

31,Oct, Naoyuki Kamo

# skimming作業

- mcはzee,zmumuのpythiaと  $\gamma$ +jetのpythia,herwigをlocalに置いてある
- z+jetについてはsherpaも用意されているが、COMMONが未完成？
- egamは終了。localに置いてある。ただし、本当に全部終わっているかの確認が必要
- muは一部破損していて、今持っている正確な統計量がよくわからない。すくなくとも6割は超えている。
- 原因がわかっていないが、treeが書き込まれていないファイルがあり、validationが必要

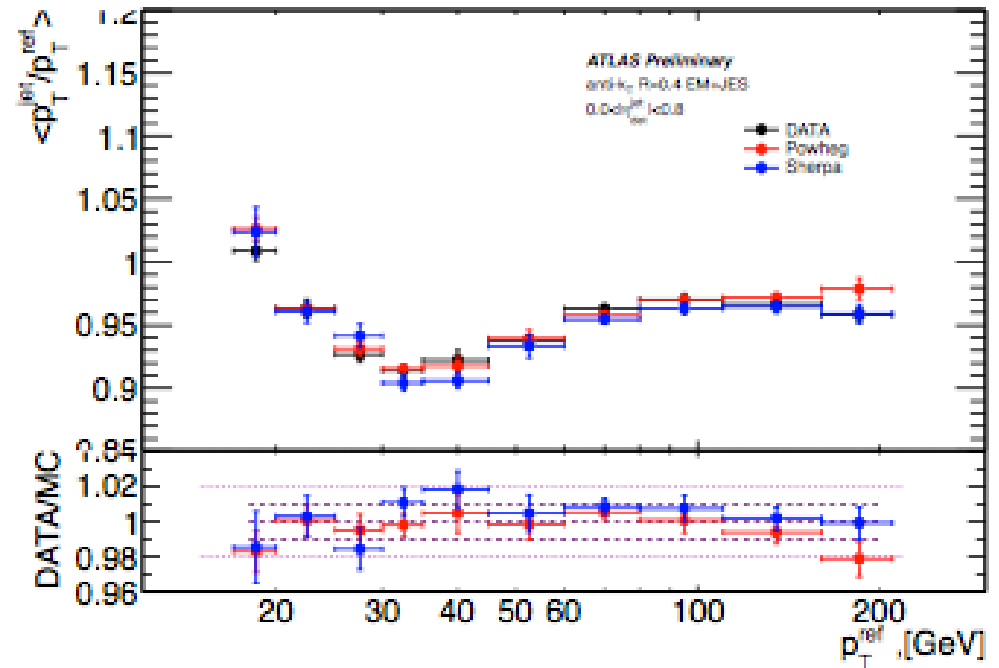
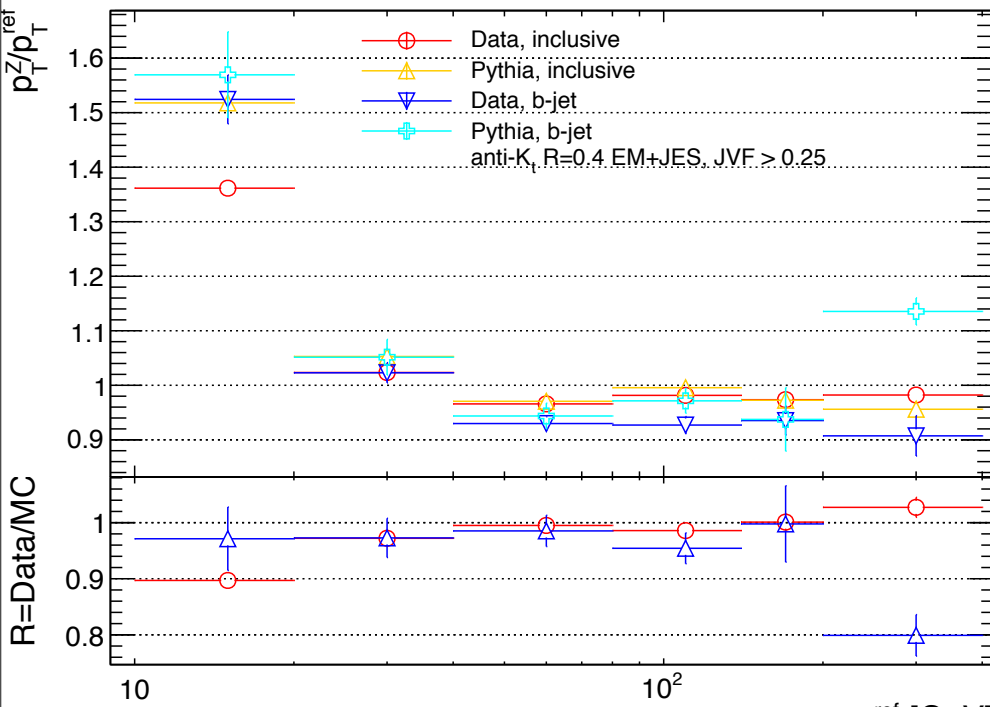
# 作業計画

- 以下を考えて、
  - Tokyo siteにdataをかなり置かせてもらったので、jobの進行速度があがった
  - Z + jetも $\gamma$ +jetも大半は同じ作業で、egamのdata、mcはほぼ揃っている
- **1a.** ファイルのvalidationして、壊れている、不足しているファイルは再度jobを投げる
- **1b.** Zee,Zmumu を持ってる範囲で終わらせる + 他の人の解析の統計の確認
- **1d.** 修論の章立て (週明け)
- **2a.** うまい具合に運んでいたら $\gamma$  +jetもやる
- **2b.** Z+jetのsherpaのCOMMONが用意されたら調べる？
- **3.** 修論本文の執筆

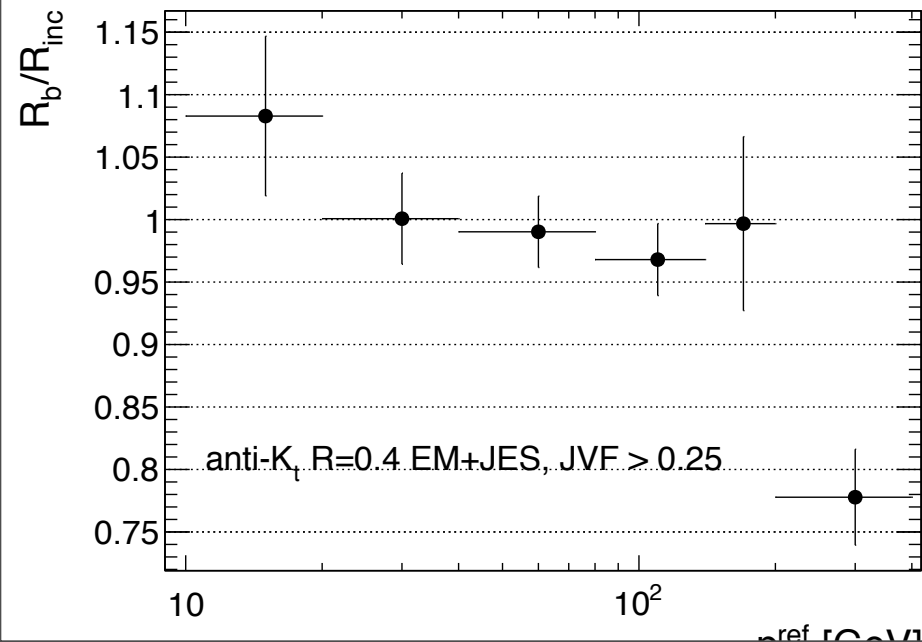
# insituの現状

- 持っている範囲でZmumuで解析を行った
  - Zeeの方はバグで走らなかった（前は走っていたので単純なことだと思う）
- todo,
  - 統計量の確認
  - 他のjet algorithmも同様に
  - GSCを適用
  - track数などを調べる
  - $p_T^{\text{ref}}$ の定義。  $\cos\varphi$  をかける？

# Zmumuの結果



(a) Anti- $k$ ,  $R = 0.4$  EM+JES



- 全体の統計量の何割かは調べれていない
- GSCはかけていない
- 左上は私のプロット、右上は ATLAS COM-PHYS-2013-1013の結果
- 左下は b-Jet / inclusive
- 分布の様相は似ていると思う

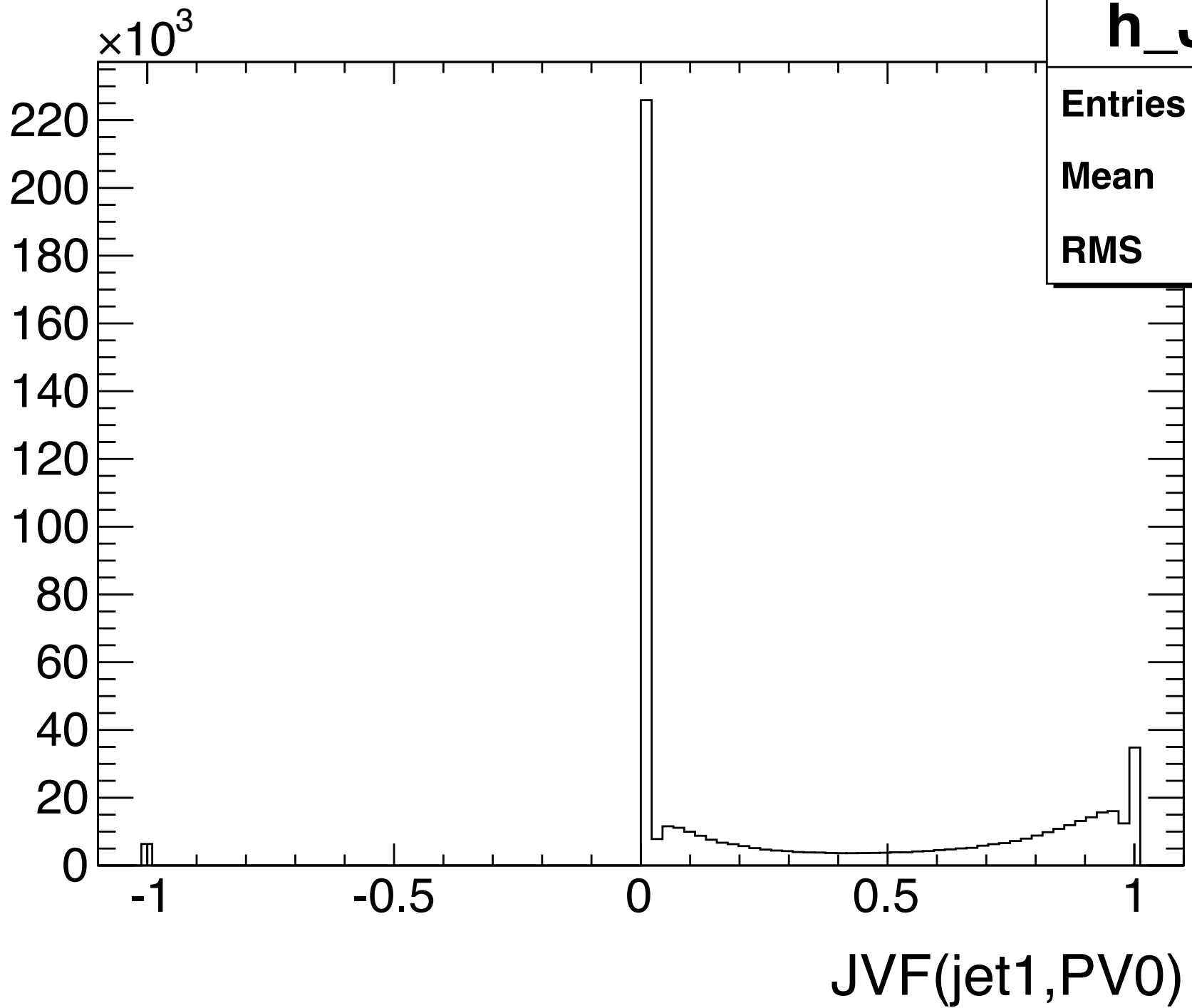
# mc dijet

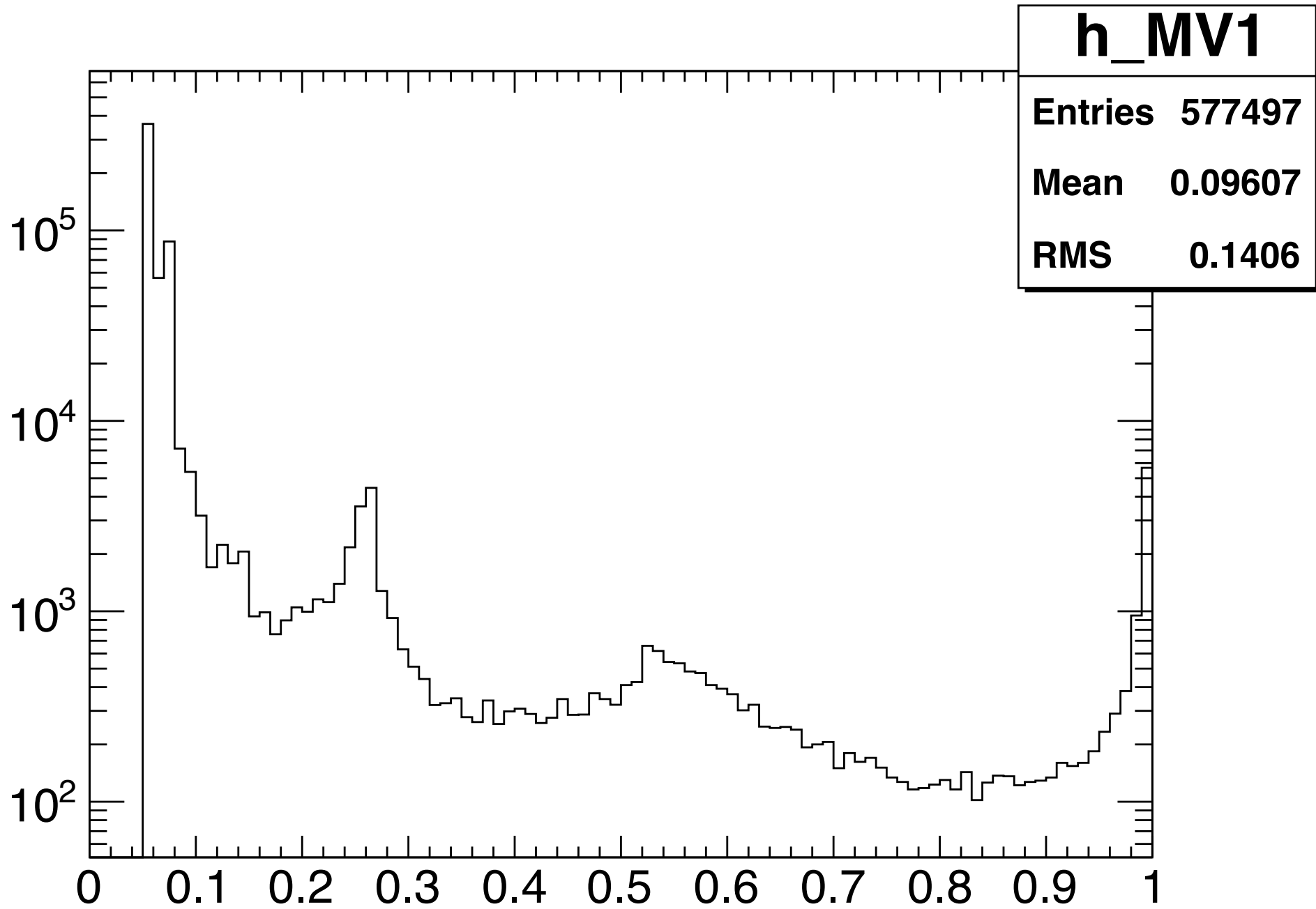
- todo
  - mc12\_8TeV.  
147542.Sherpa\_QCD\_2to2\_4j50filterのcheck  
作業
    - 今はNtupleにflavorの変数を付け加える  
コードが書きかけの状態になっている
  - sherpa sampleの追加
  - 新しいGSC（まだvalidation作業中）

back up

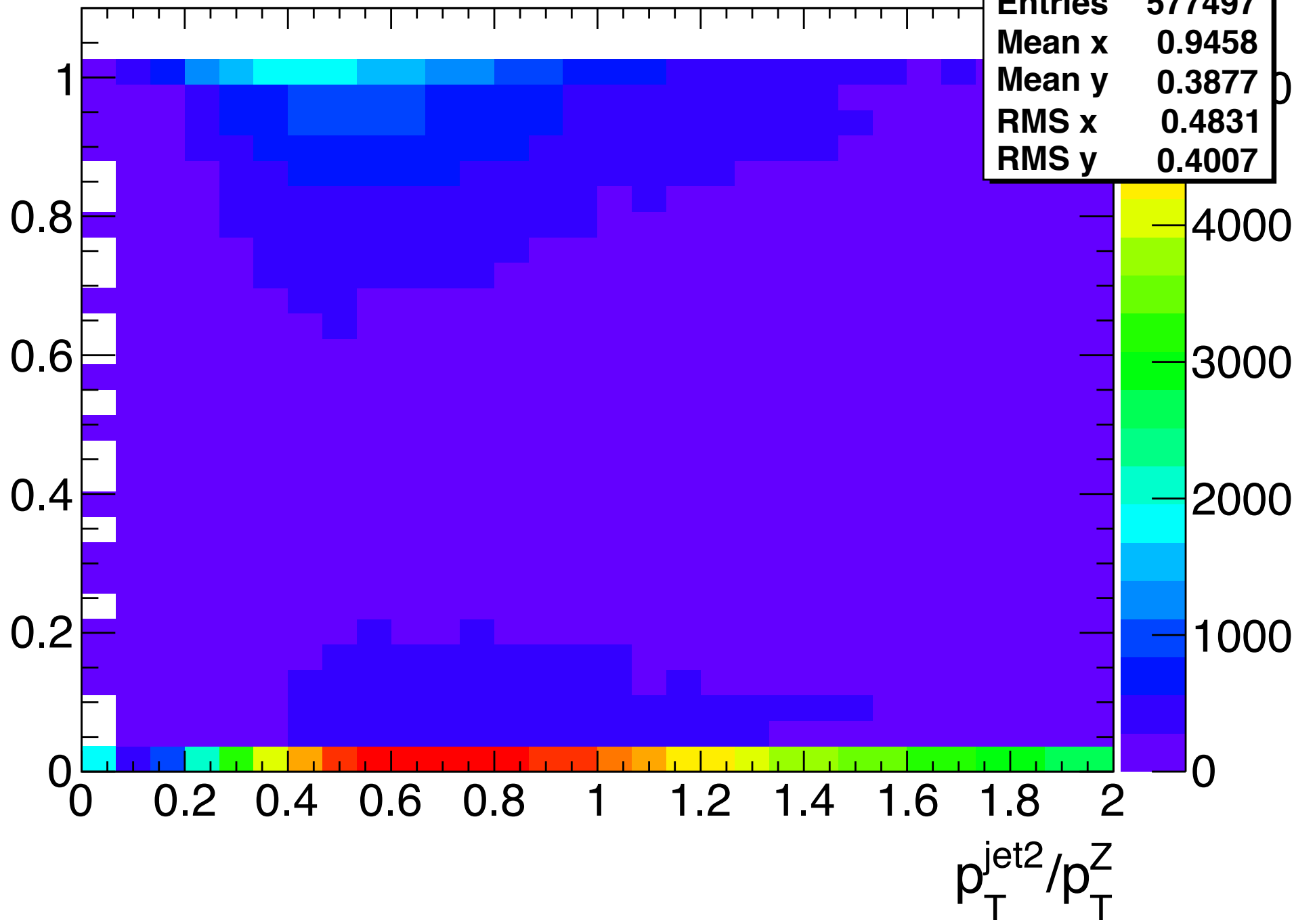
# mc Zmumuパラメー タ、統計推移

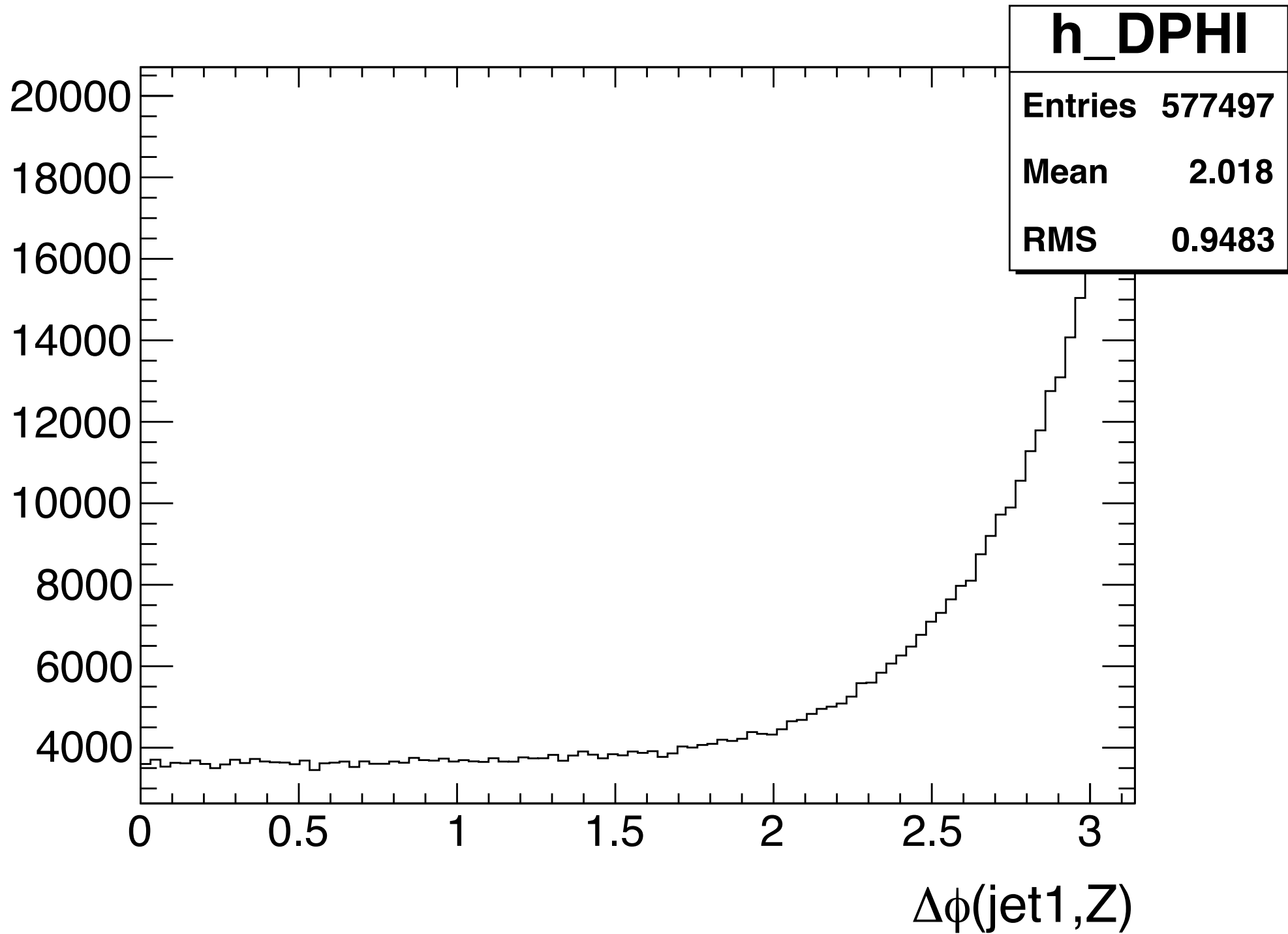




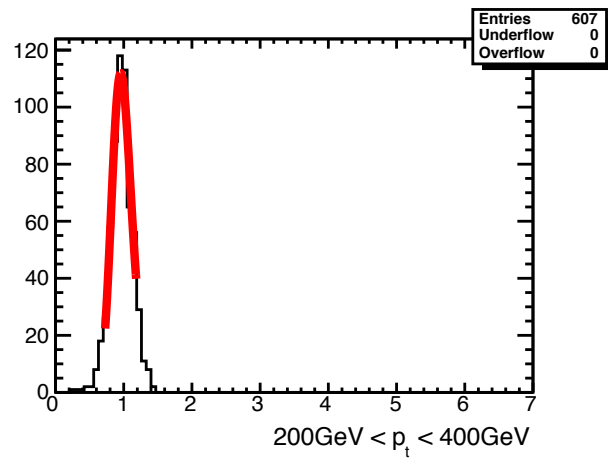
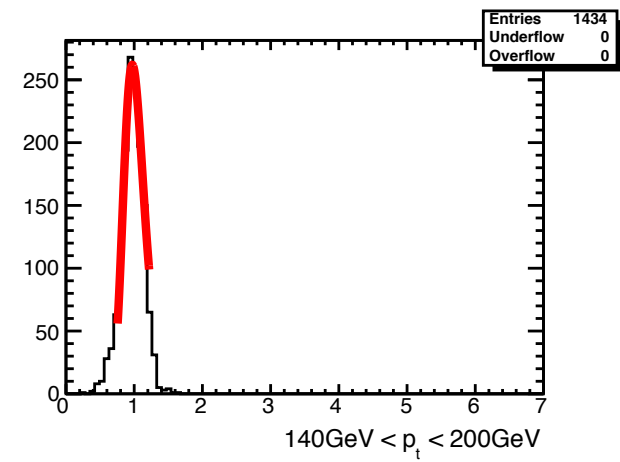
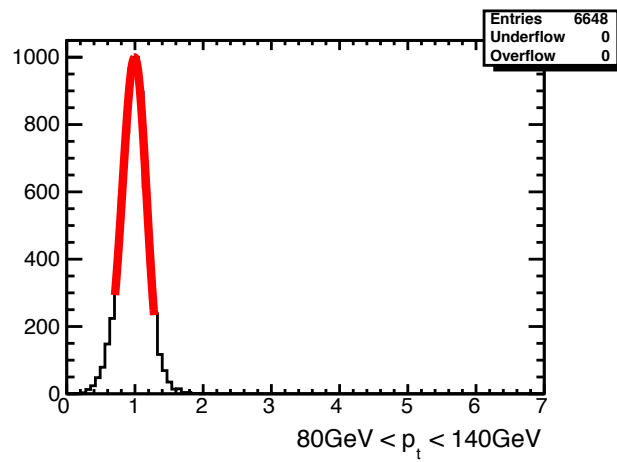
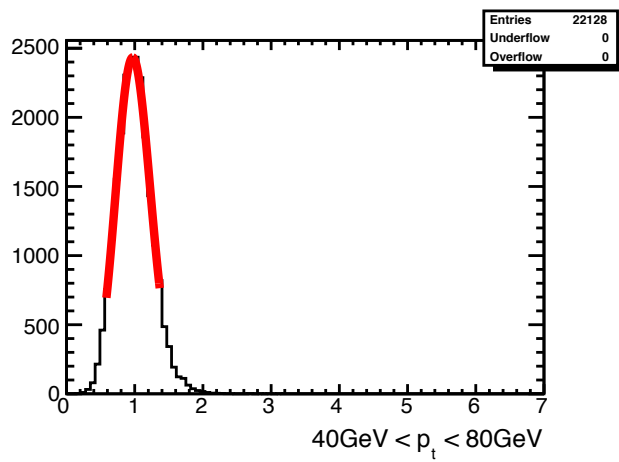
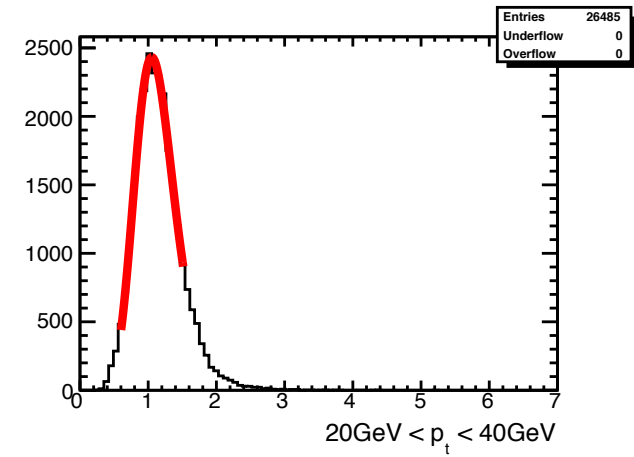
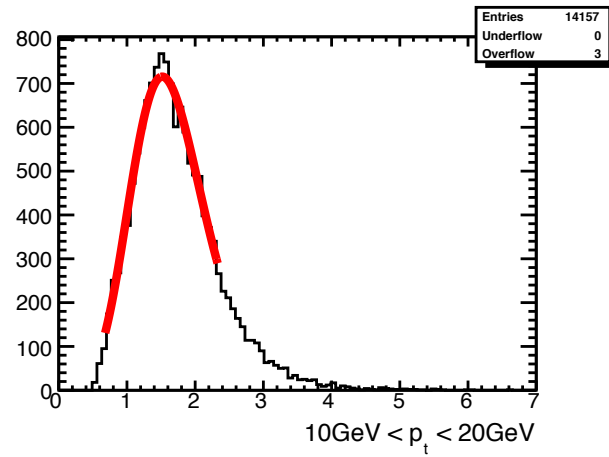
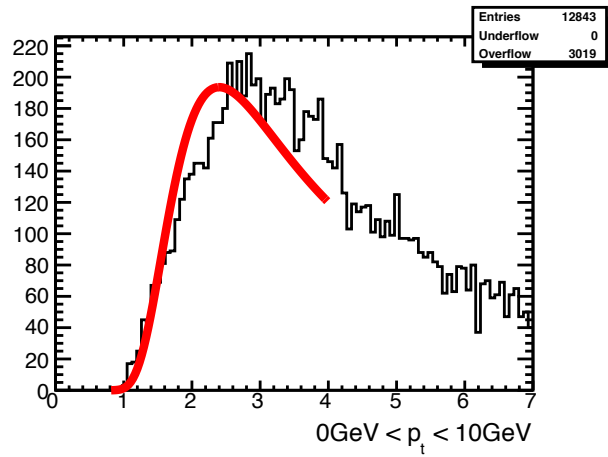


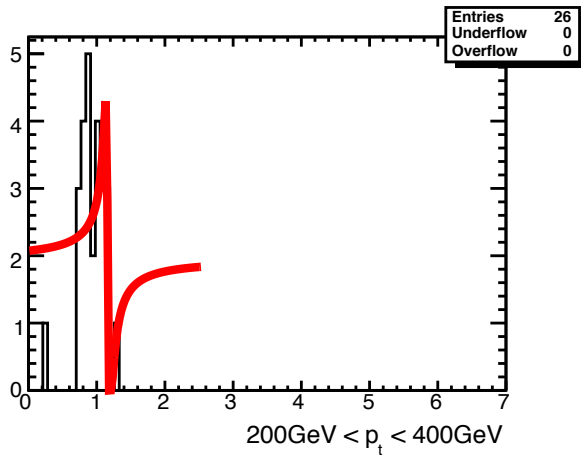
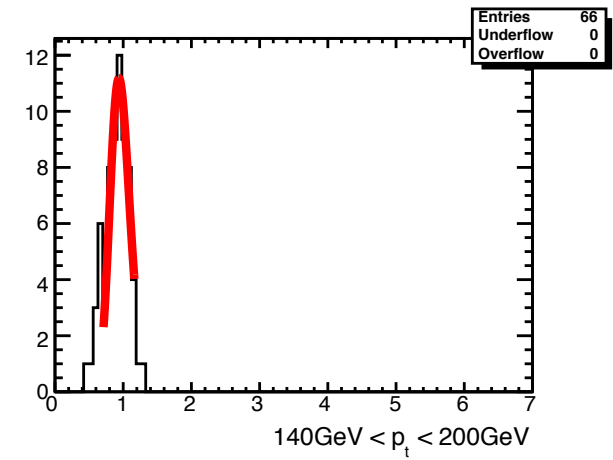
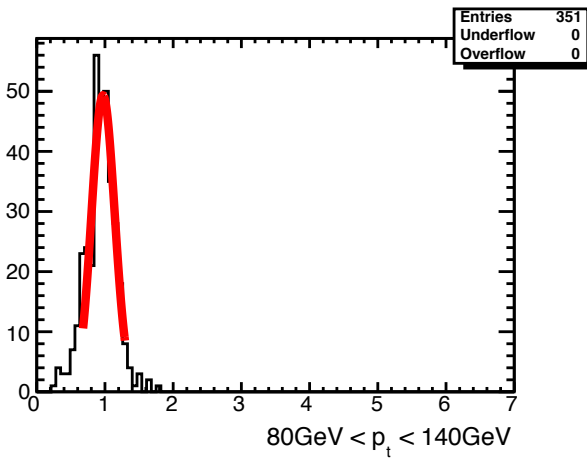
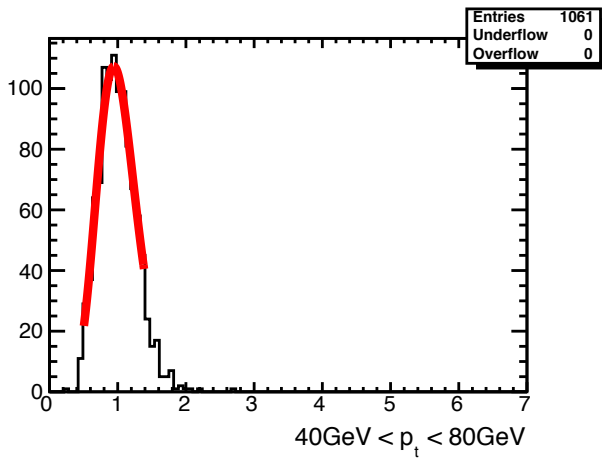
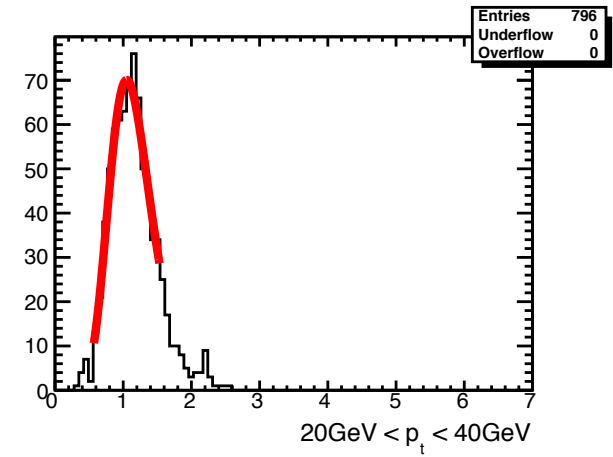
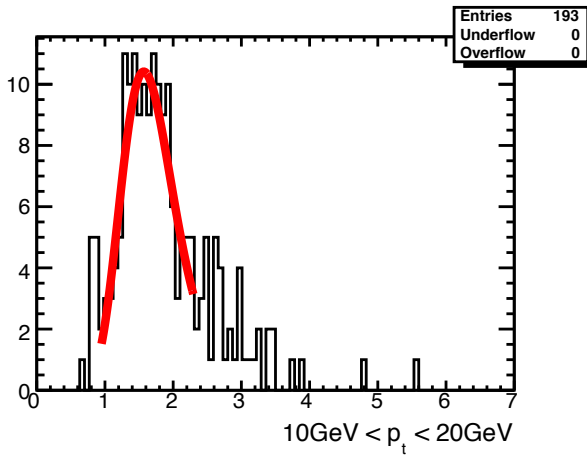
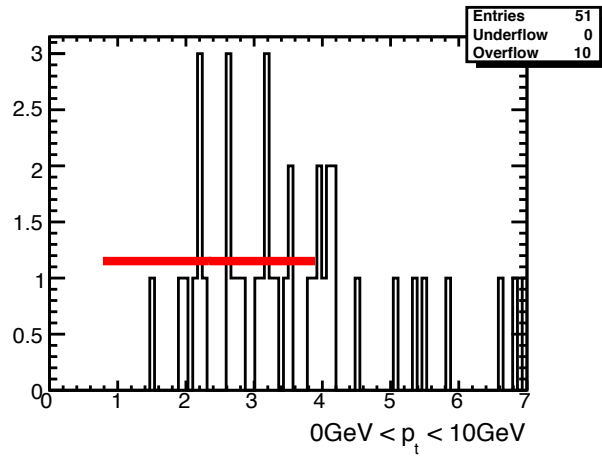
JVF(jet2)





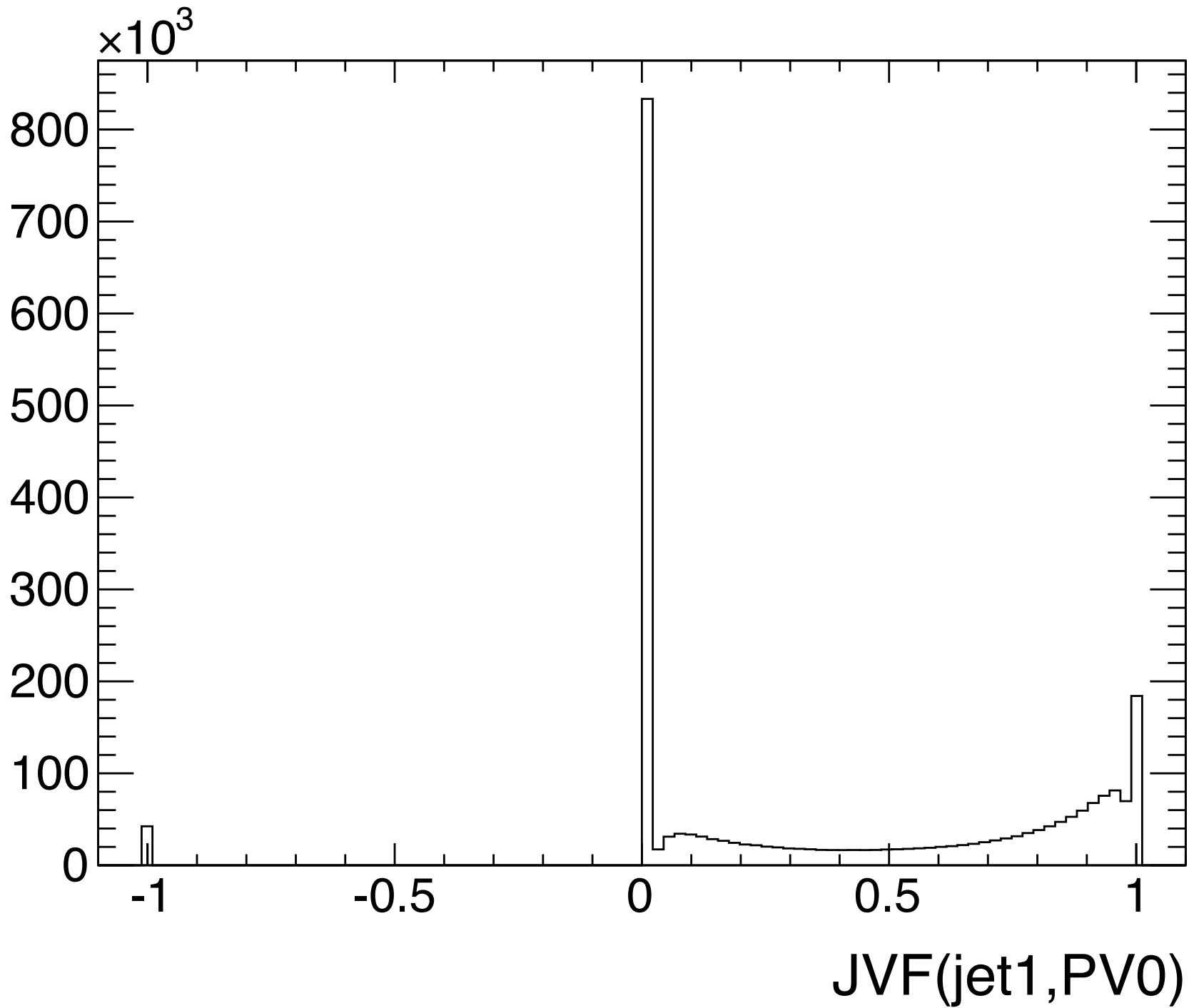
Z	728914	446658	349798	178017	42154	6660	2135	84
Z + 1jet	728914	446658	349798	178017	42154	6660	2135	84
other cuts	234085	151458	134011	77477	20374	3518	1246	53
$\Delta\phi > 2.9$	16652	19852	39348	35742	11191	2094	833	37
$p_T^{\text{jet}2}/p_T^Z < 0.2$	12843	14157	26485	22128	6648	1434	607	31
COMBNN > 0.8119	51	193	796	1061	351	66	26	
	0	10	20	40	80	140	200	400
	$p_T^Z$ [GeV]							

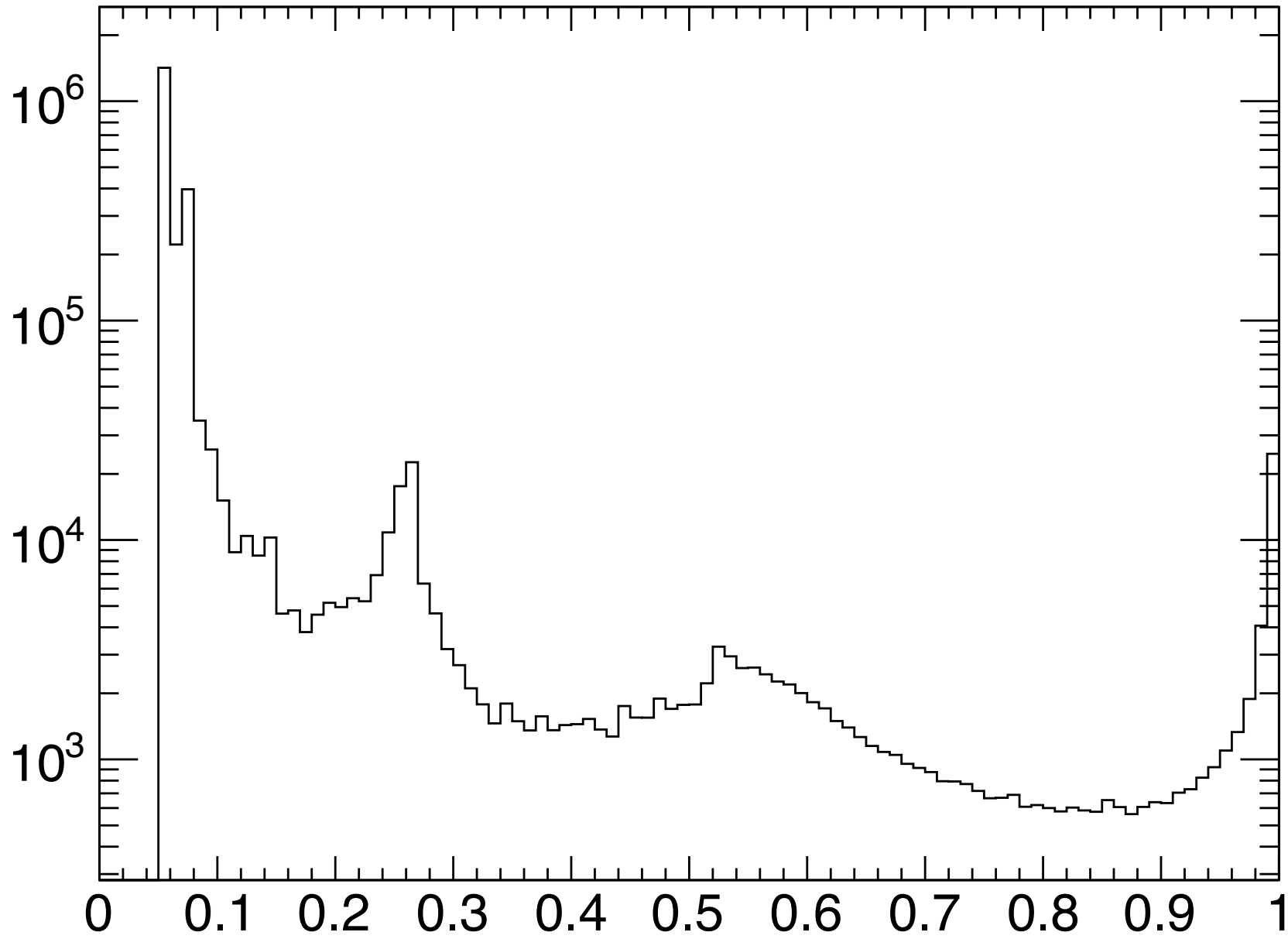




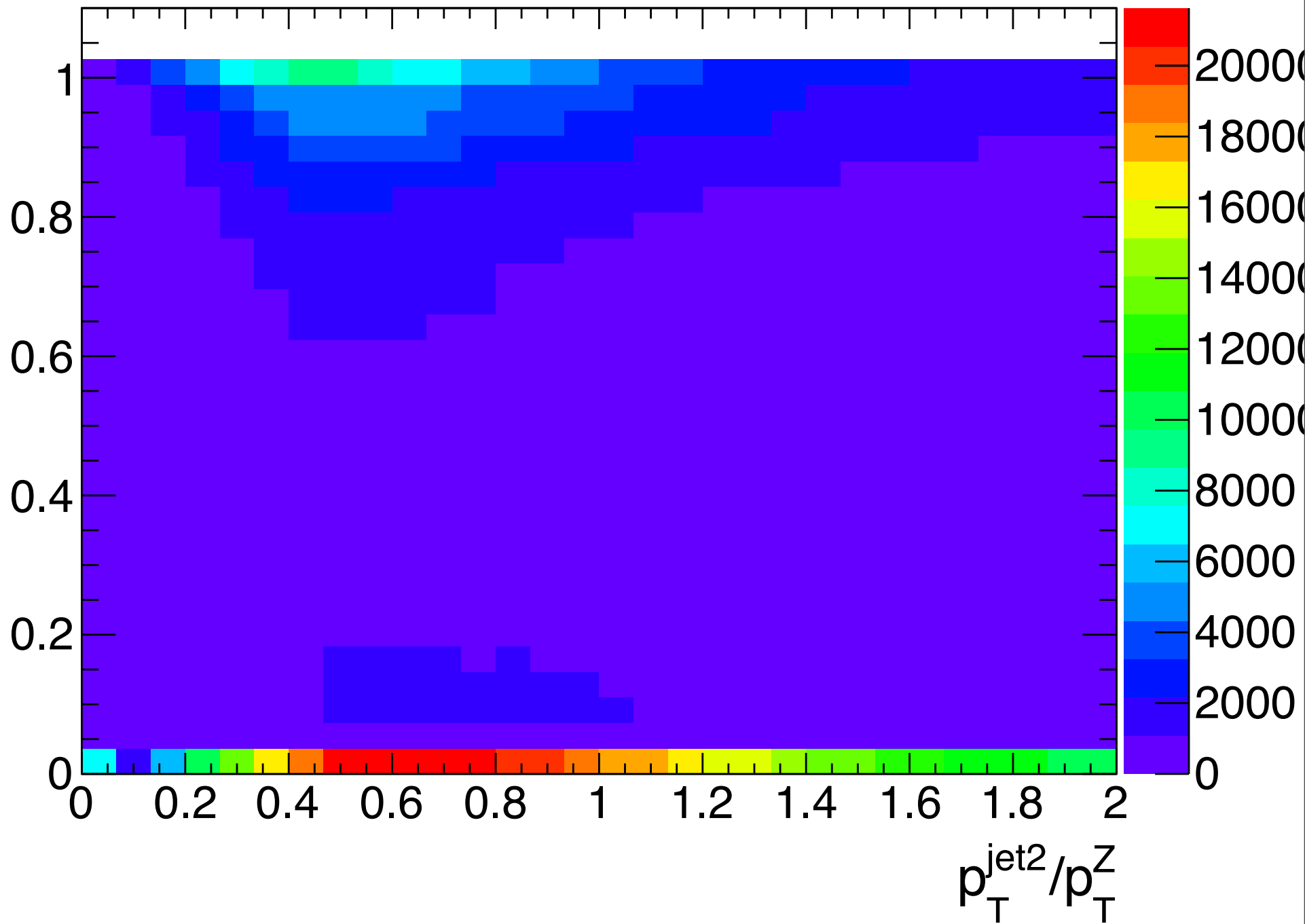
# data Zmumuパラメータ、統計推移

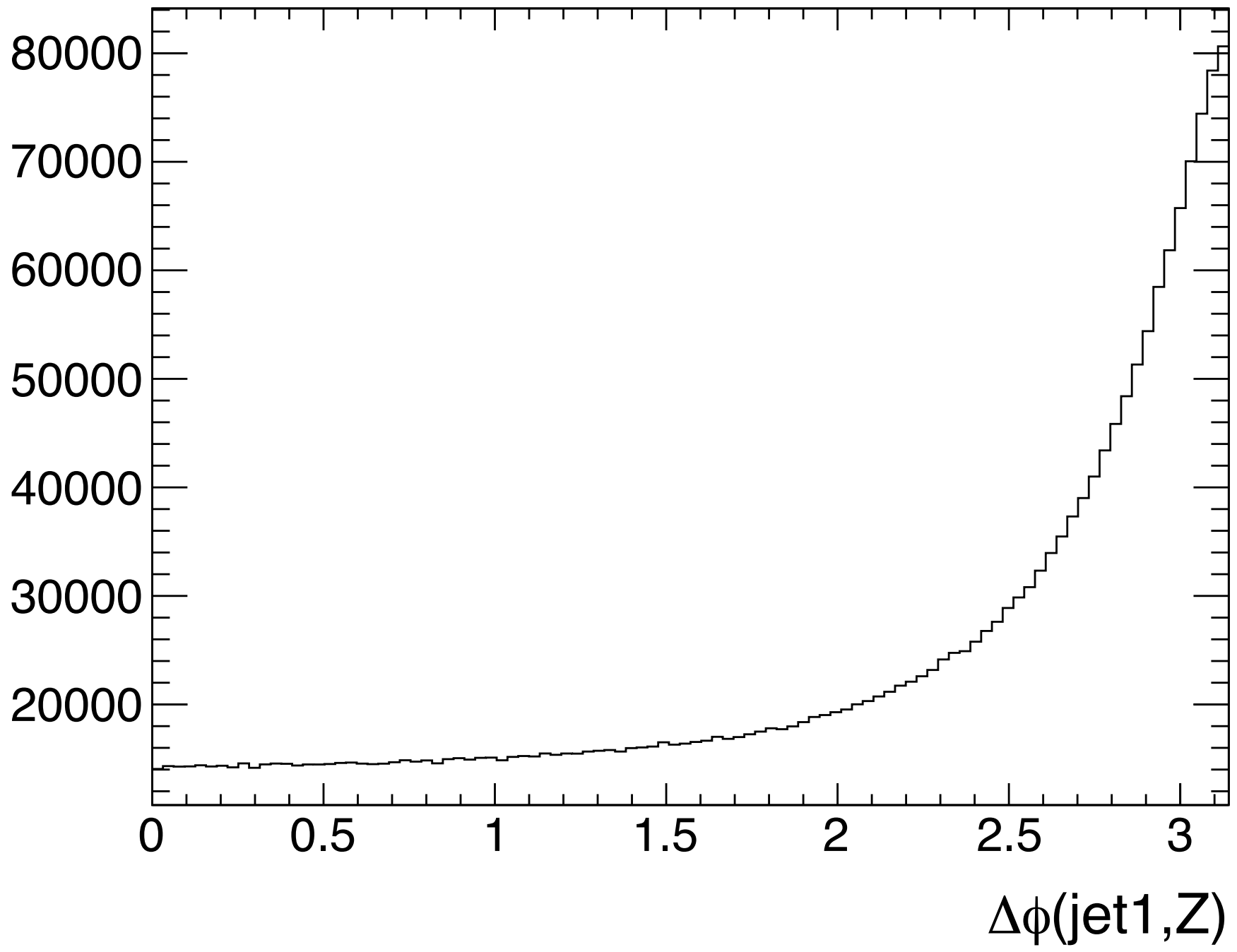




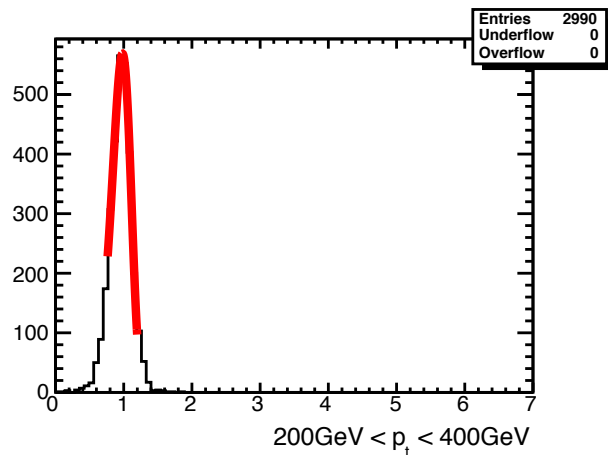
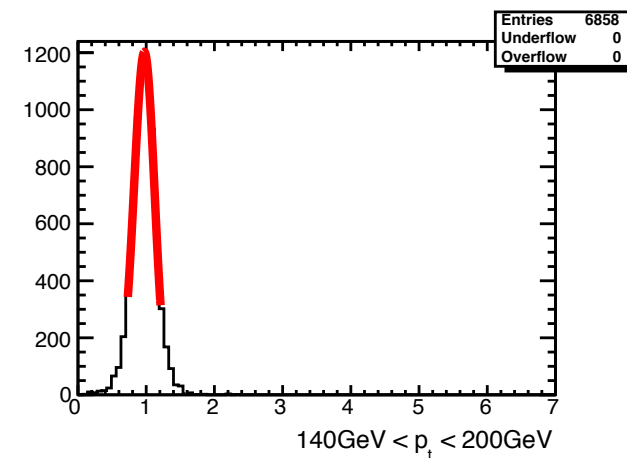
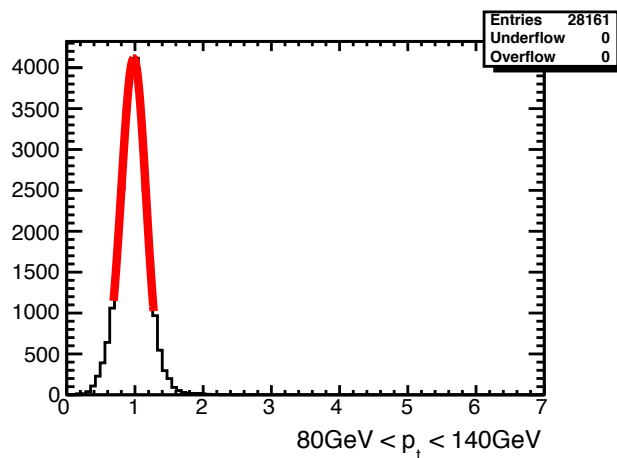
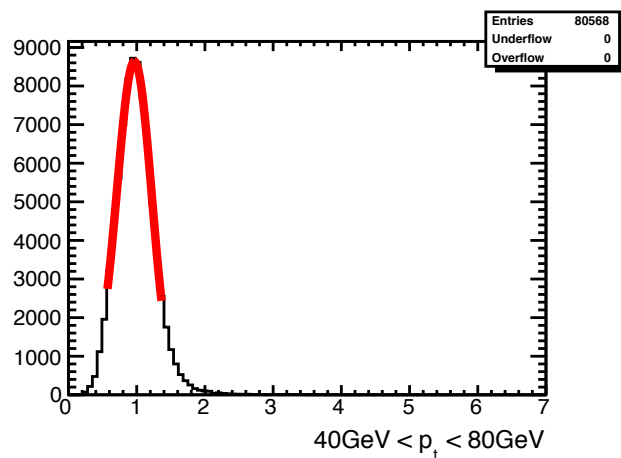
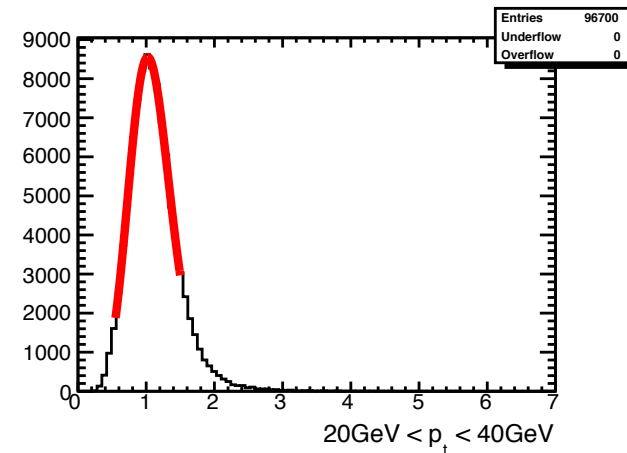
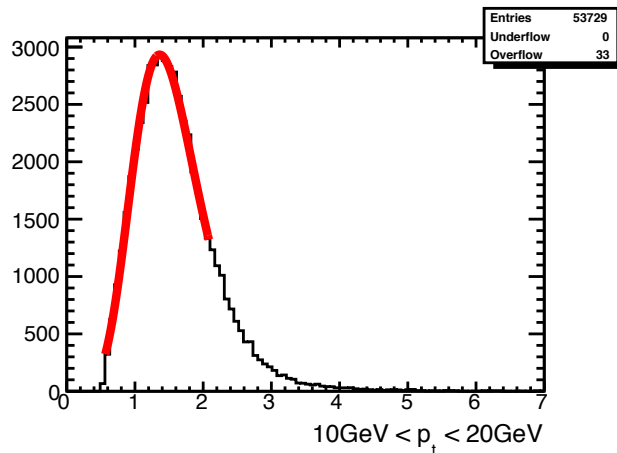
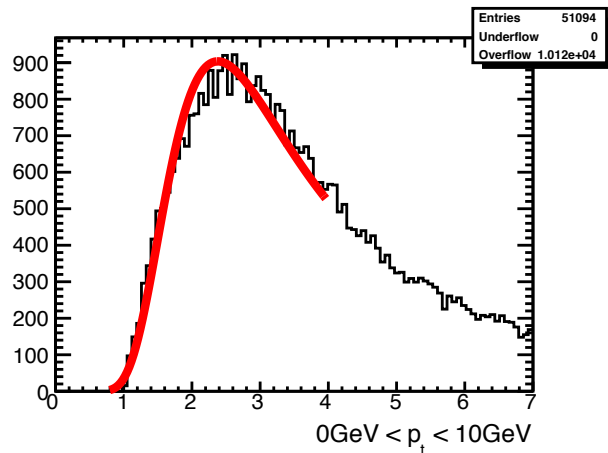


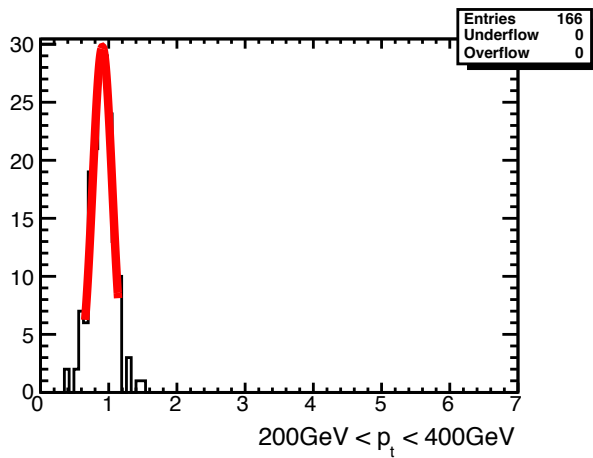
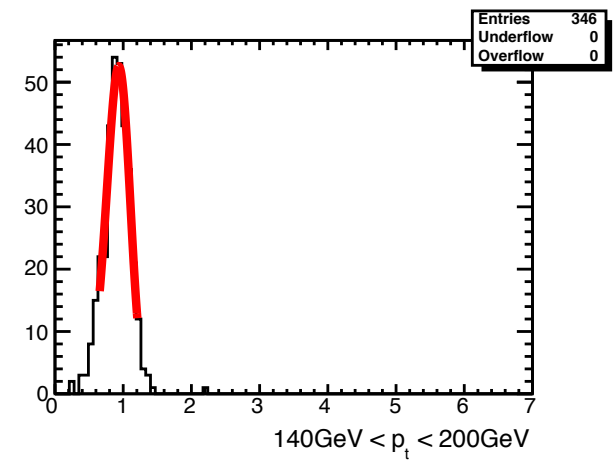
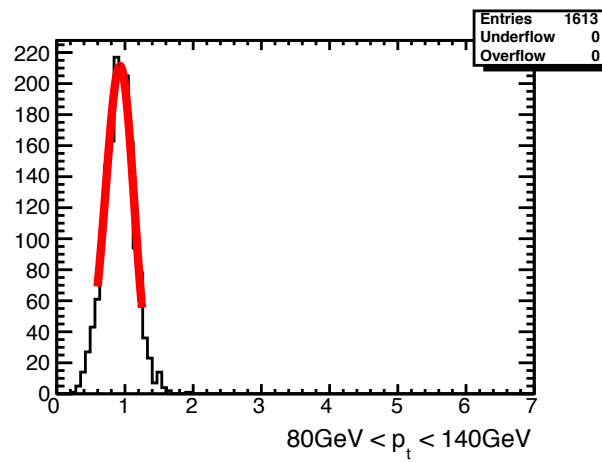
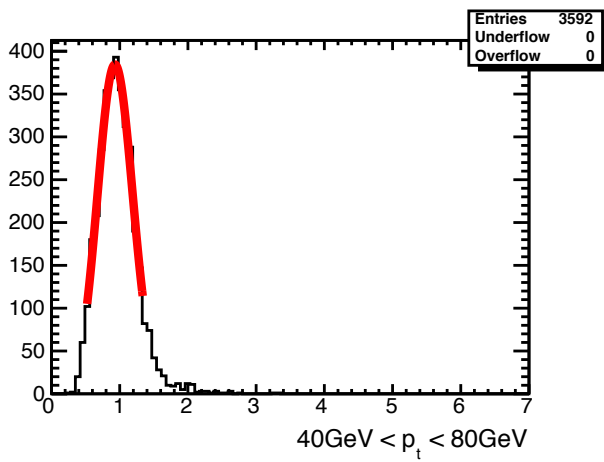
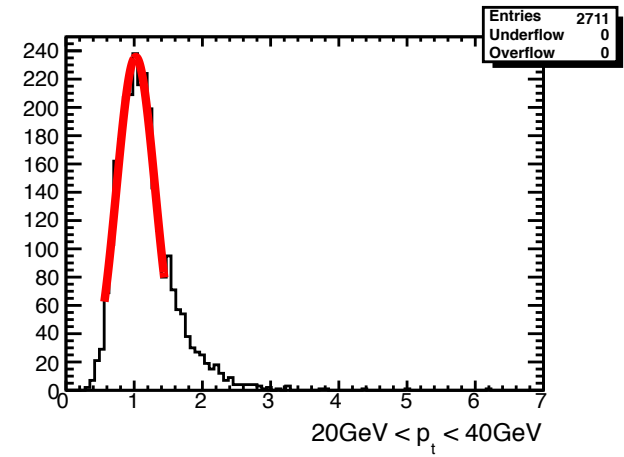
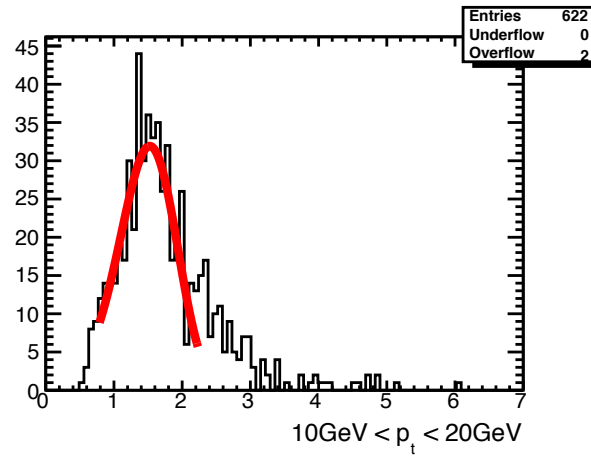
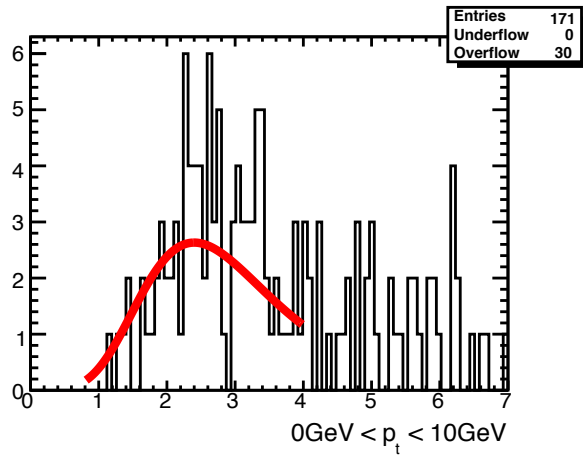
JVF(jet2)



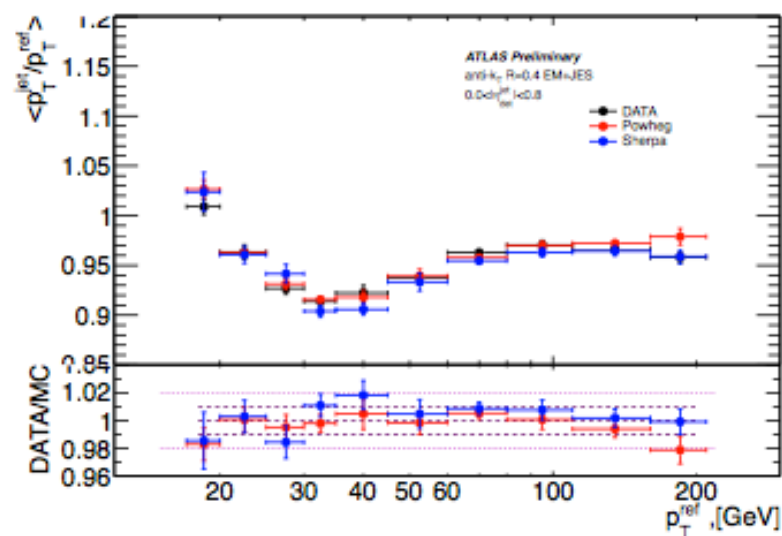


Z	3.1436e+06	1.91592e+06	1.59808e+06	869913	205485	34492	11857	634
Z + 1jet	3.1436e+06	1.91592e+06	1.59808e+06	869913	205485	34492	11857	634
other cuts	979204	617937	563997	351279	95717	17698	6741	376
$\Delta\phi > 2.9$	71186	81088	159804	150519	50991	10539	4309	253
$p_T^{\text{jet}2}/p_T^Z < 0.2$	51094	53729	96700	80568	28161	6858	2990	197
COMBNN > 0.8119	171	622	2711	3592	1613	346	166	8
	0	10	20	40	80	140	200	400
	$p_T^Z$ [GeV]							

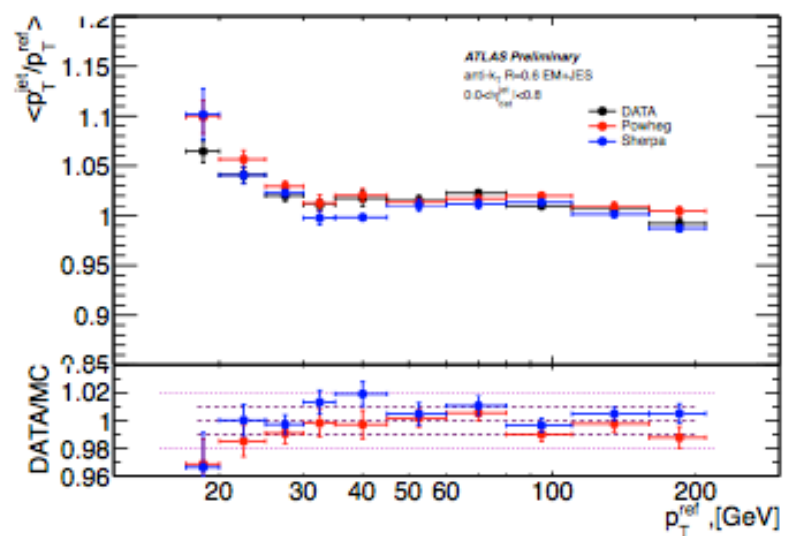




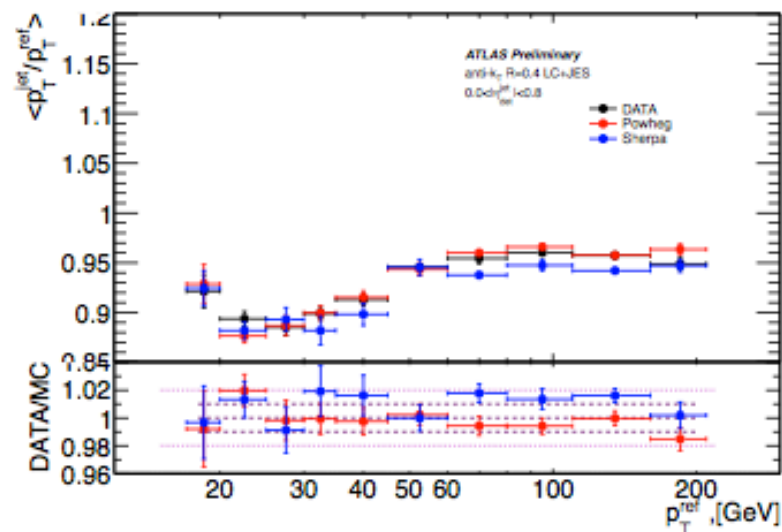
# ATL-COM-PHYS-2013-1013



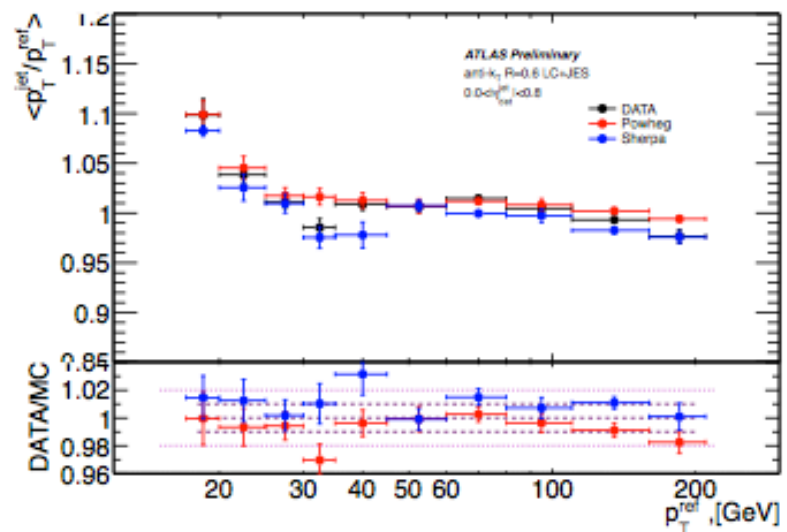
(a) Anti- $k_r$ ,  $R = 0.4$  EM+JES



(b) Anti- $k_r$ ,  $R = 0.6$  EM+JES



(c) Anti- $k_r$ ,  $R = 0.4$  LCW+JES



(d) Anti- $k_r$ ,  $R = 0.6$  LCW+JES

Figure 3: Mean  $p_T$  balance for anti- $k_r$  jets with distance parameter  $R = 0.4$  (a,c) and  $R = 0.6$  (b,d) calibrated with the EM+JES (a,b) and LCW+JES (c,d) schemes in the data and with two MC simulations. Only statistical uncertainties are shown.



# Z + jet

- el\_medium++ , mu\_medium
- $\Delta R(\text{jet}, \text{el\_medium++}) < 0.1$  のjetはelectronとする
- Trigger(zee): EF\_el2Tvh\_loose1 (multi-electron , unprecaled)
- Trigger(zmumu): EF\_mu24i\_tight || EF\_mu36\_tight
- B-tag :  $M_{VI} > 0.8 || 9$  (nominal efficiency 70%)

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	$ \eta^{\text{jet}}  < 0.8,  JVF  > 0.25$ if $p_T < 50 \text{ GeV}$	jet pre-selection
$\Delta R_{j,e} = \sqrt{(\Delta\eta)^2 + (\Delta\phi)^2}$	$> 0.35$ anti- $k_t$ $R = 0.4$ jets $> 0.5$ anti- $k_t$ $R = 0.6$ jets	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

# gamma+ jet

- $\Delta R(\text{jet}, \text{gamma}) < 0.1$  の jet は gamma とする (ただし gamma は下表の条件を満たす)。
- Trigger: EF\_g20\_loose || EF\_g40\_loose || EF\_g60\_loose || EF\_g80\_loose || EF\_g100\_loose || EF\_g120\_loose
- B-tag :  $MV1 > 0.8119$  (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 $\gamma$	<del><math>p_T^\gamma &gt; 85 \text{ GeV}</math></del> and $ \eta^\gamma  < 1.37$	photon pre-selection
$E_T^{\gamma \text{ Iso}}$	$< 3 \text{ GeV}$	$\gamma$ 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

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