

22, Aug, 2013 Naoyuki Kamo

Z + jet , gamma + jet

- <https://cds.cern.ch/record/1562922/files/ATL-COM-PHYS-2013-1013.pdf>
- に書いてあるselectionを要求して、統計量の見積もりを再計算した。

Z + jet

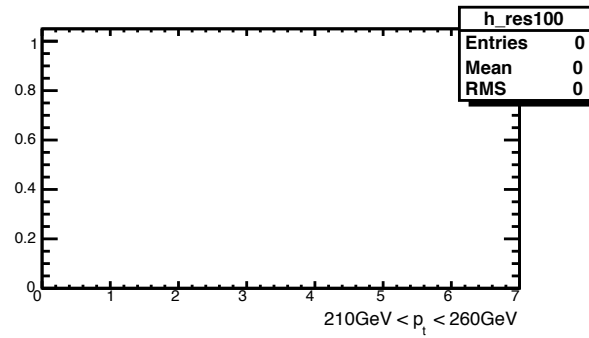
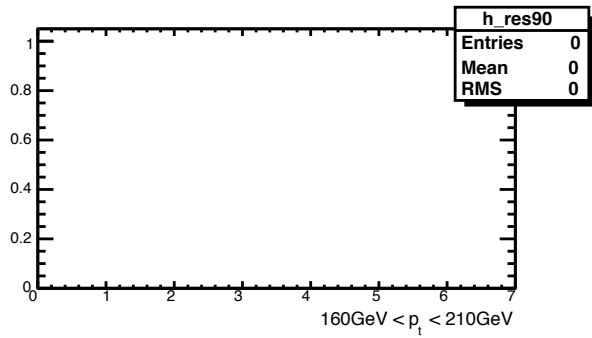
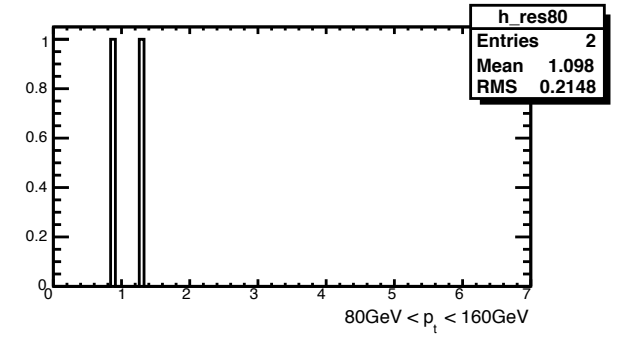
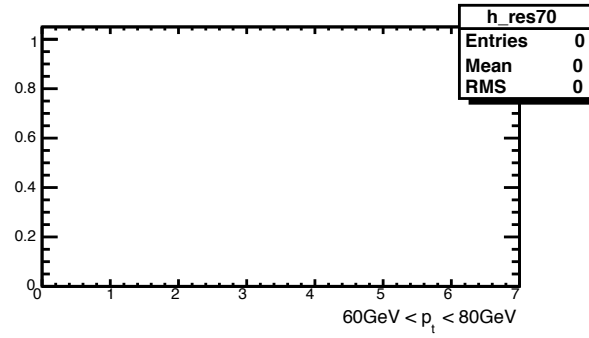
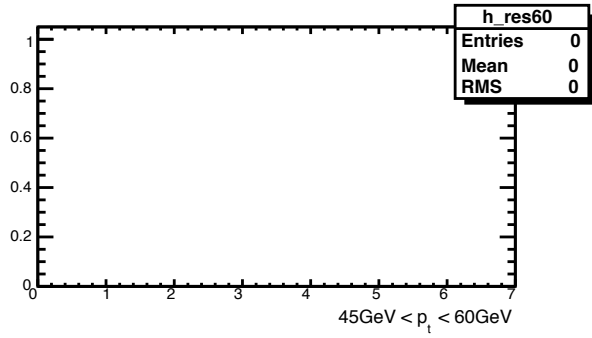
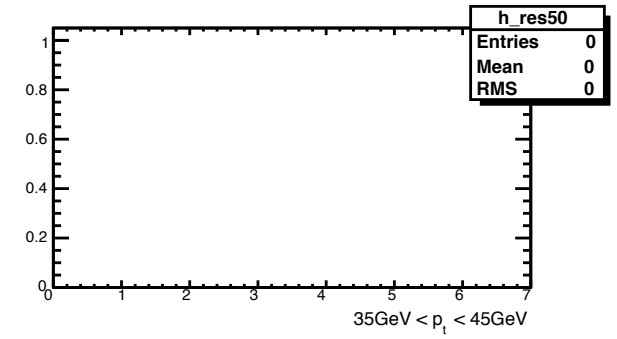
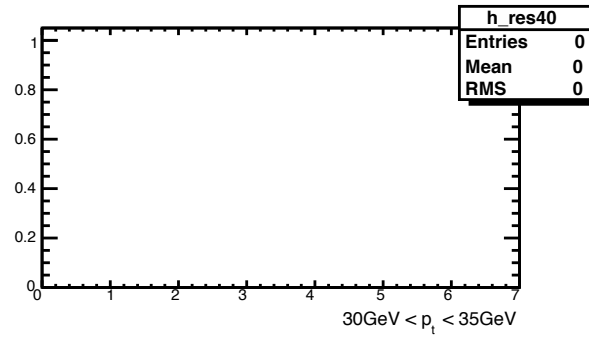
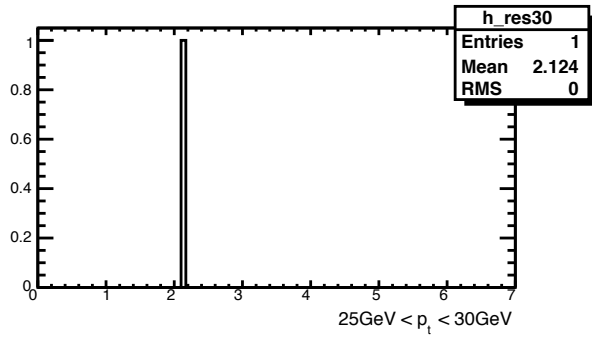
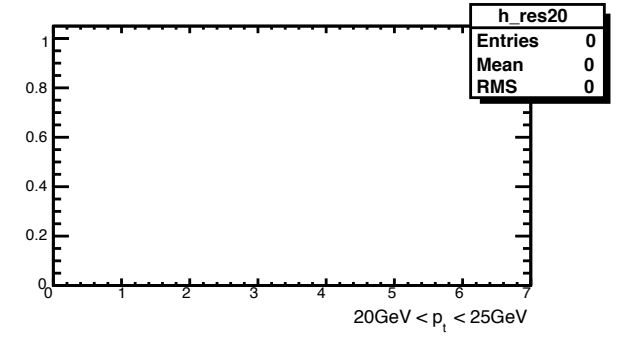
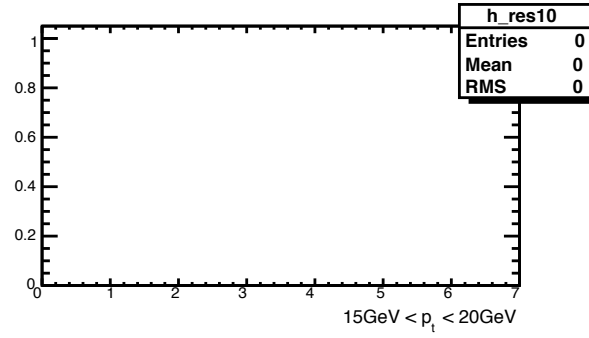
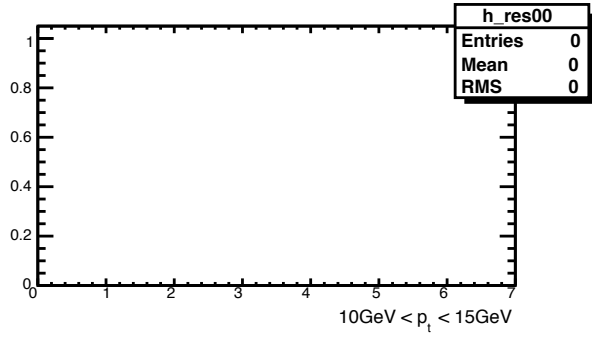
- Data(zee) : data12_8TeV.
00208126.physics_Egamma.merge.NTUP_JETMET.r4065_p1278_p1344_p1345_tid01117601_00/(589562 events)
- Data(zmumu): data12_8TeV.
00212142.physics_Muons.merge.NTUP_JETMET.r4065_p1278_p1344_p1345_tid01118277_00/ (762343 events)
- Zeeは全体の1/743、 Zmumuは1/971の統計量
- el_medium++ , mu_medium
- $\Delta R(\text{jet}, \text{el_medium++}) < 0.1$ のjetはelectronとする
- Trigger(zee): EF_e12Tvh_loose1 (multi-electron , unprecaled)
- Trigger(zmumu): EF_mu24i_tight || EF_mu36_tight
- B-tag : MVI > 0.8119 (nominal efficiency70%)

Variable	Selection	description
e_1, e_2	$E_T^{e_{1,2}} > 20 \text{ GeV}$ $80 \text{ GeV} < M_{e^+e^-} < 116 \text{ GeV}$ $ \eta^{e_{1,2}} < 2.47$ excluding $1.37 < \eta^e < 1.52$	electron pre-selection
leading jet $\Delta R_{j,e} = \sqrt{(\Delta\eta)^2 + (\Delta\phi)^2}$	$ \eta^{\text{jet}} < 0.8, JVF > 0.25$ if $p_T < 50 \text{ GeV}$ > 0.35 anti- k_t $R = 0.4$ jets > 0.5 anti- k_t $R = 0.6$ jets	jet pre-selection isolation/topology
$p_T^{\text{jet}2}$	< $\max(0.2 \times p_T^Z, 10 \text{ GeV})$	radiation/topology
JVF(jet2)	> 0.25, if $ \eta^{\text{jet}2} < 2.4$ and $p_T < 50 \text{ GeV}$	JVF restriction for sub-leading jets

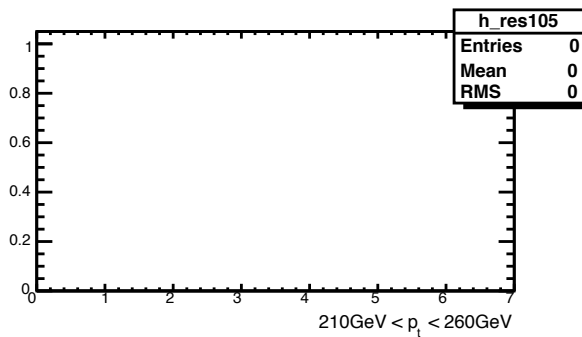
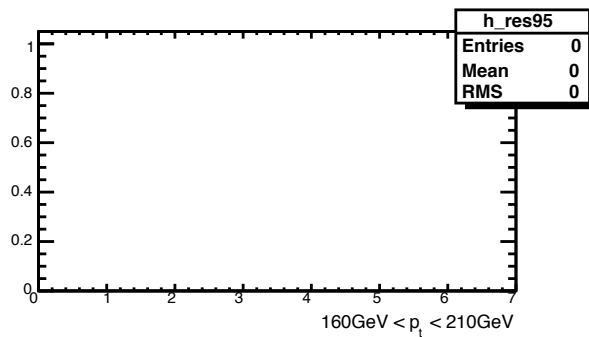
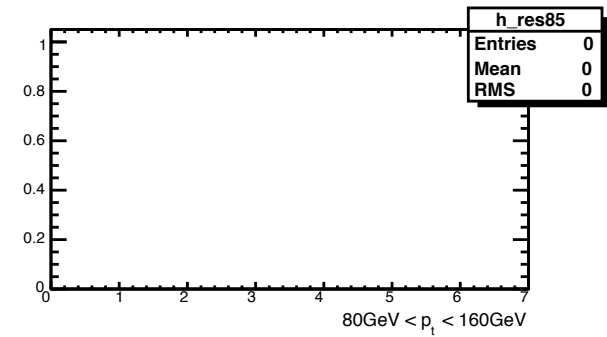
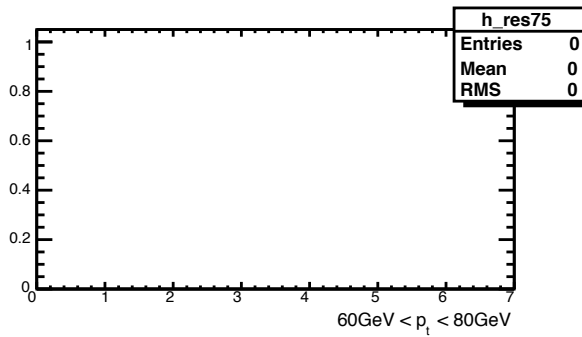
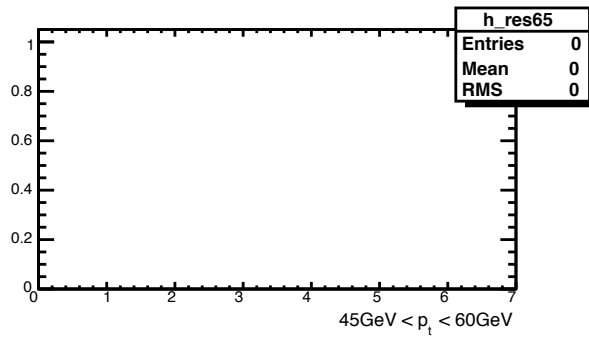
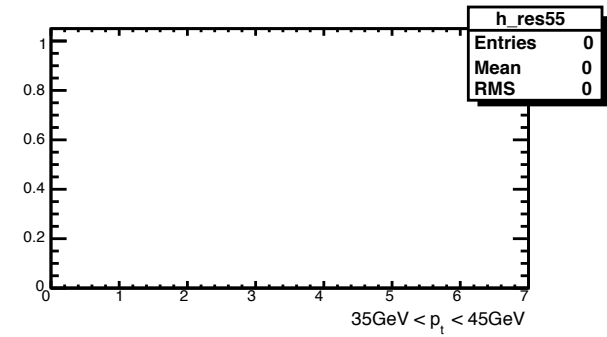
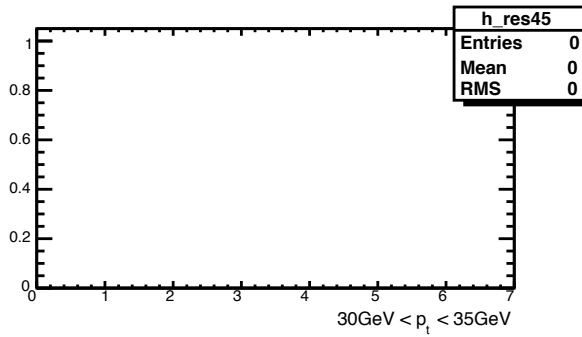
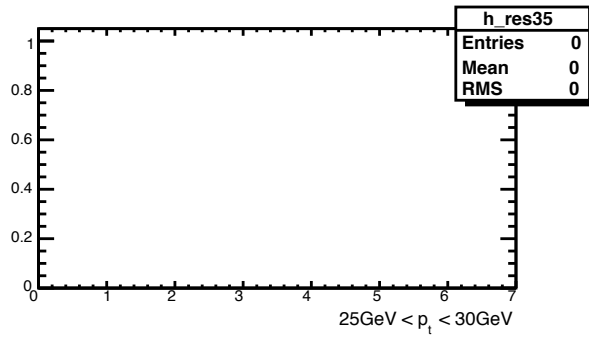
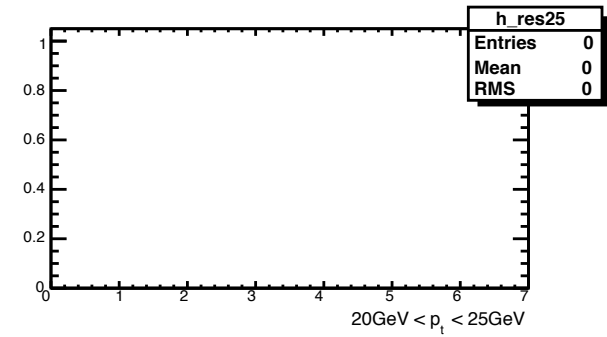
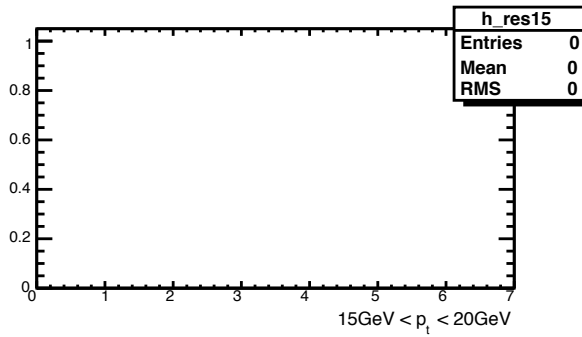
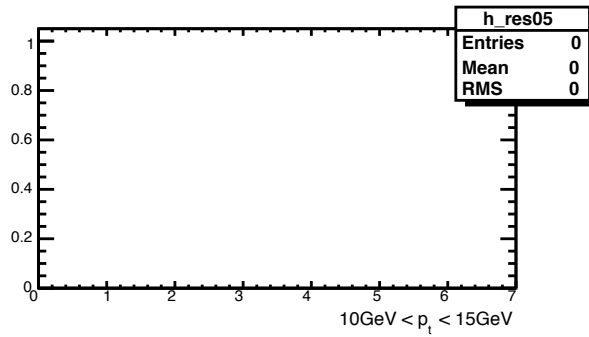
- Zeeでmedium++を要求した場合、cut前の段階で統計量はほぼ0 (p6) 。
- looseにするとすこし増えるが、あまり変わらない。
- 公式のselectionなので、何かバグ？zmumuもほとんど同じマクロなので、両方バグっている可能性も。
- Zmumuの方は前と変わらず、統計量は不十分 (p12)

Zee + jet

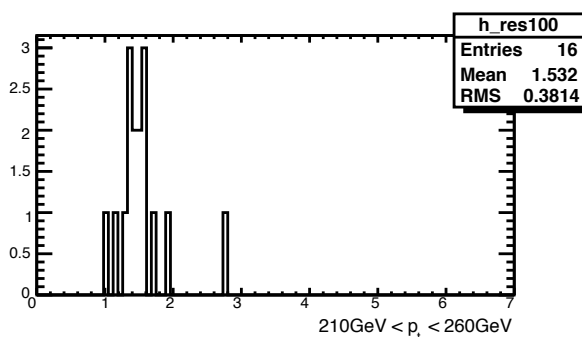
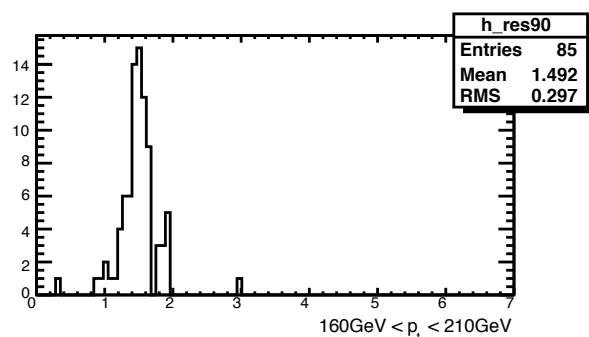
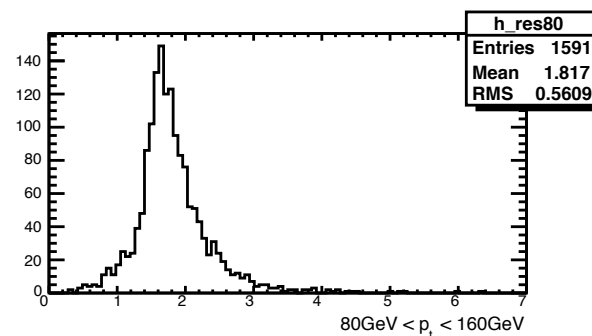
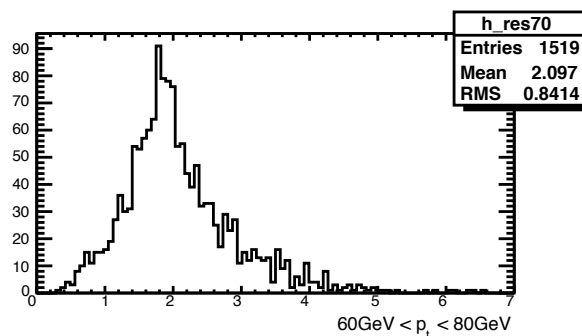
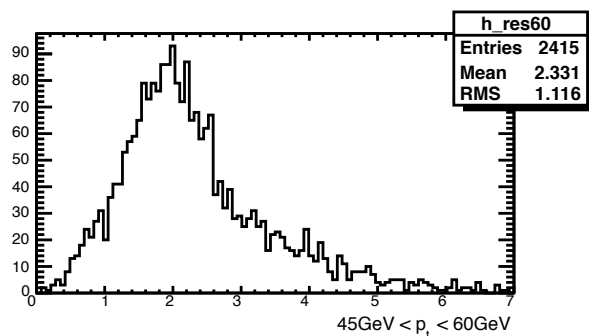
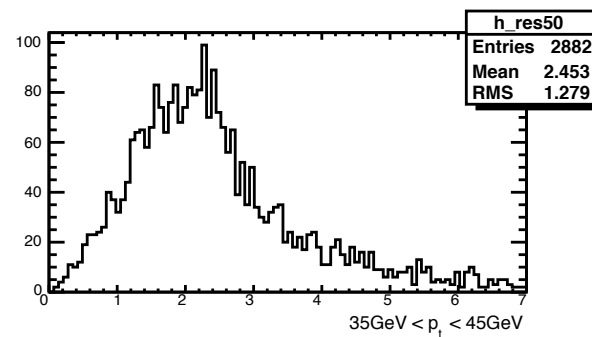
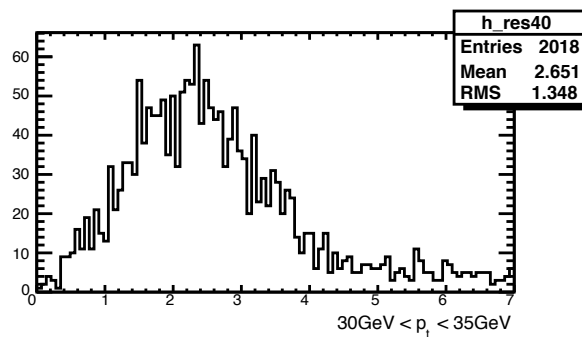
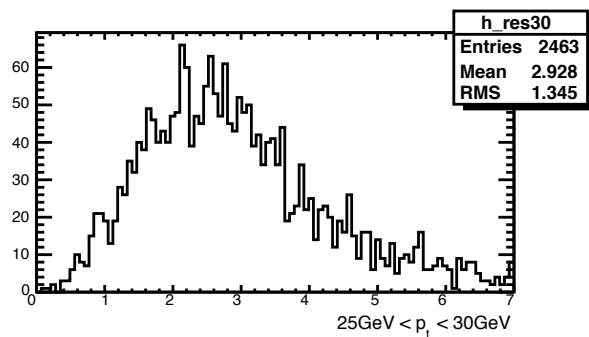
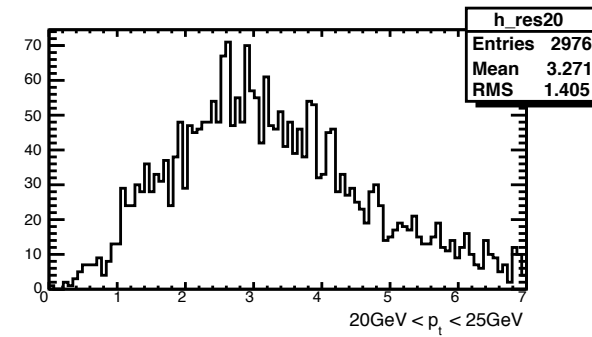
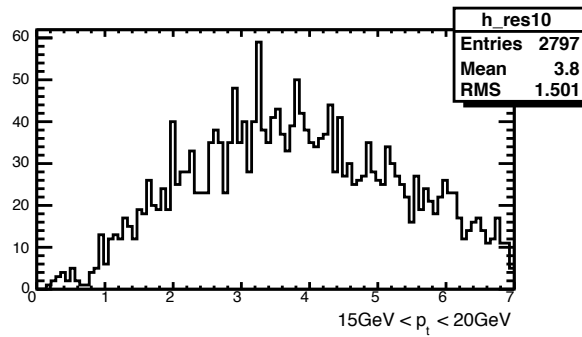
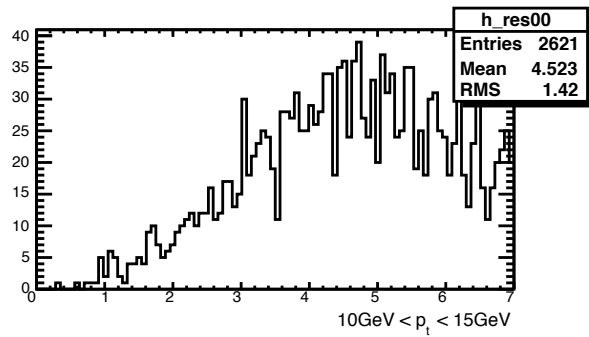
Zee (medium++ Cut前)



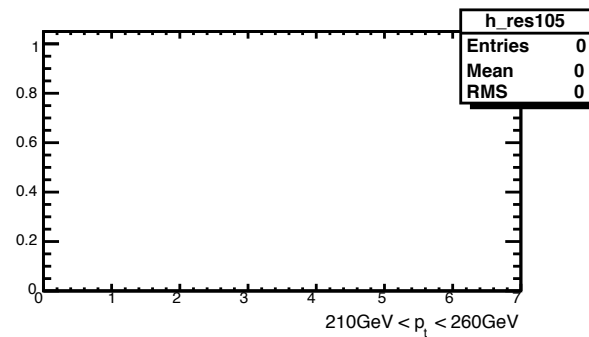
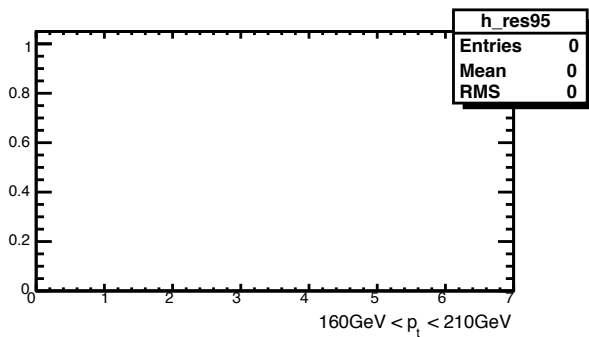
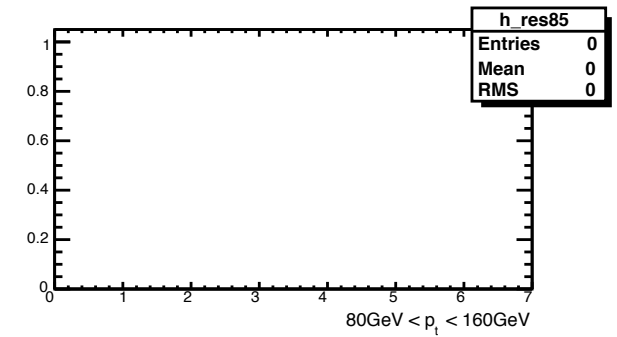
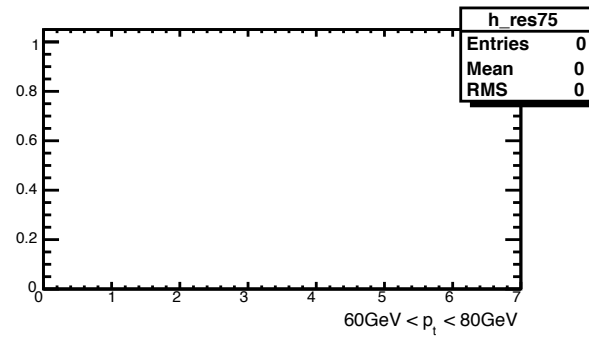
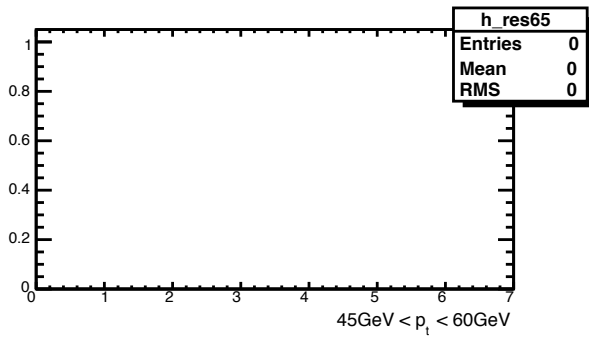
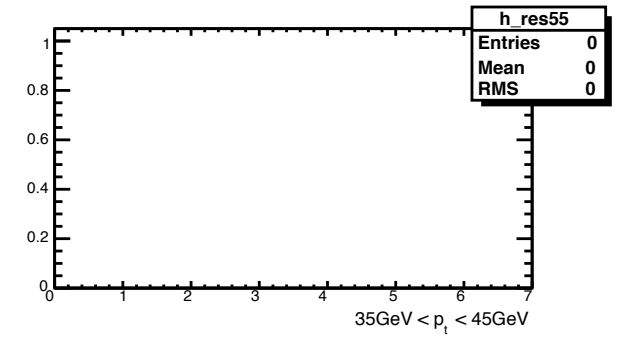
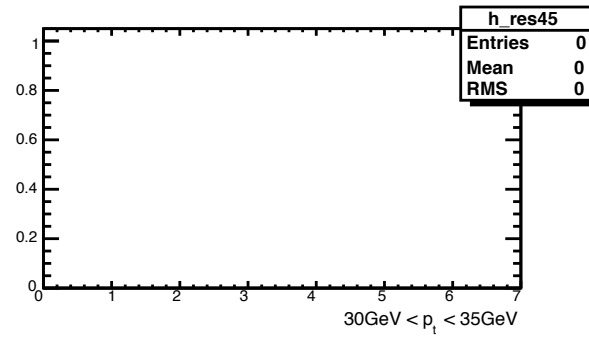
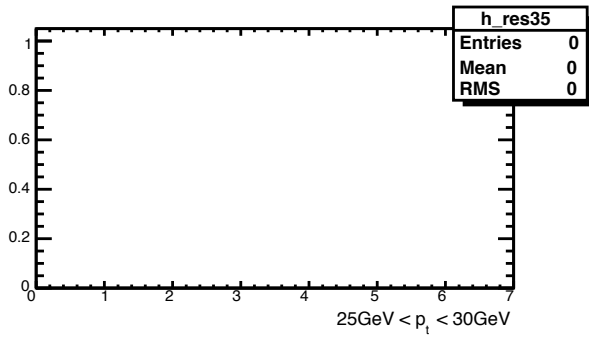
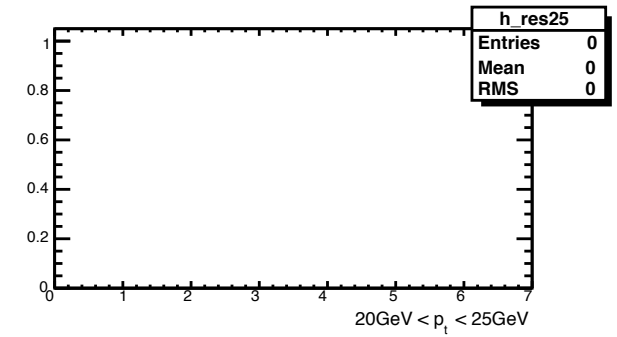
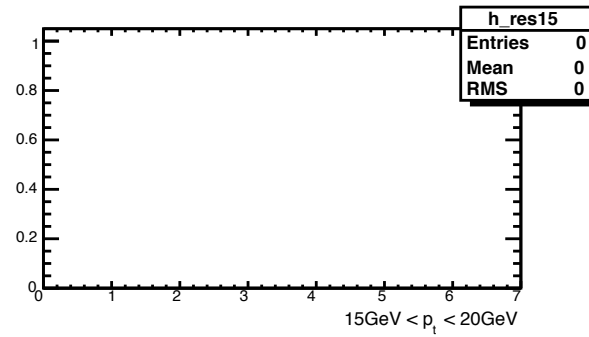
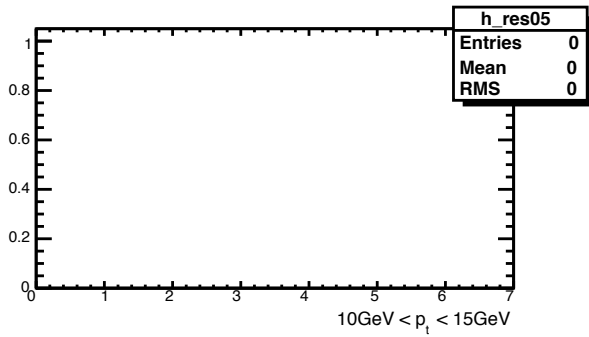
Zee (medium++ Cut後)



Zee (medium++要求なし Cut前)

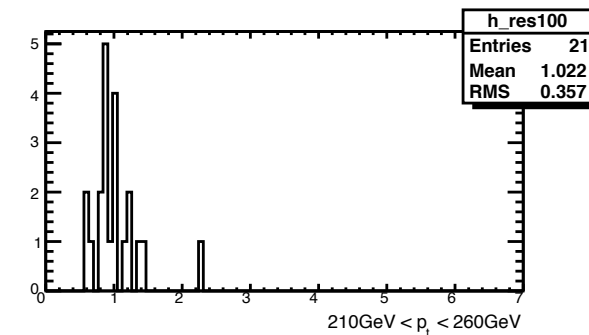
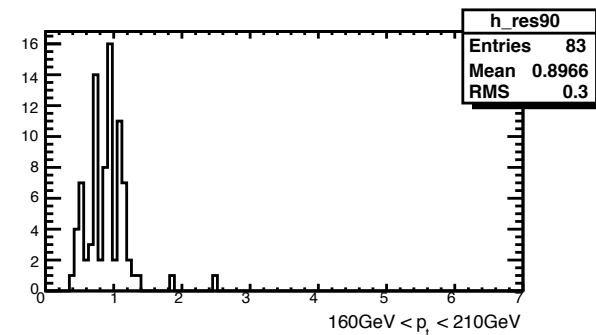
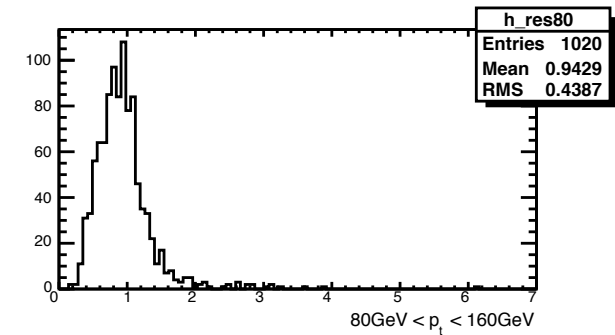
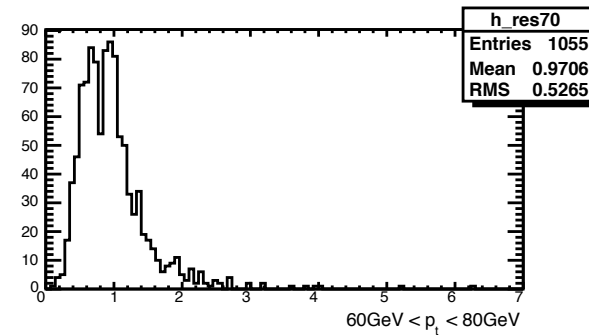
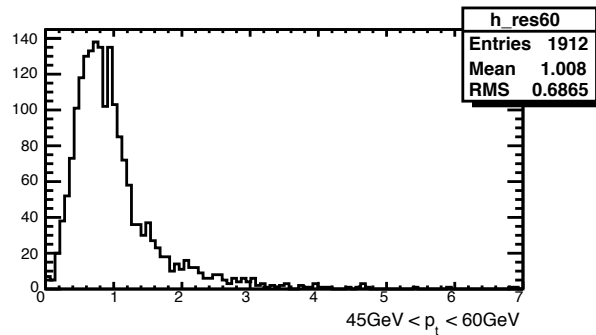
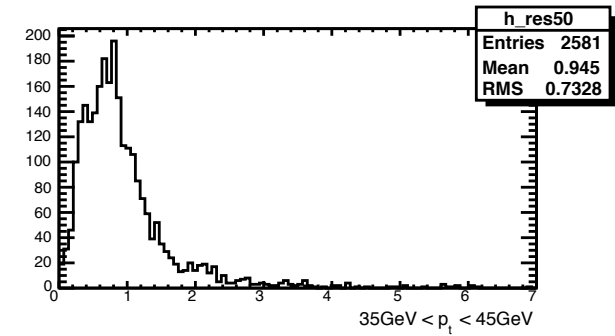
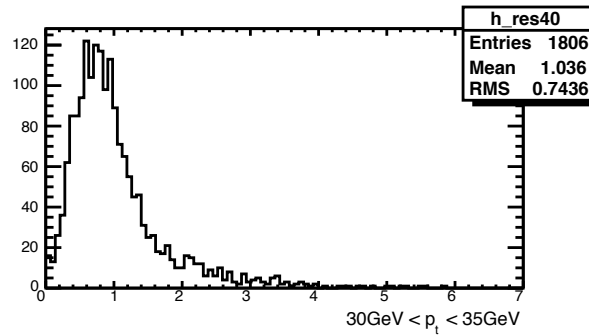
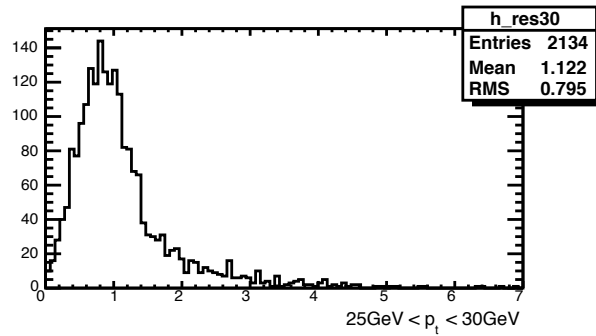
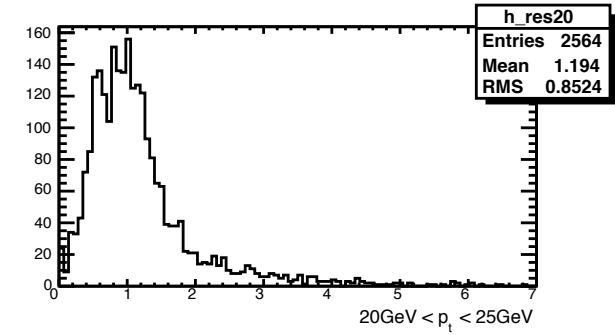
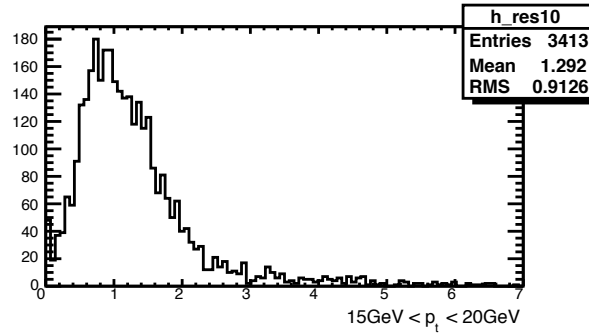
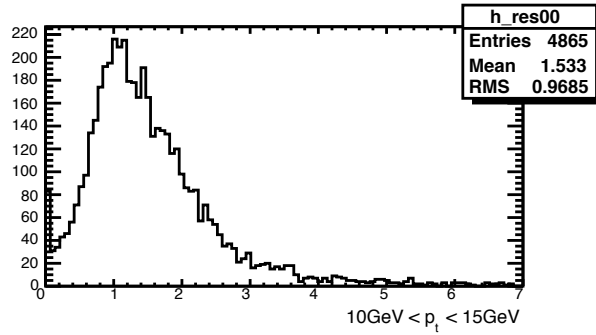


Zee (medium++要求なし Cut後)

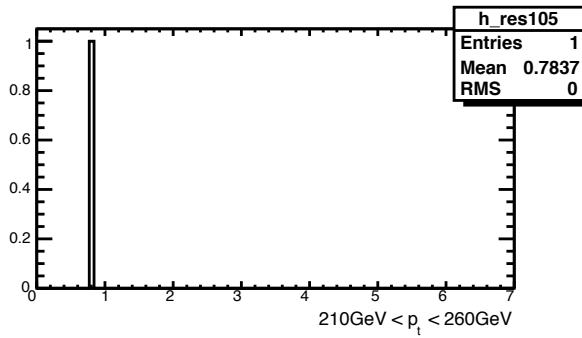
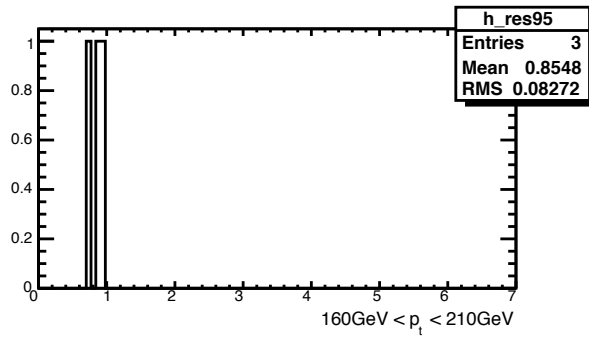
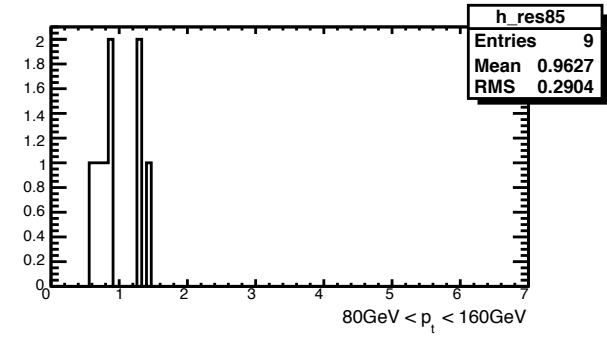
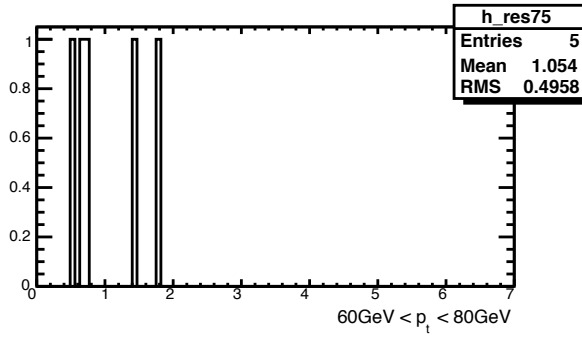
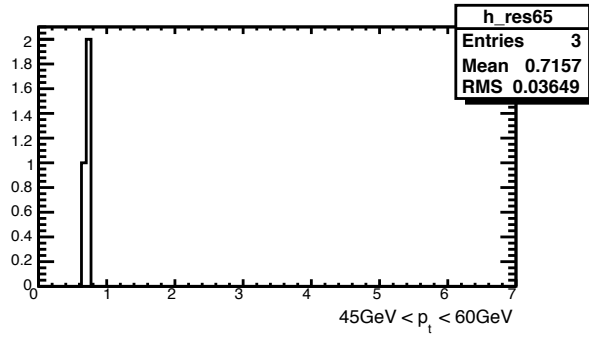
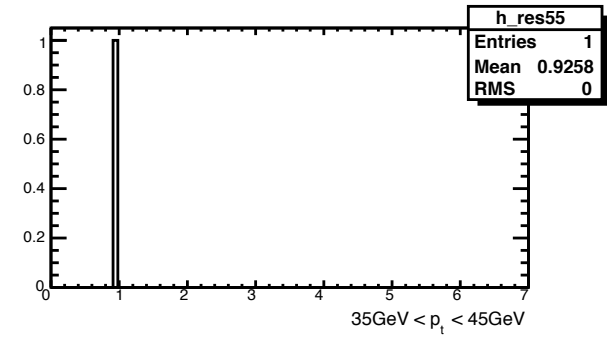
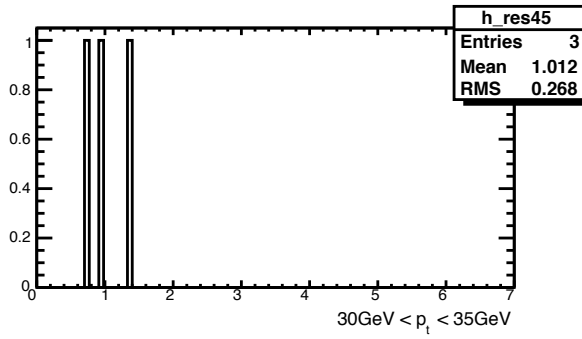
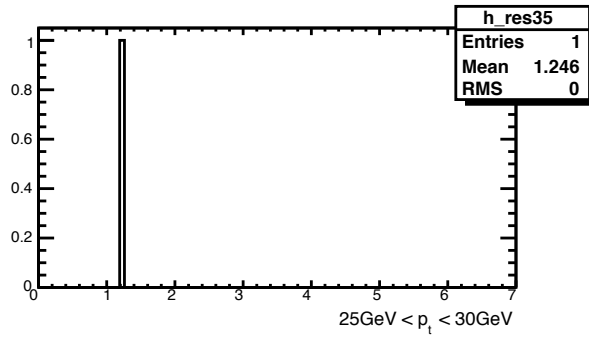
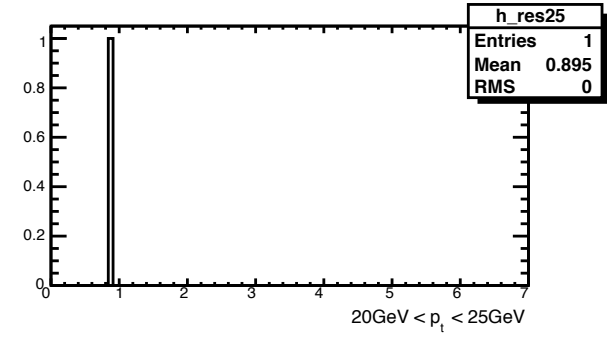
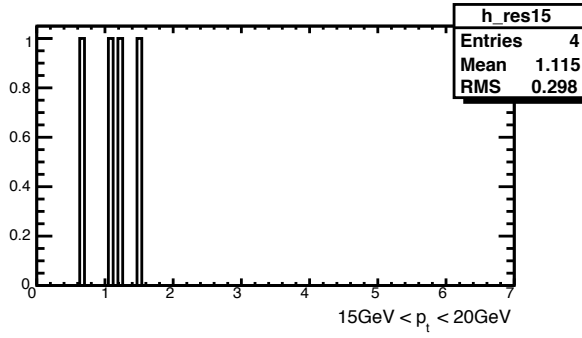
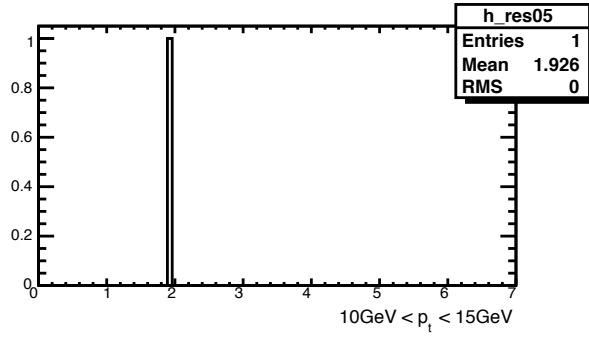


Zmumu + jet

Zmumu (Cut前)



Zmumu (Cut後)



gamma+ jet

- Data : data l2_8TeV.00208126.physics_Egamma.merge.NTUP_JETMET.r4065_p1278_p1344_p1345_tid01117601_00/(589562 events、全体の1/743)
- $\Delta R(\text{jet}, \text{gamma}) < 0.1$ の jet は gamma とする (ただし gamma は下表の条件を満たす)。
- Trigger(zmumu): EF_g120_loose (unprescaled)
- B-tag : MVI > 0.8119 (nominal efficiency 70%)
- selection については <https://twiki.cern.ch/twiki/bin/viewauth/AtlasProtected/GammaJetCalib2012> に詳しく書いてある

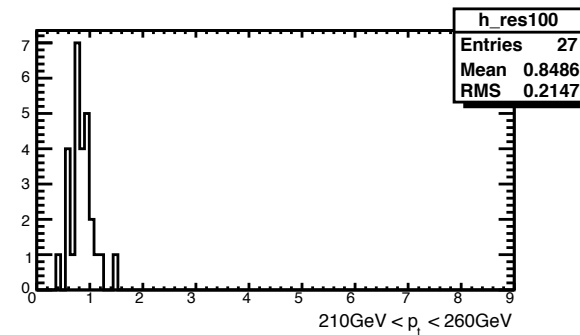
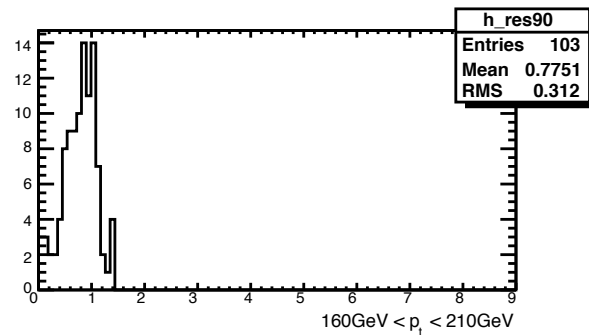
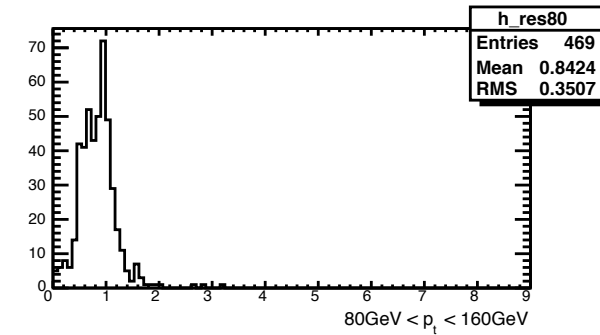
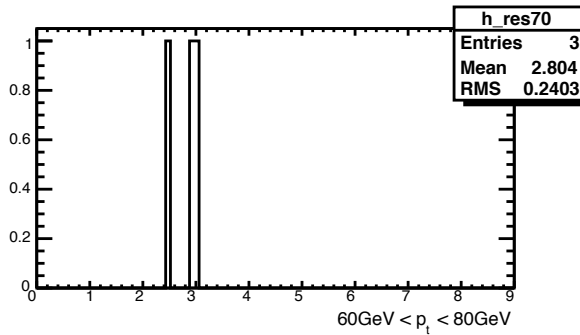
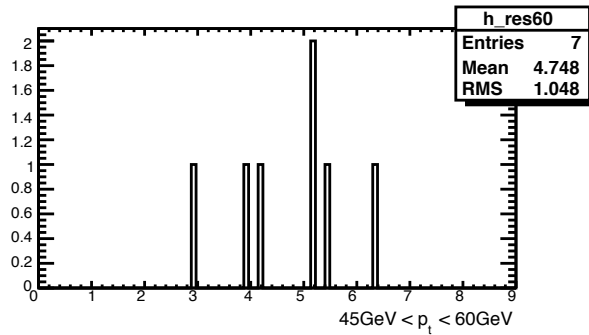
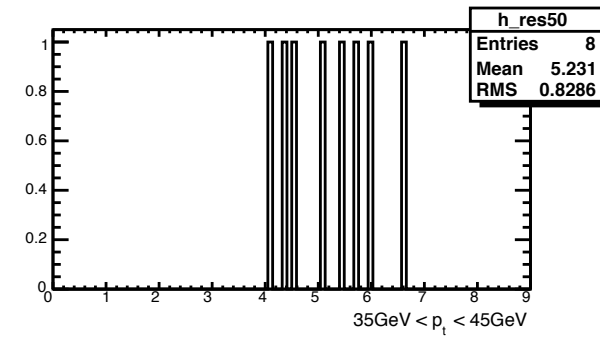
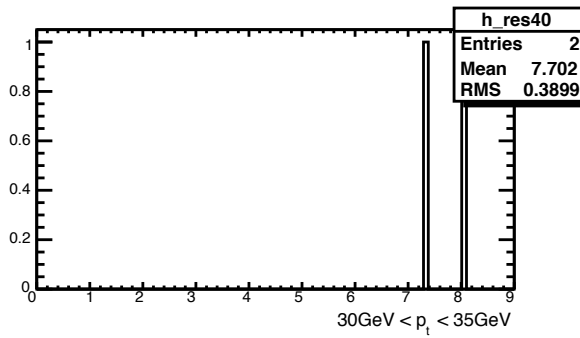
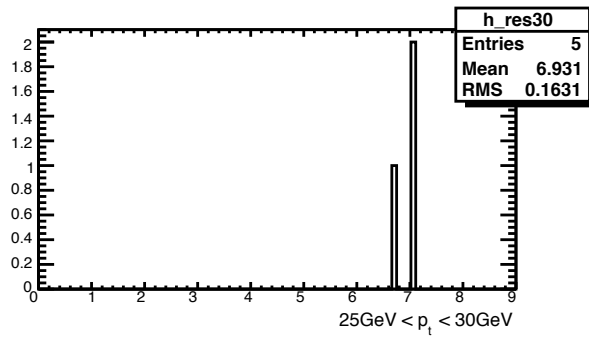
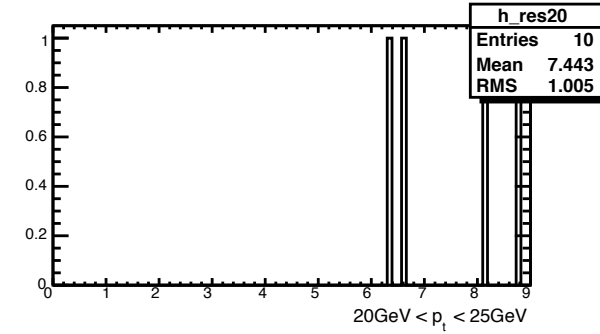
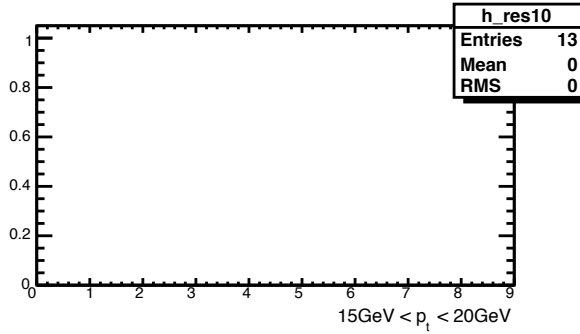
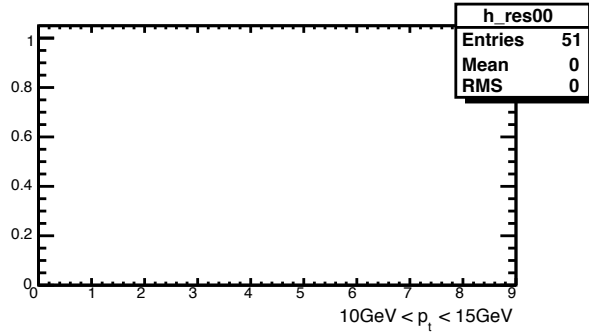
Variable	Selection	description
leading γ	$p_T^\gamma > 85 \text{ GeV}$ and $ \eta^\gamma < 1.37$	photon pre-selection
$E_T^{\gamma \text{ Iso}}$	$< 3 \text{ GeV}$	γ isolation
$E_T^{\gamma \text{ cluster}} / (\sum p_T^{\text{tracks}})$	$\in [0, 2]$ (single-track conversions) $\in [0.5, 1.5]$ (double-track conversions)	jets faking photons
leading jet	$p_T^{\text{jet}} > 12 \text{ GeV}$ and $ \eta^{\text{jet}1} < 0.8$	jet pre-selection
$\Delta\phi_{\text{jet}-\gamma}$	> 2.9 radians	radiation suppression
$p_T^{\text{jet}2}$	$< 0.2 \times p_T^\gamma$	radiation suppression
JVF(jet2)	> 0.25 , if $ \eta^{\text{jet}2} < 2.4$	JVF restriction for sub-leading jets

※ $p_{T_gamma} > 85 \text{ GeV}$ は要求していない

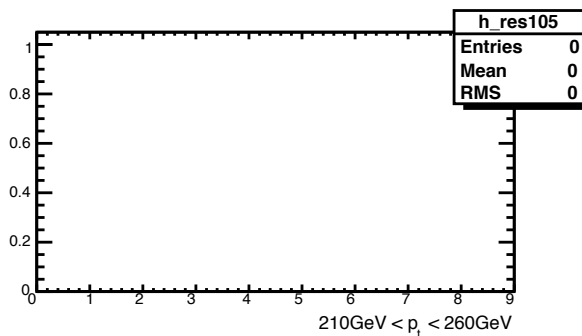
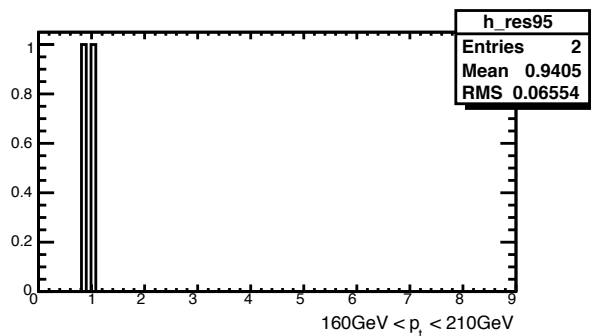
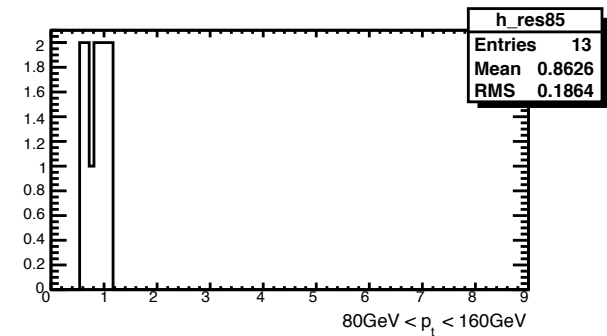
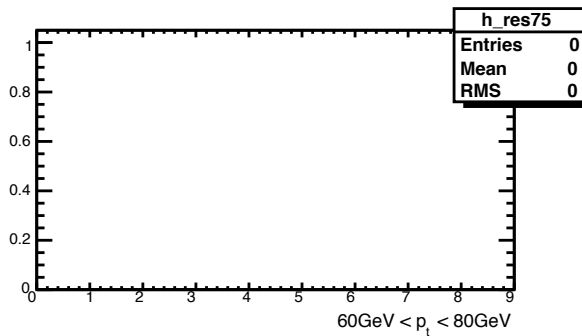
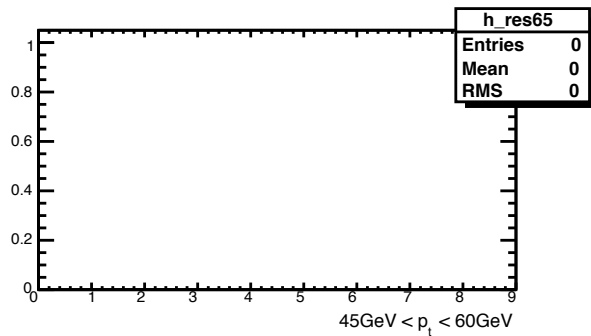
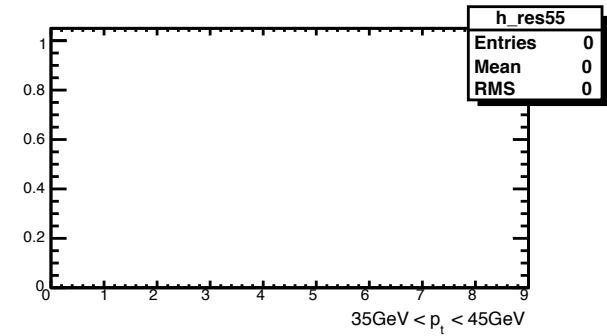
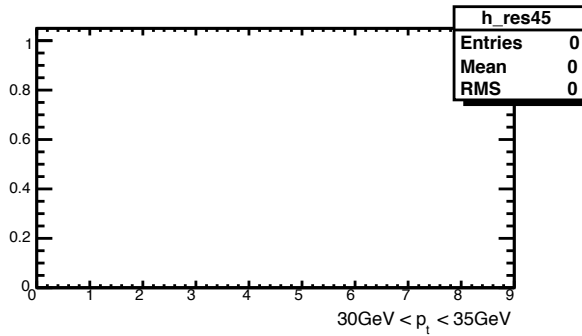
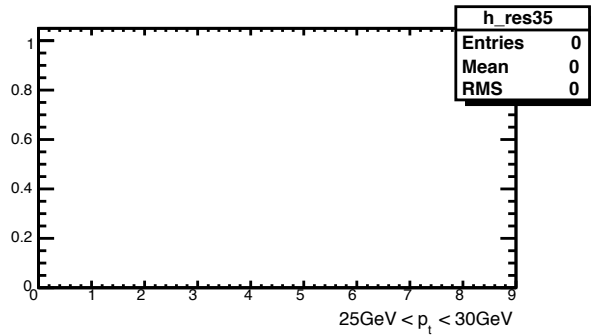
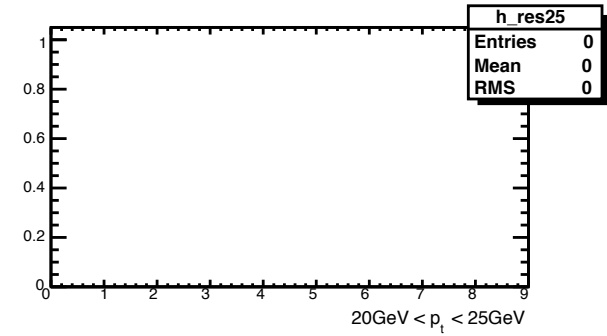
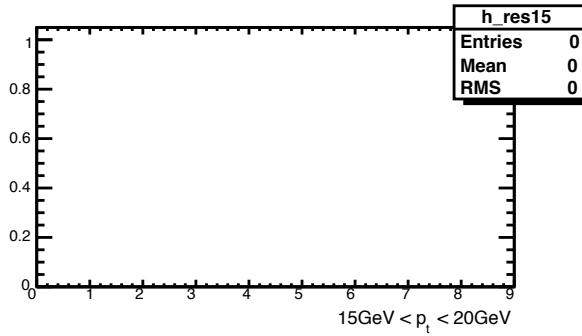
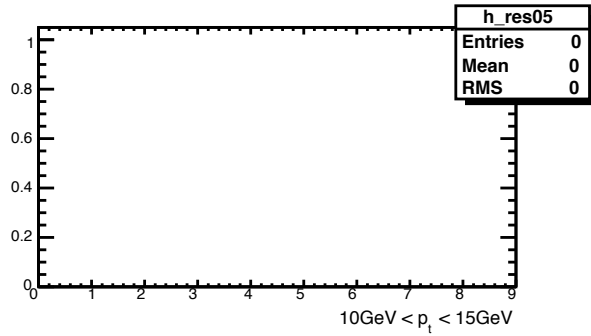
- EF_g120_looseを要求するとlow pT 側がほとんどいなくなる (p16) 。
- EF_g20_looseも試したが、あまり変わらず (p18) 。
- <https://twiki.cern.ch/twiki/bin/viewauth/Atlas/TrigEgammaRecommendedTriggers2012>
- Triggerをかけずに試したら統計量が増えた (streamは physicsEgamma) (p20)
- (きちんと調べてないが) electronをgammaとmiss idしている？
- (本文終わり)

gamma + jet

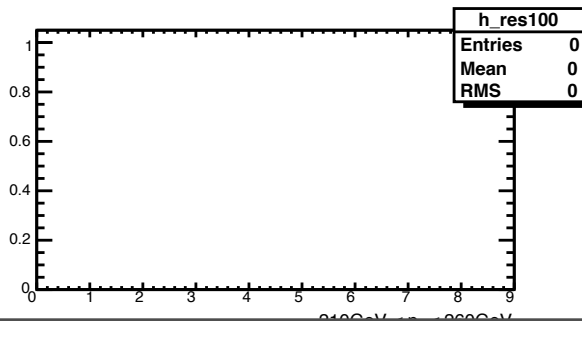
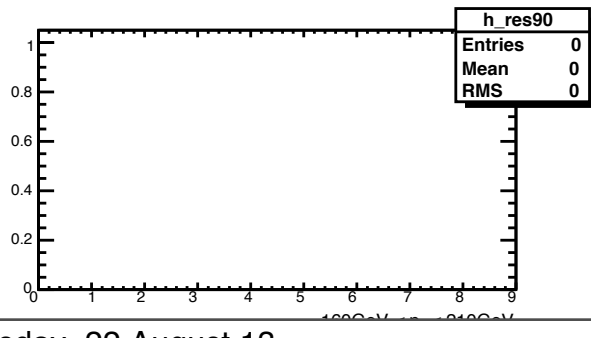
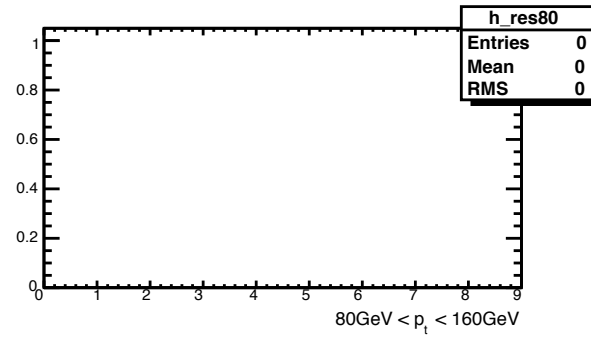
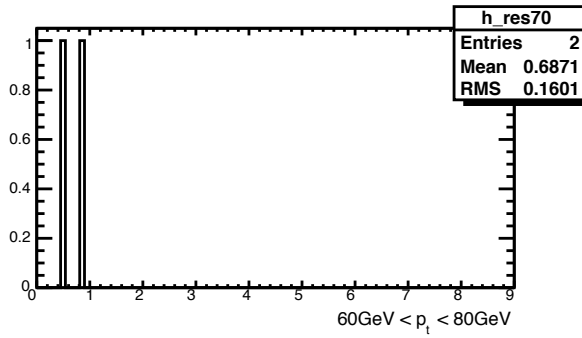
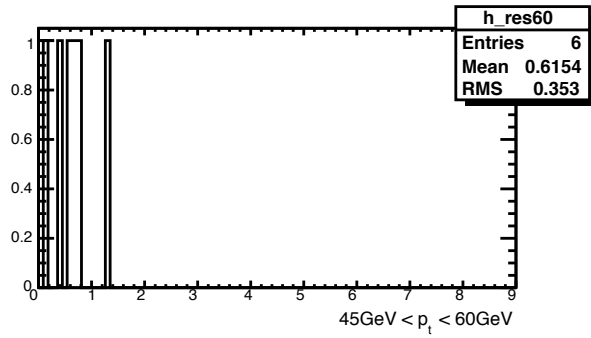
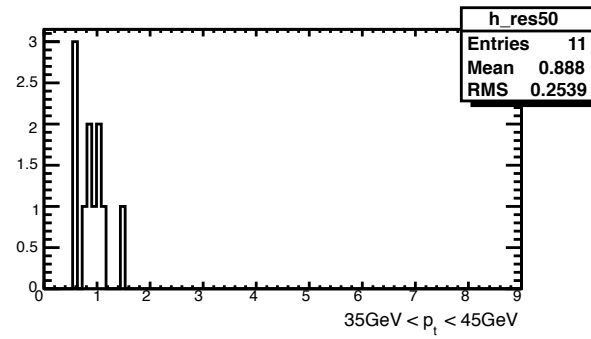
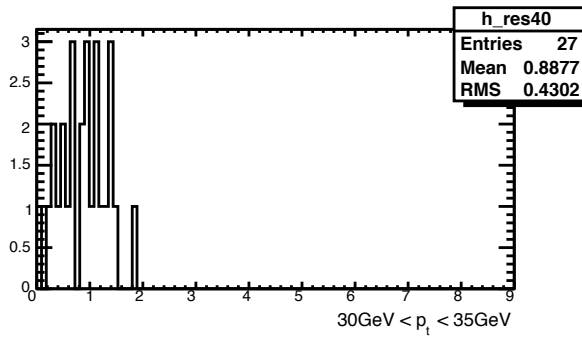
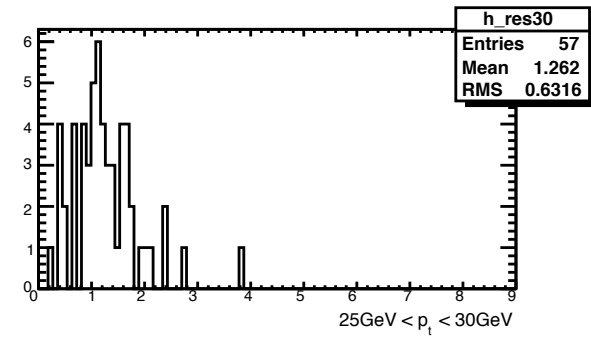
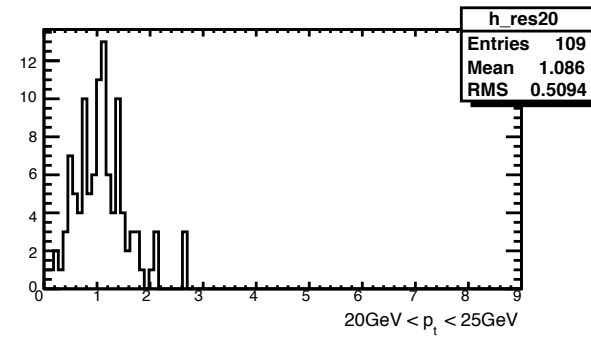
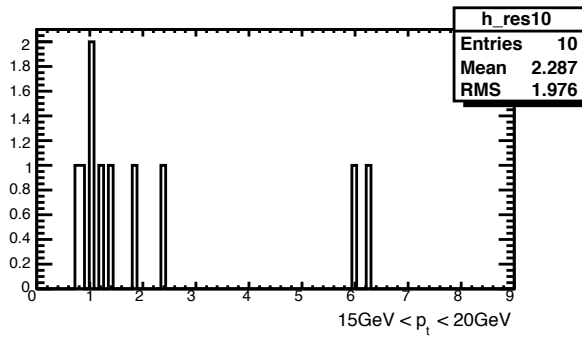
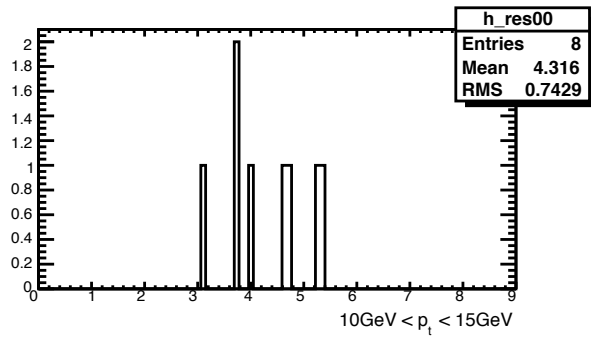
gamma + jet (EF_g|20_looseを要求かつcut前)



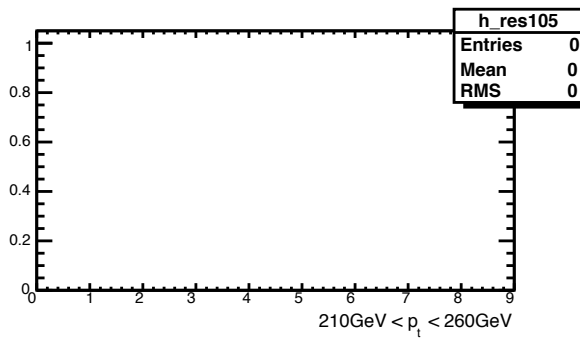
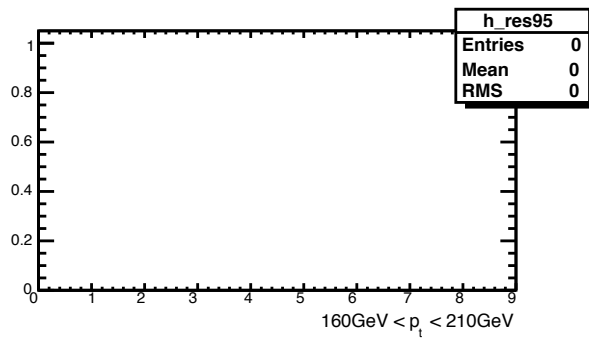
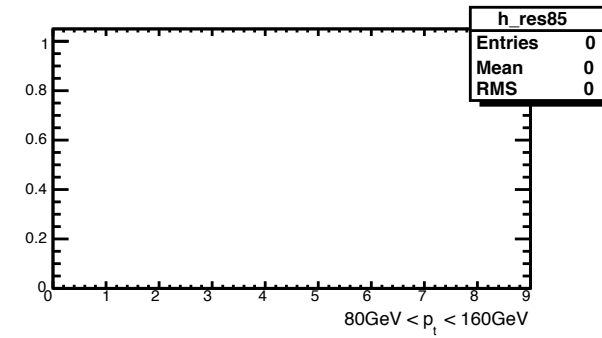
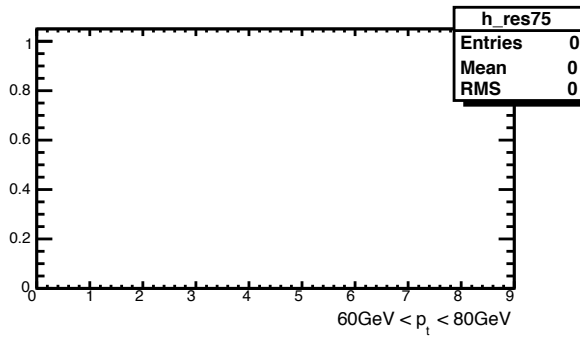
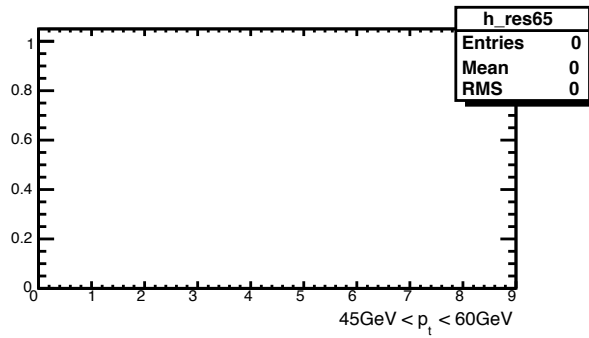
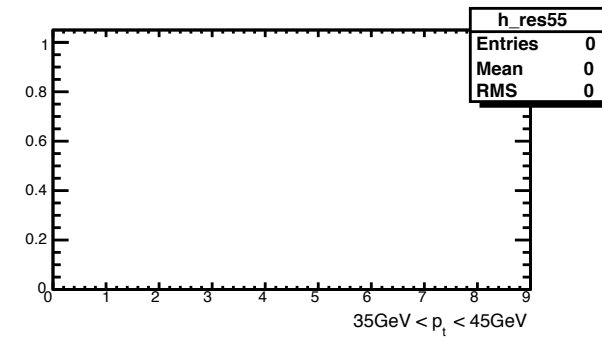
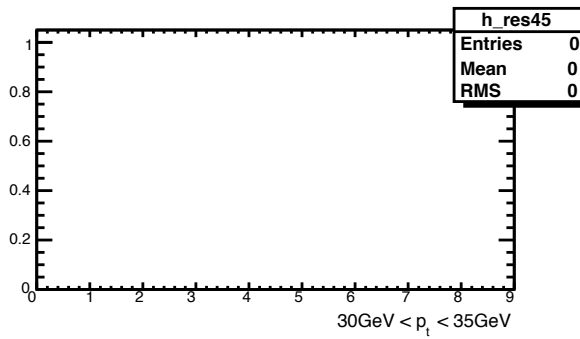
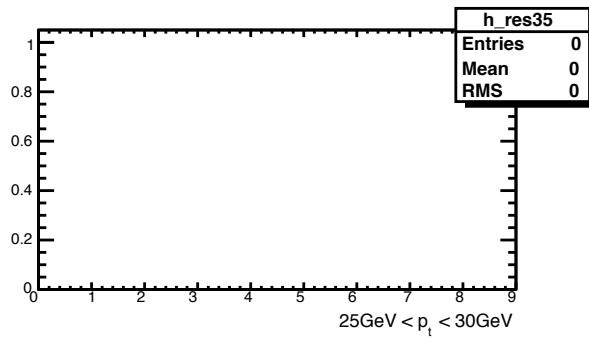
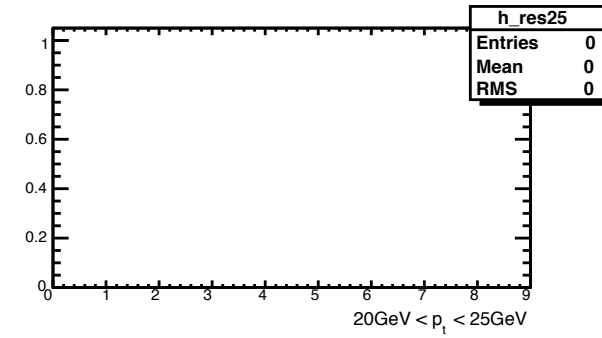
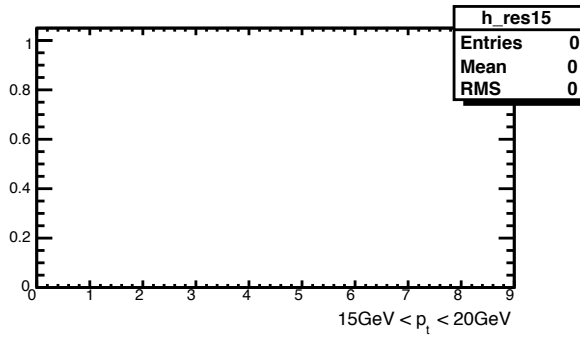
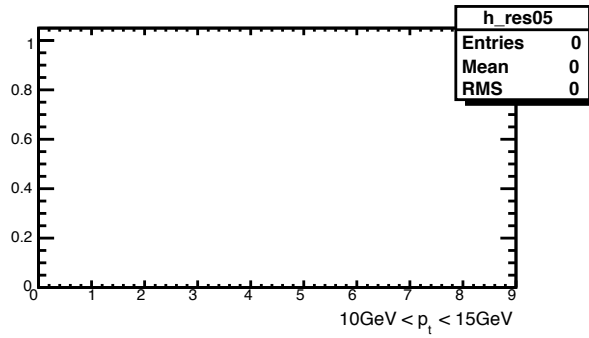
gamma + jet (EF_g|20_looseを要求かつcut後)



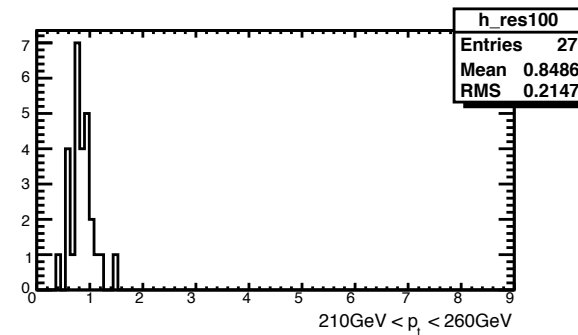
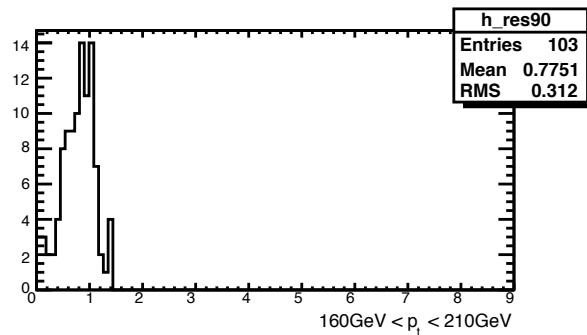
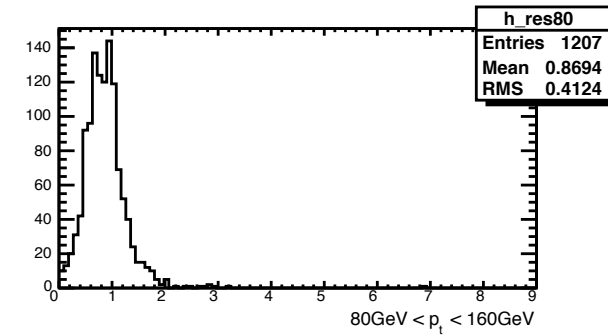
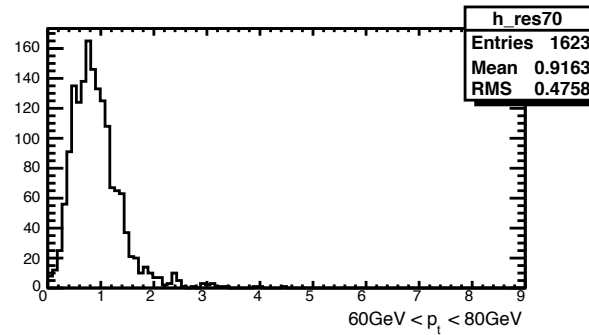
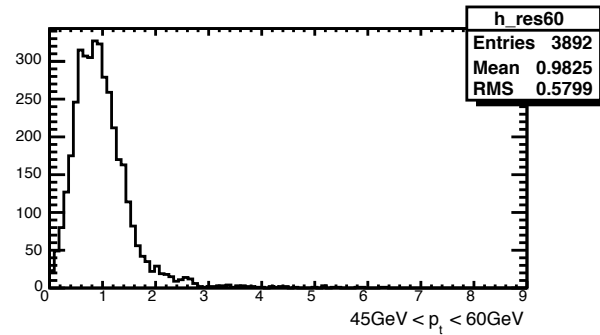
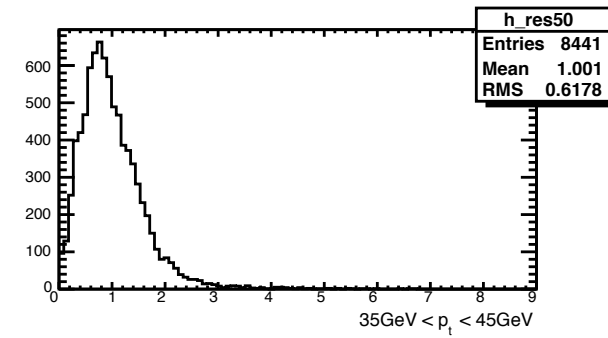
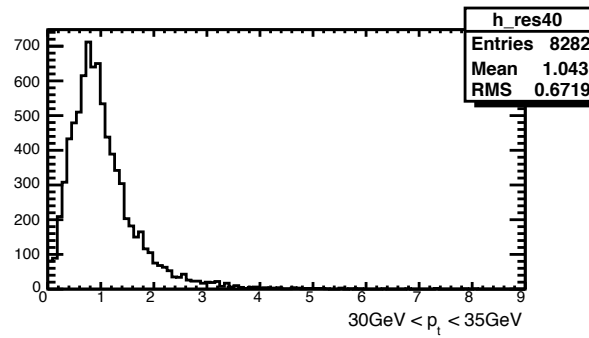
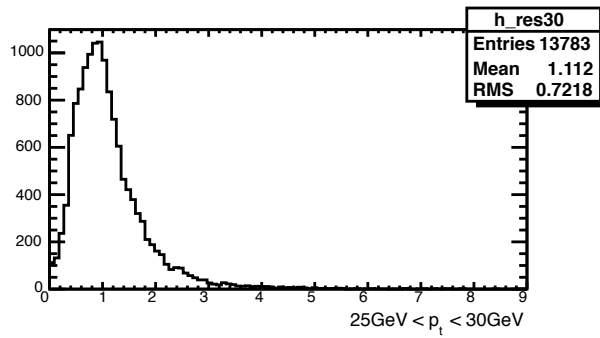
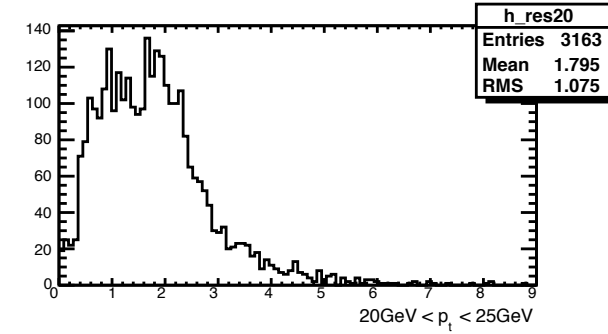
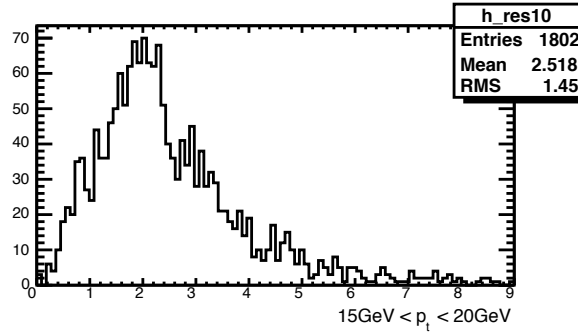
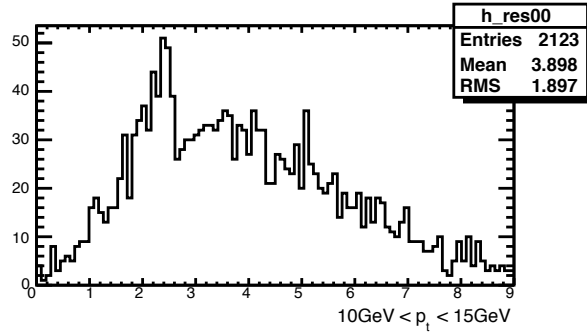
gamma + jet (EF_g20_looseを要求かつcut後)



gamma + jet (EF_g20_looseを要求かつcut後)



gamma + jet (Trigger条件なしcut前)



gamma + jet (Trigger条件なしcut後)

