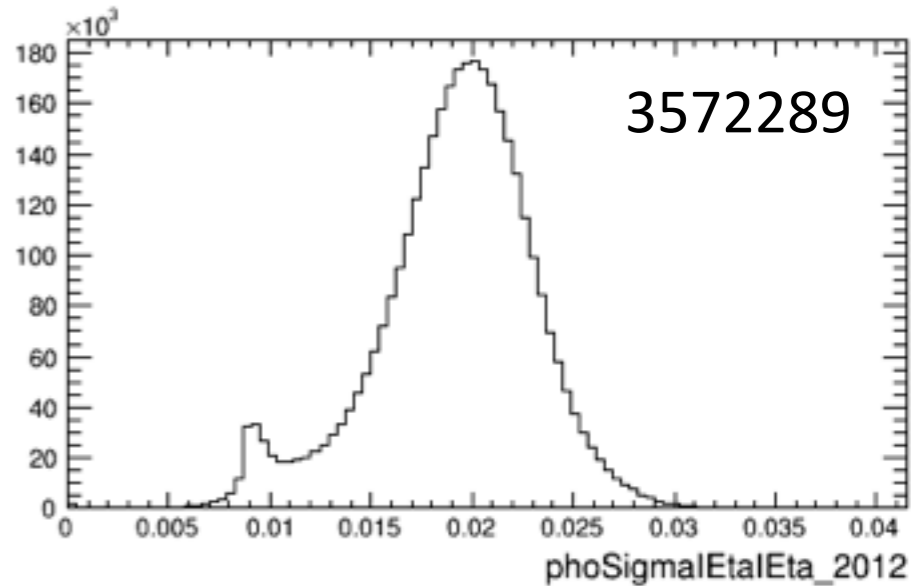
phoSignalEtaIEta_2012 (phoSignalEtaIEta_2012<1 && abs(phoEta)<1.44)



phoSignalEtaIEta_2012 (phoSignalEtaIEta_2012<1 && abs(phoEta)<1.44 && phoHovEr<0.1)

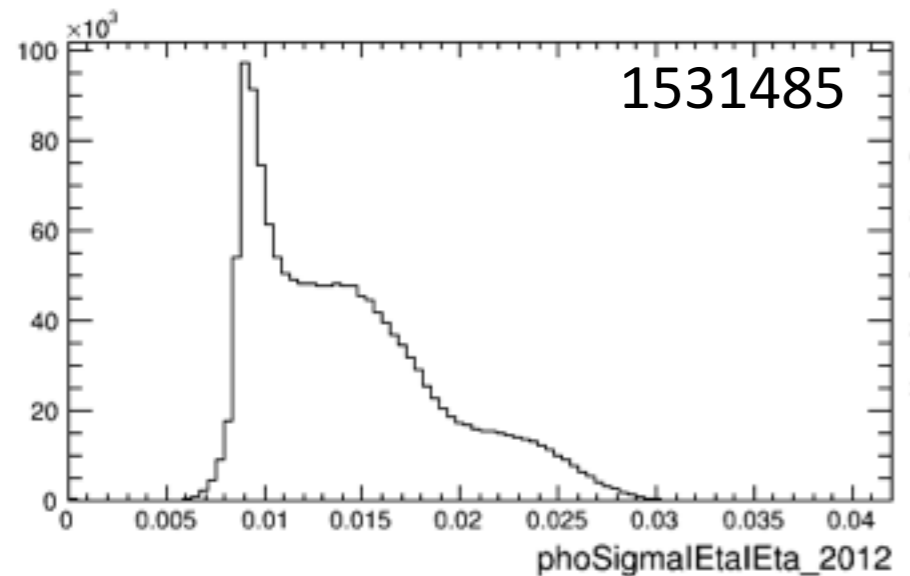


phoSignalEtaIEta_2012 (phoSignalEtaIEta_2012<1 && abs(phoEta)<1.44 && phoHovEr<0.1 && phoEta>30)

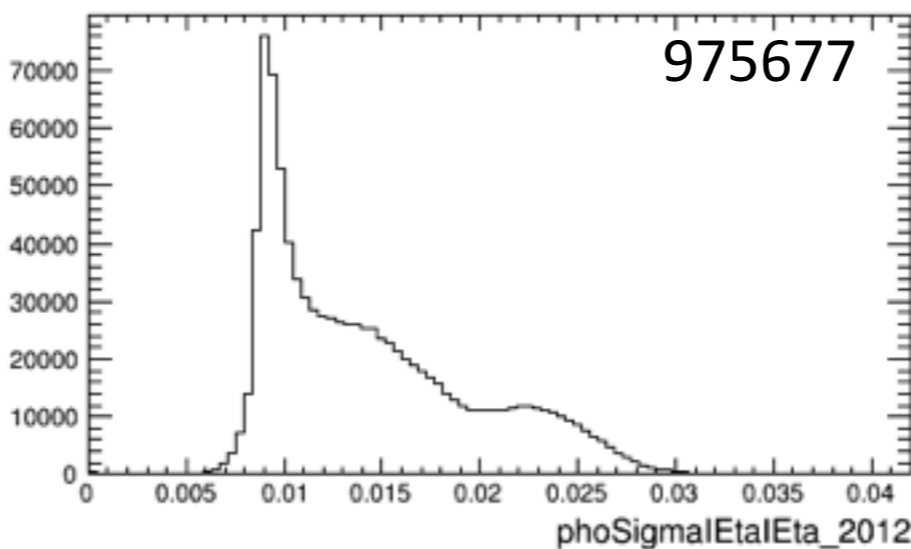


$p_T > 30$ GeV

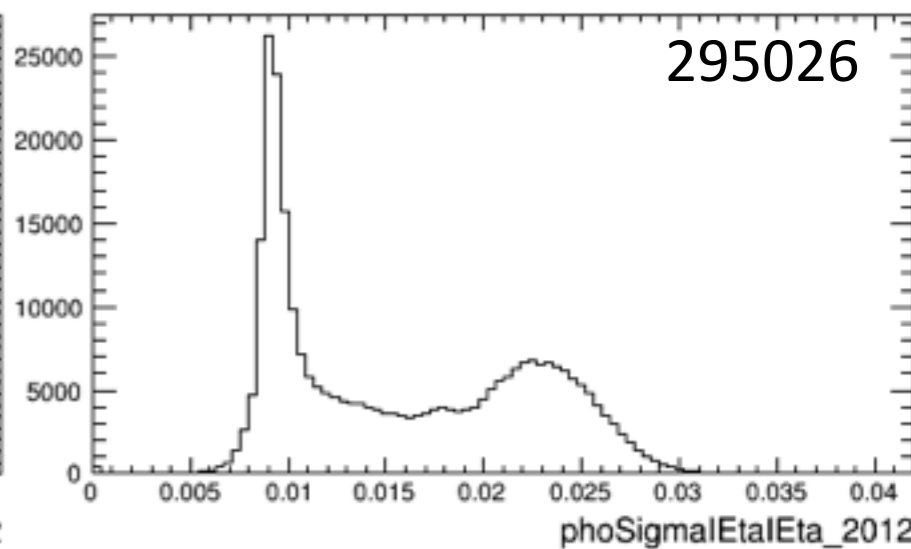
phoSignalEtaIEta_2012 (phoSignalEtaIEta_2012<1 && abs(phoEta)<1.44 && phoEt>30)



phoSignalEtaIEta_2012 (phoSignalEtaIEta_2012<1 && abs(phoEta)<1.44 && phoHovEr<0.1 && phoEt>30)



phoSignalEtaIEta_2012 (phoSignalEtaIEta_2012<1 && abs(phoEta)<1.44 && phoHovEr<0.1 && phoEta>30)



- Reco + ID Efficiency =

$$\epsilon_{Reco+ID} = \frac{\# \text{ recoMatched generated photons}}{\# \text{ generated isolated photons (genIso} < 5 \text{ GeV)}}$$

- Isolation Efficiency =

$$\epsilon_{Iso} = \frac{\# \text{ recoMatched isolated generated photons (sumIso} < 1 \text{ GeV)}}{\# \text{ recoMatched generated photons}}$$

- Total Efficiency =

$$\epsilon_{total} = \epsilon_{Reco+ID} \times \epsilon_{Iso}$$

- ◉ **Bins**
 - ptBin {40,50,60,70,80}; etaBin {0.0,1.44}; centBins = {0,60,200};
- ◉ **Event Selection on DATA**
 - no trigCut; pcollisionEventSelection; spike rejection; no hotspot
- ◉ **Signal**
 - pbpb
 - phoHoverE<0.1
 - (pho_ecalClusterIsoR4 + pho_hcalRechitIsoR4 + pho_trackIsoR4PtCut20) < 1.0
 - phoSigmaEtaEta_2012<0.0102
 - pp GED middle cut from Egamma POG
 - phoHoverE<0.05
 - phoSigmaEtaEta<0.0102
 - ((pfIso4<=1.37) && (pfnIso4<=1.06+0.014*phoEt+0.000019*phoEt*phoEt) && pfplIso4<=(0.28+0.0053*phoEt))
- ◉ **Purity**
 - sideband cut :
 - ((pho_ecalClusterIsoR4 + pho_hcalRechitIsoR4 + pho_trackIsoR4PtCut20)>5) && ((pho_ecalClusterIsoR4 + pho_hcalRechitIsoR4 + pho_trackIsoR4PtCut20)<10)
 - phoHoverE<0.1
 - mc cut :
 - (pho_genMatchedIndex!= -1)
 - mcCallIsoDR04[pho_genMatchedIndex]<5
 - abs(mcPID[pho_genMatchedIndex])<=22

- **ppData :**
 - `"/home/goyeonju/CMS/Files/photon2016/2015-Data-promptRECO-photonSkims_pp-photonHLTFilter-v0-HiForest.root";`
- **ppMC :**
 - `"/home/goyeonju/CMS/Files/photon2016/2015-PP-MC_Pythia8_Photon30_pp502_TuneCUETP8M1.root";`
- **pbpbData :**
 - `"/home/goyeonju/CMS/Files/photon2016/forestSkimed_photonSkim_pbpb_2015data.root";`
- **pbpbMC :**
 - `"/home/goyeonju/CMS/Files/photon2016/2015-PbPb-MC-AllQCDPhoton_v1_ptHat_15_30_50_80_120_with_pthatWeight.root";`