

$$\pi^0$$

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Information

- 1 π decay

$$\pi^0 \rightarrow \gamma\gamma$$

- 2 choose the first leading cluster
- 3 reconstruction

$$M_{\pi^0} = \sqrt{2E_{\gamma_1}E_{\gamma_2}(1-\cos\theta)}$$

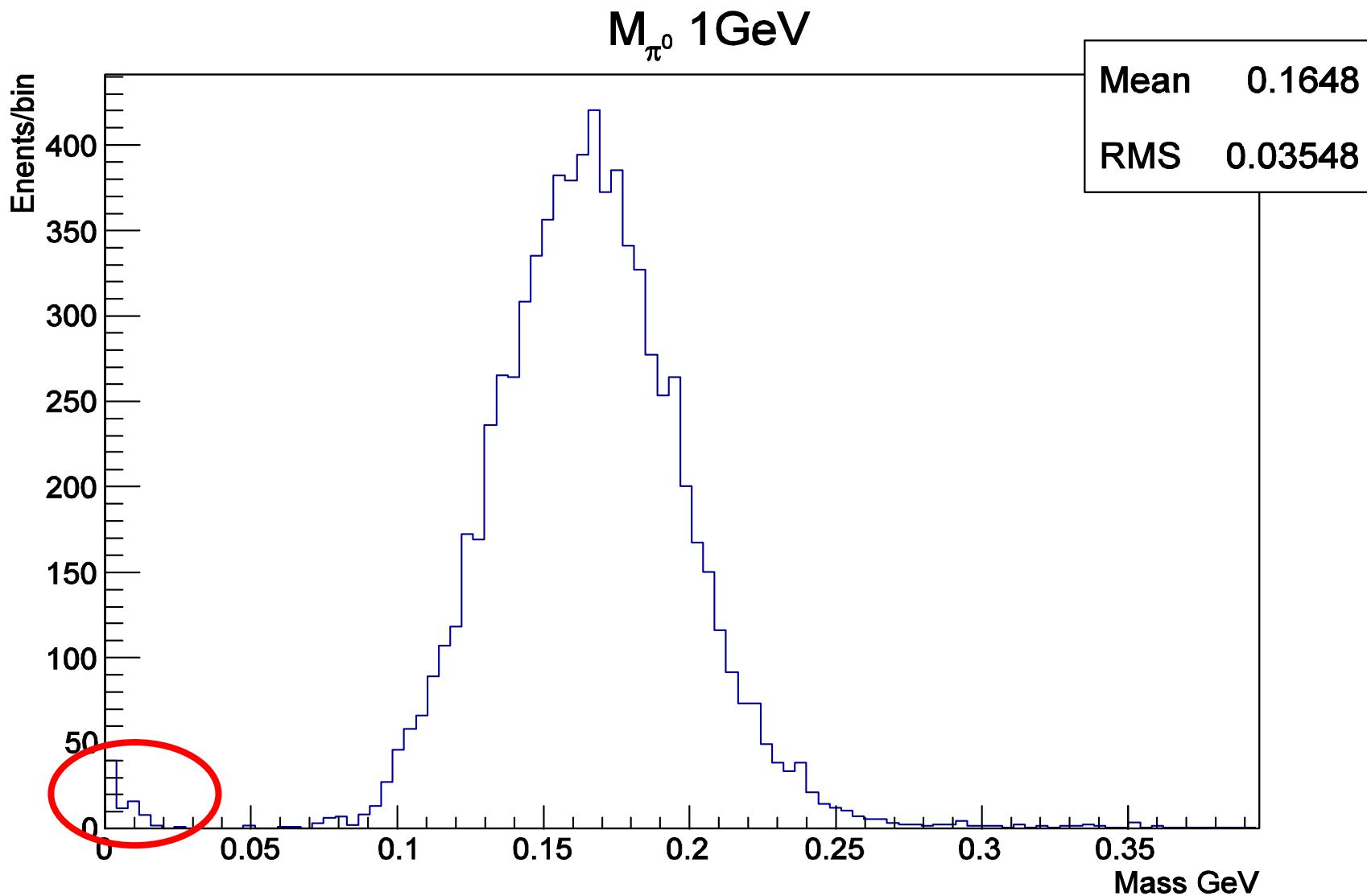
- 4 sample [/cefs/tmp_storage/wangf/Pi](http://cefs/tmp_storage/wangf/Pi)

```
↳
/generator/generator particleGun
/gun/position 0 0 0 mm
/gun/direction 0.0 1.0 0.035
/gun/energy 20 GeV
/gun/momentumSmearing 0.0 GeV
/gun/phiSmearing 1 deg
/gun/thetaSmearing 1 deg
/gun/directionSmearingMode uniform
/gun/particle pi0
/run/beamOn 10
```

[ilc17_slc6_arbor25May15.sh](#)

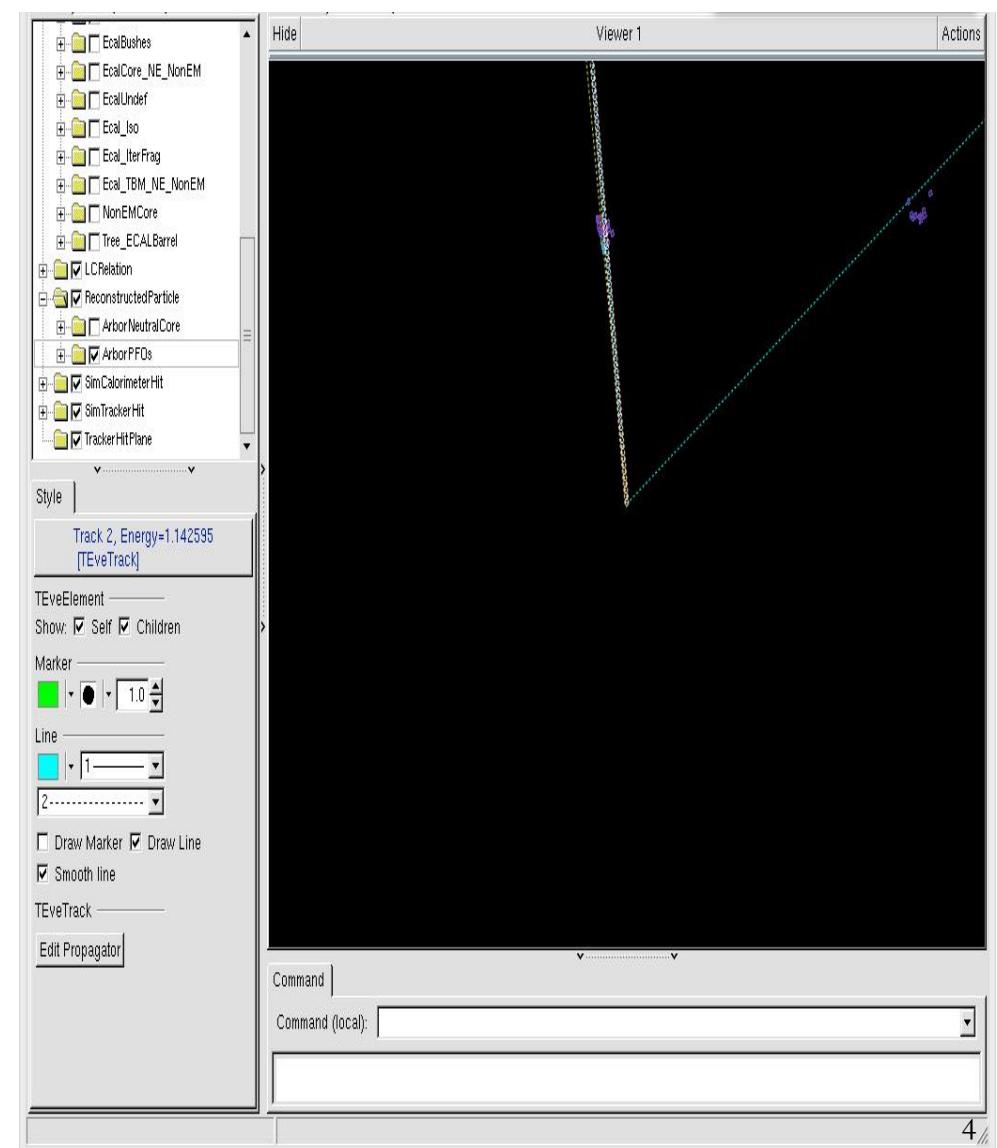
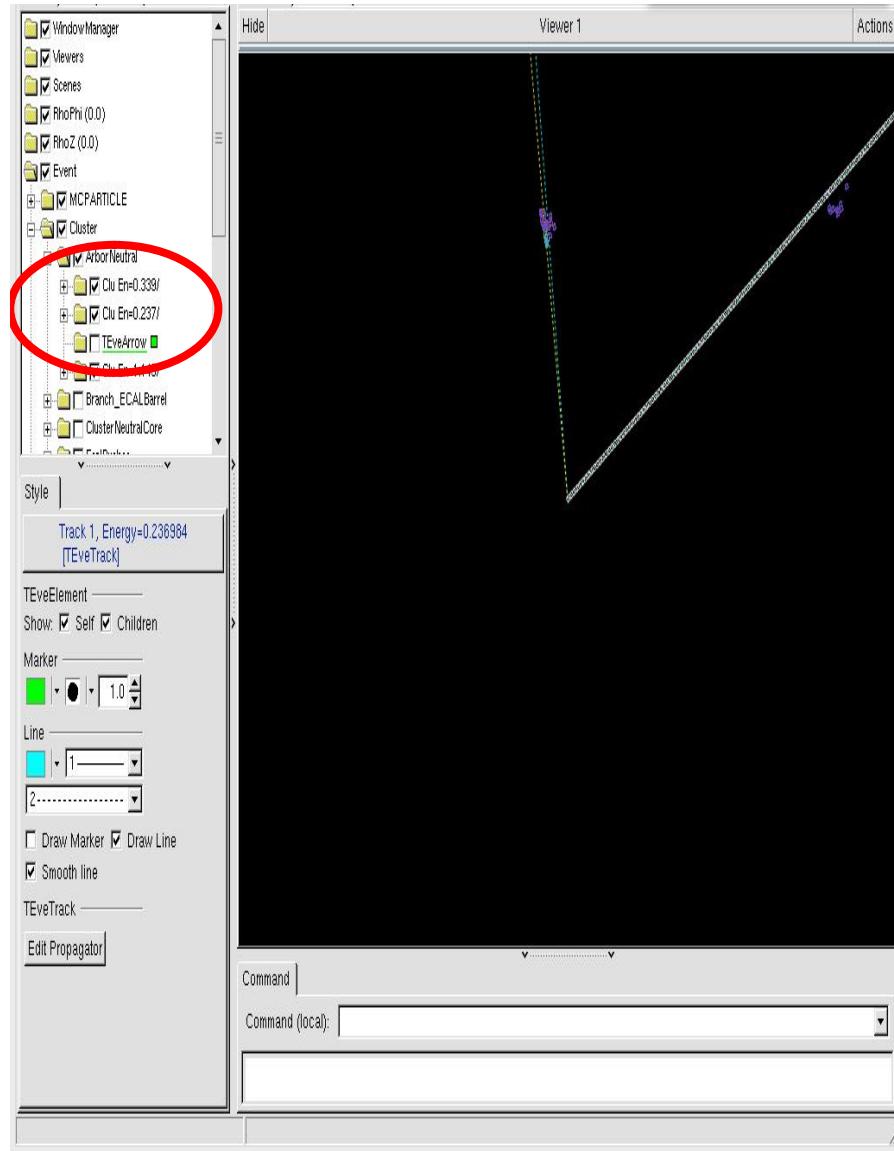
π^0 mass (1GeV) ArborNeutral

without γ conversion



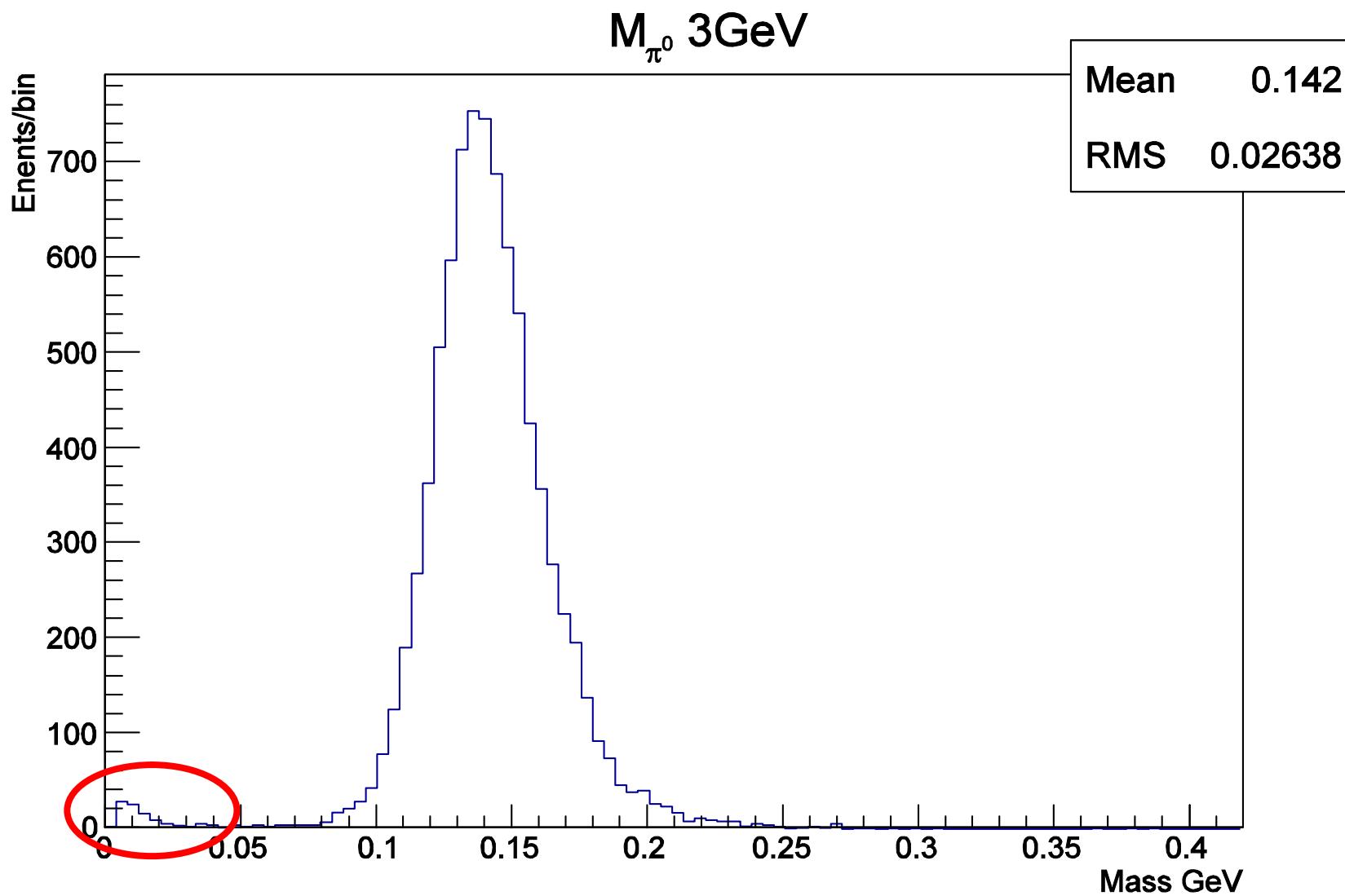
π^0 mass (1GeV) ArborNeutral

without γ conversion



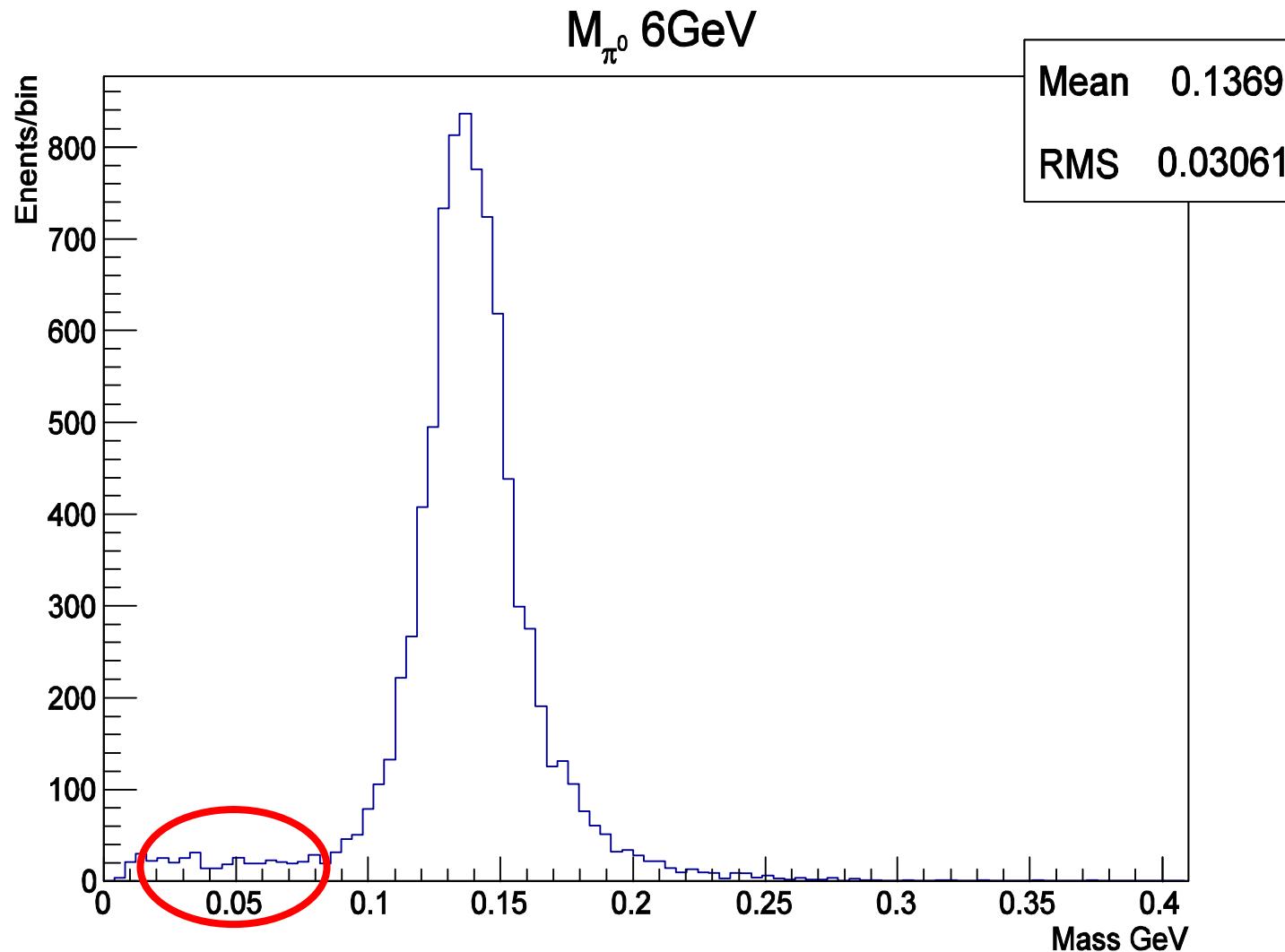
π^0 mass (3GeV) ArborNeutral

without γ conversion



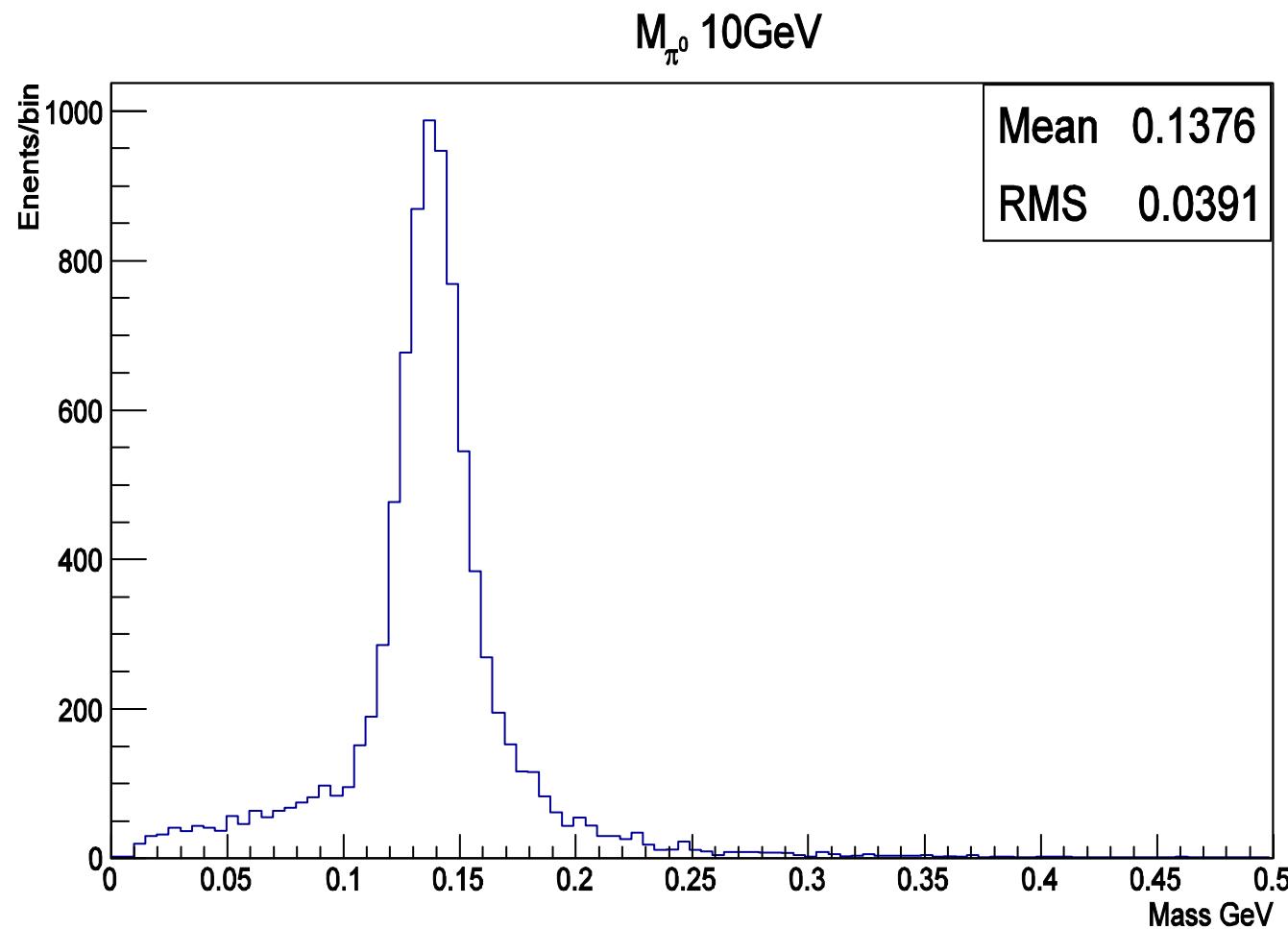
π^0 mass (6GeV) ArborNeutral

without γ conversion



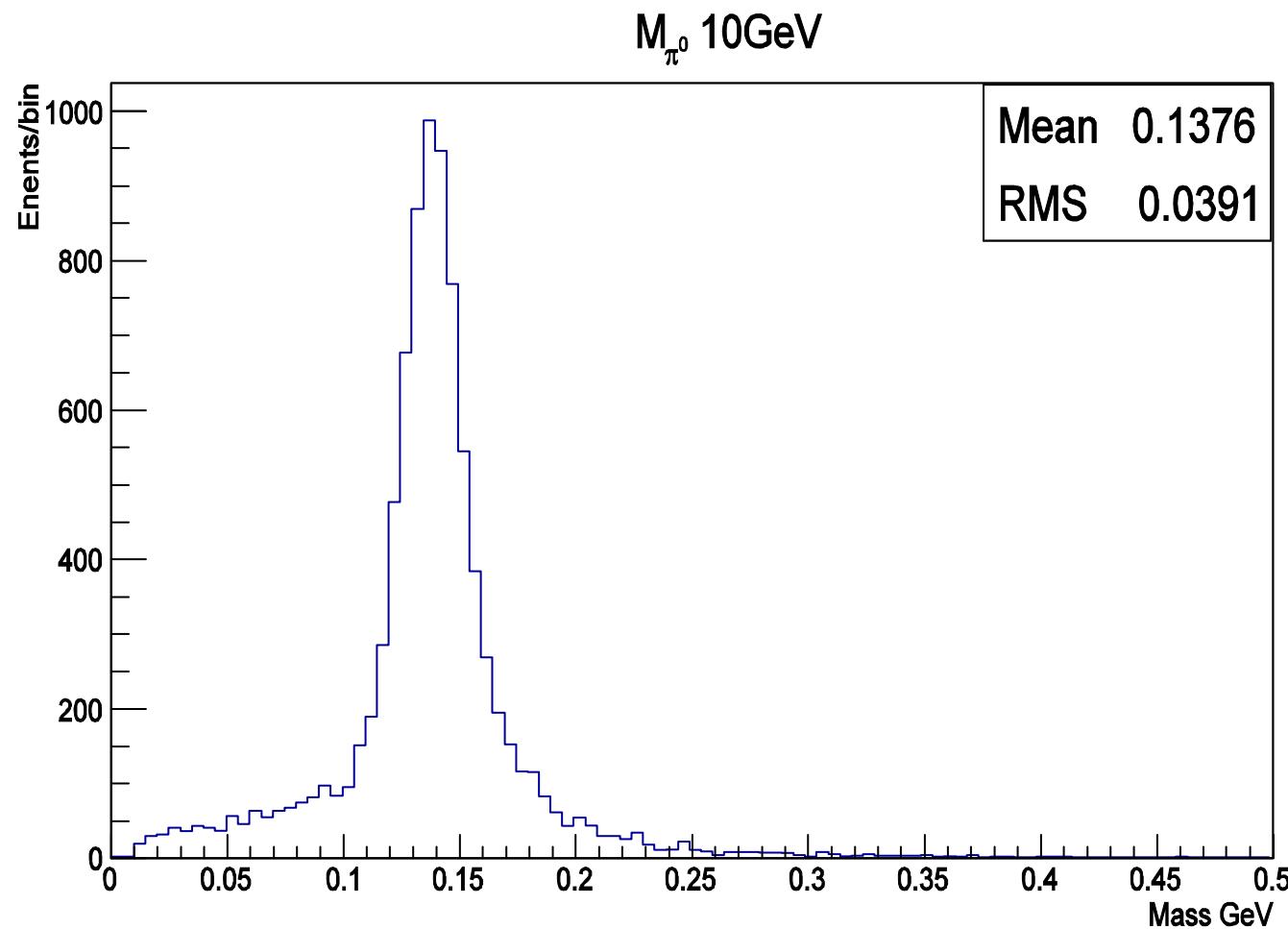
π^0 mass (10GeV) ArborNeutral

without γ conversion



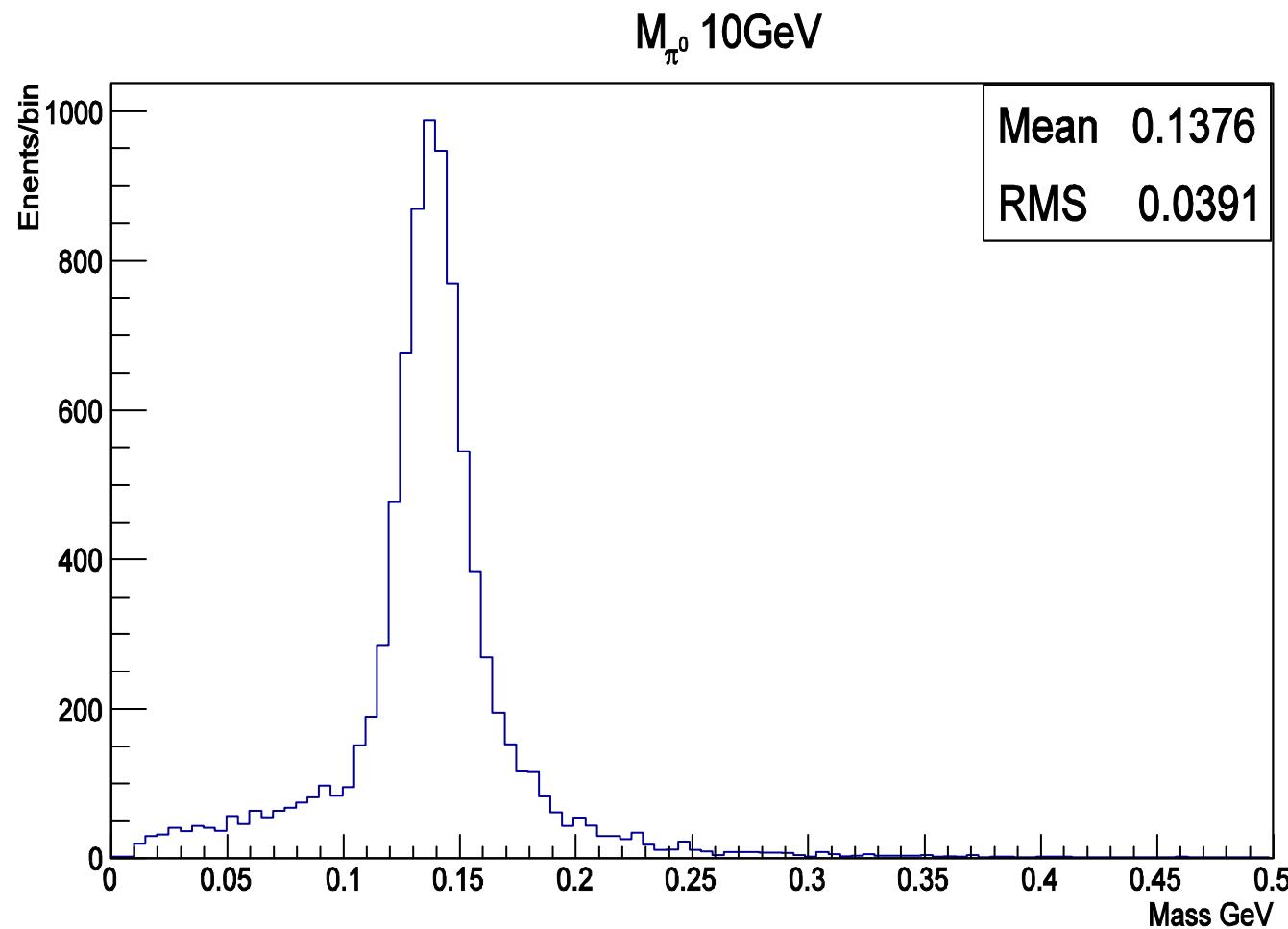
π^0 mass (10GeV) ArborNeutral

without γ conversion



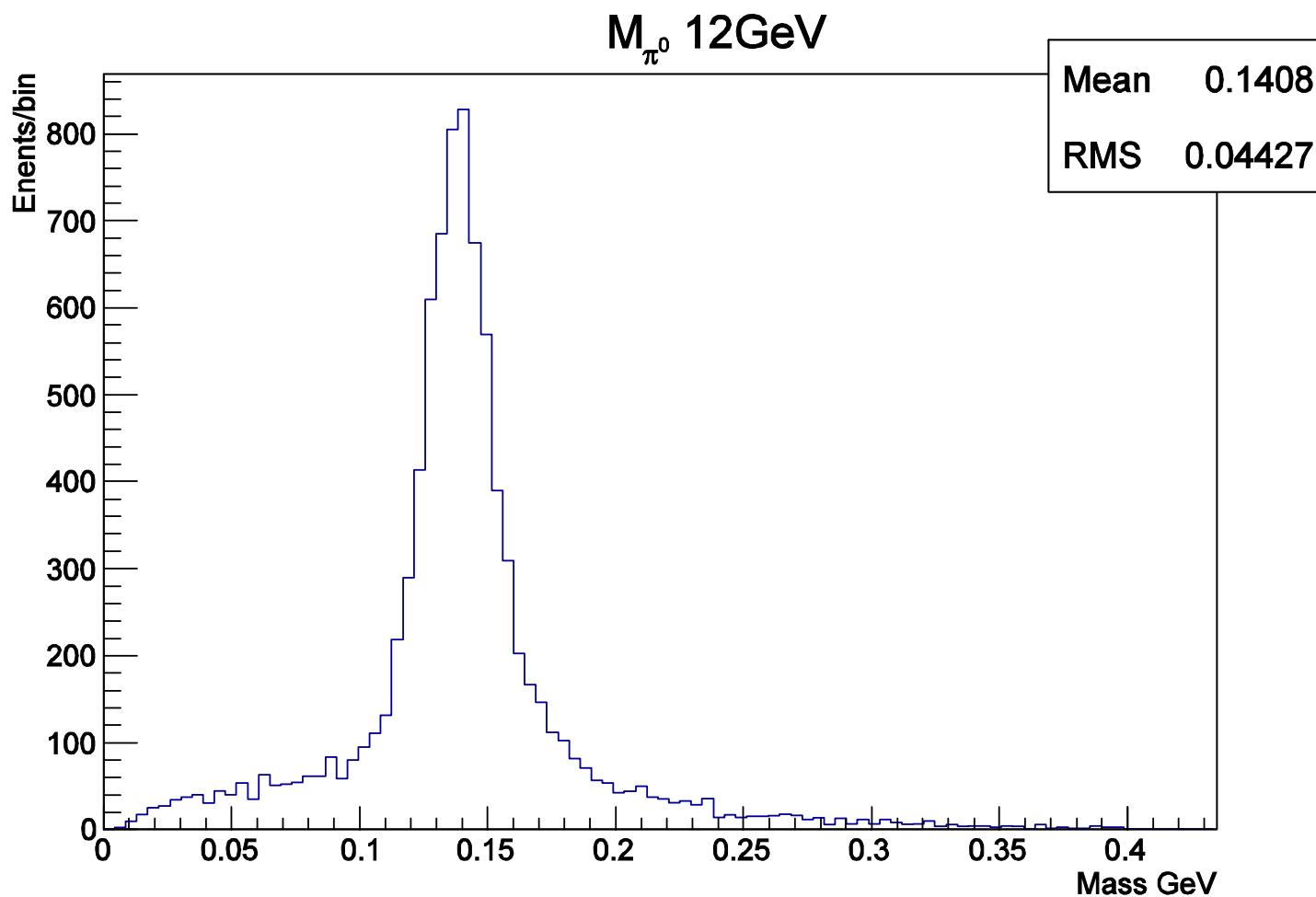
π^0 mass (10GeV) ArborNeutral

without γ conversion



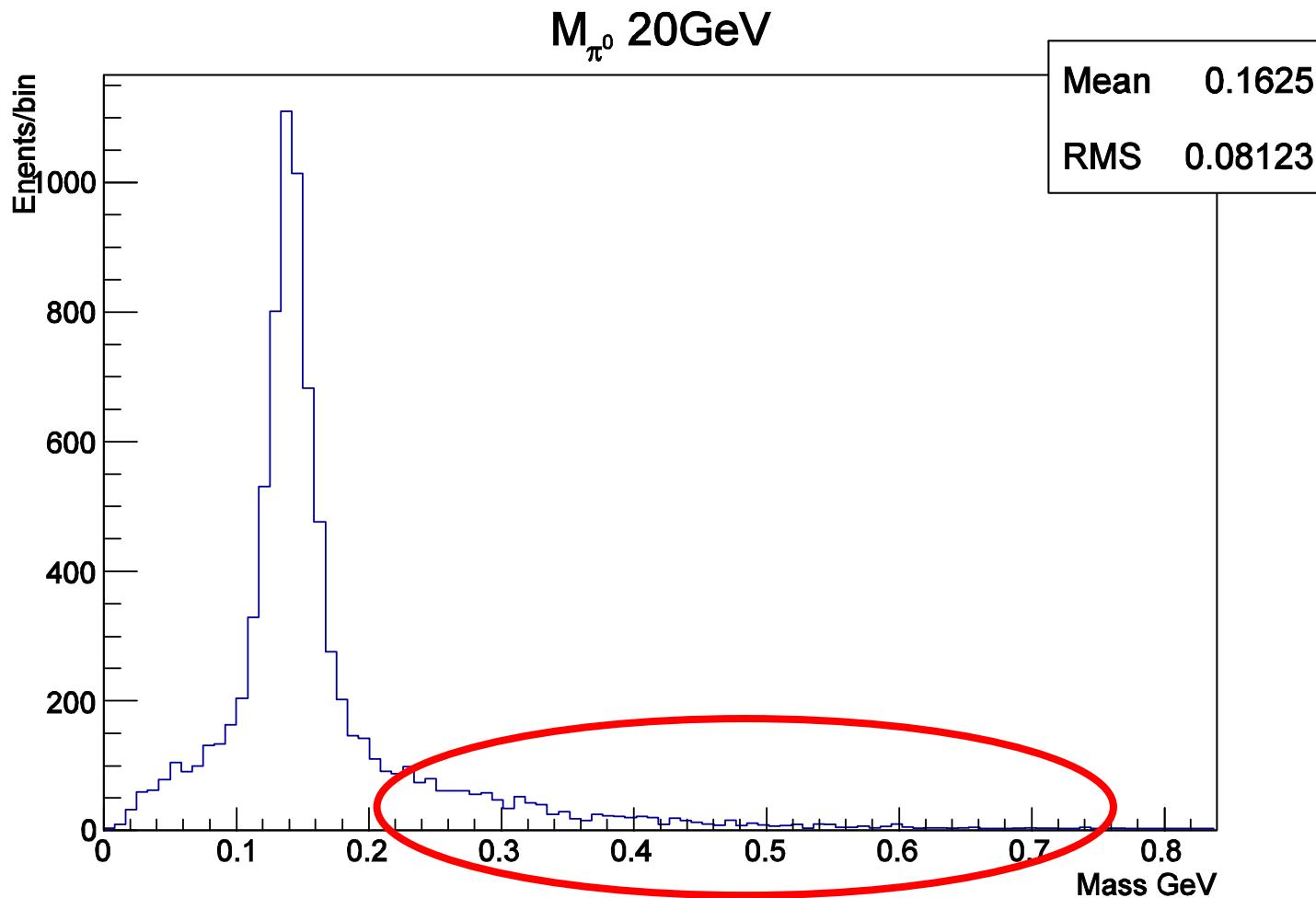
π^0 mass (12GeV) ArborNeutral

without γ conversion



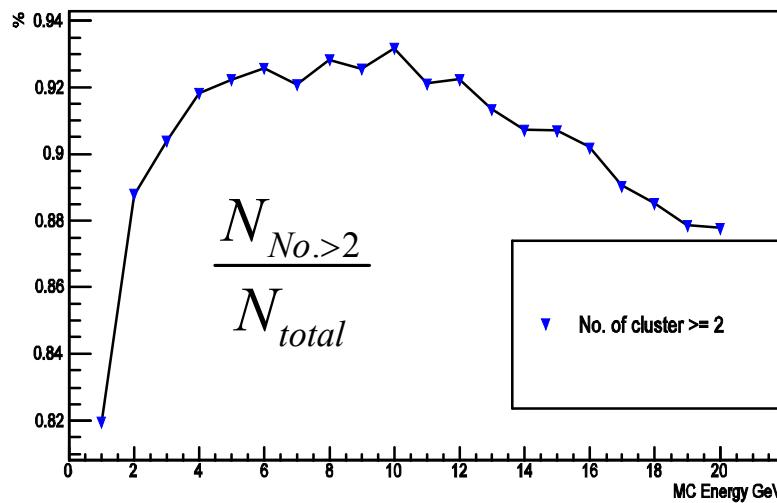
π^0 mass (20GeV) ArborNeutral

without γ conversion

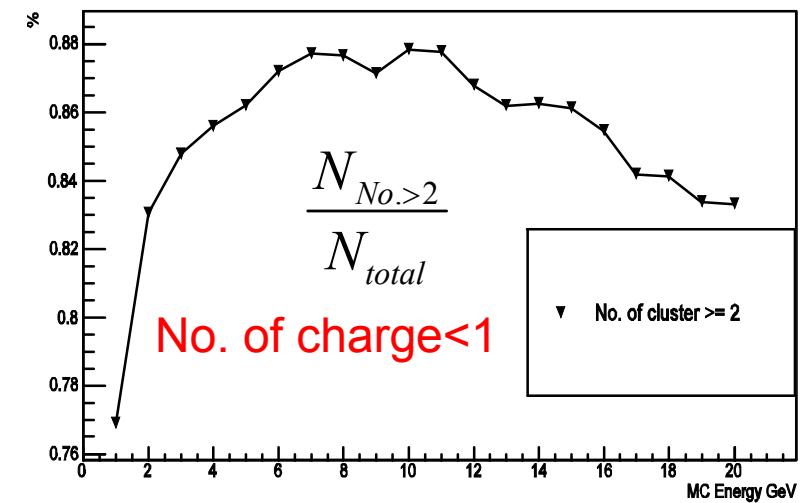


Efficiency

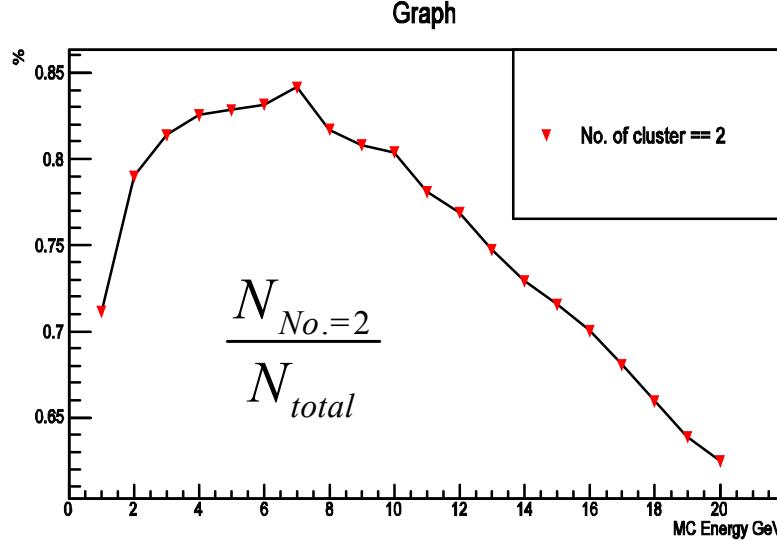
Graph



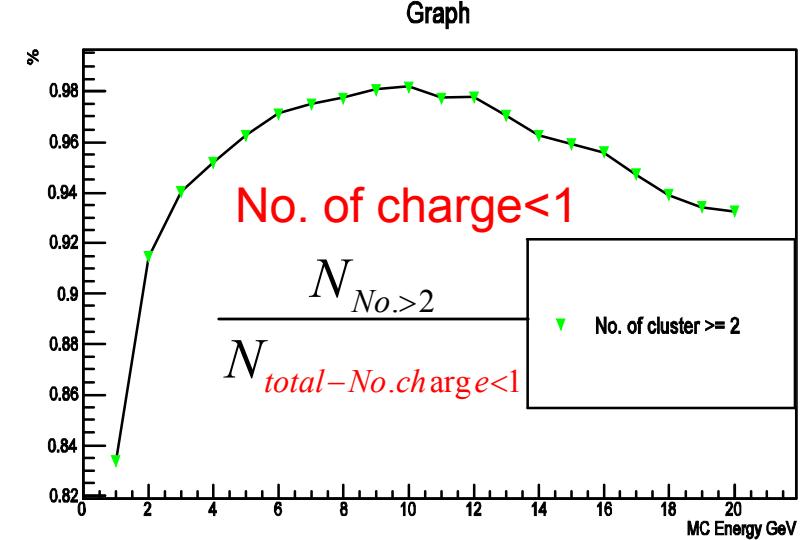
Graph



Graph



Graph



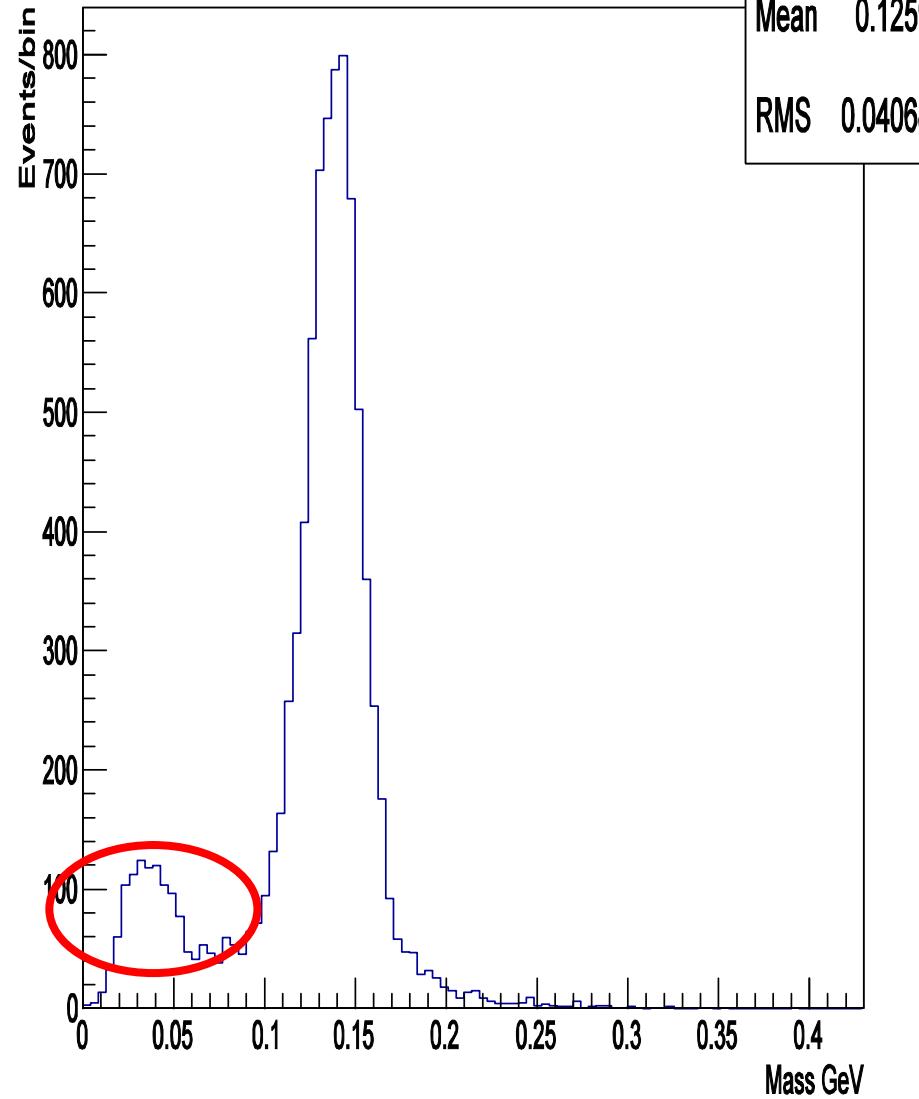
backup

π^0 mass (20GeV)

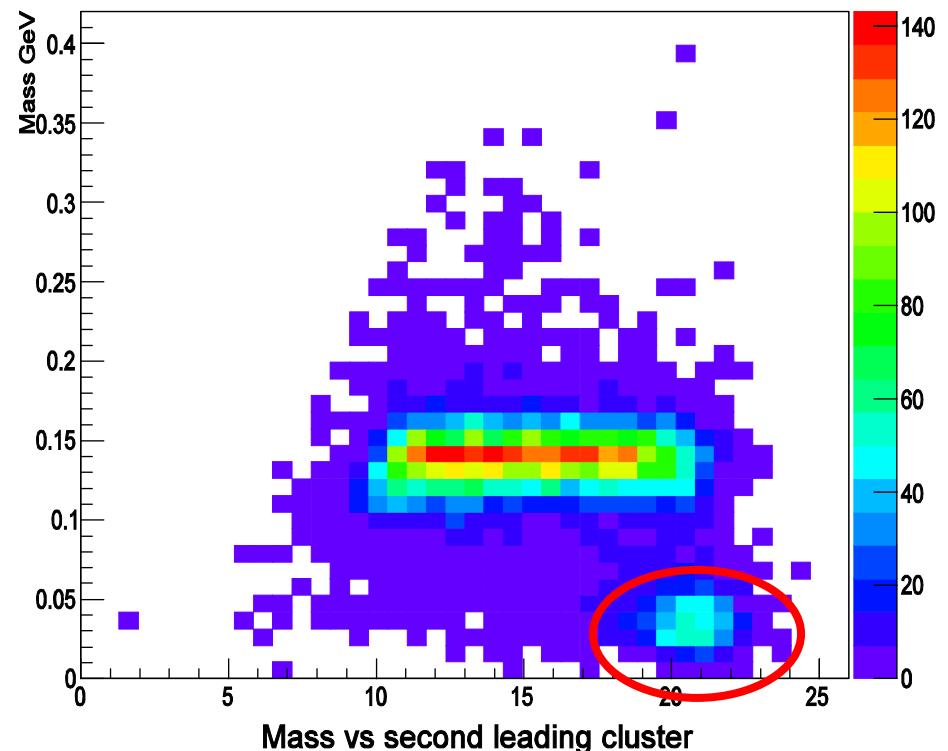
Ecalbushes

without γ conversion

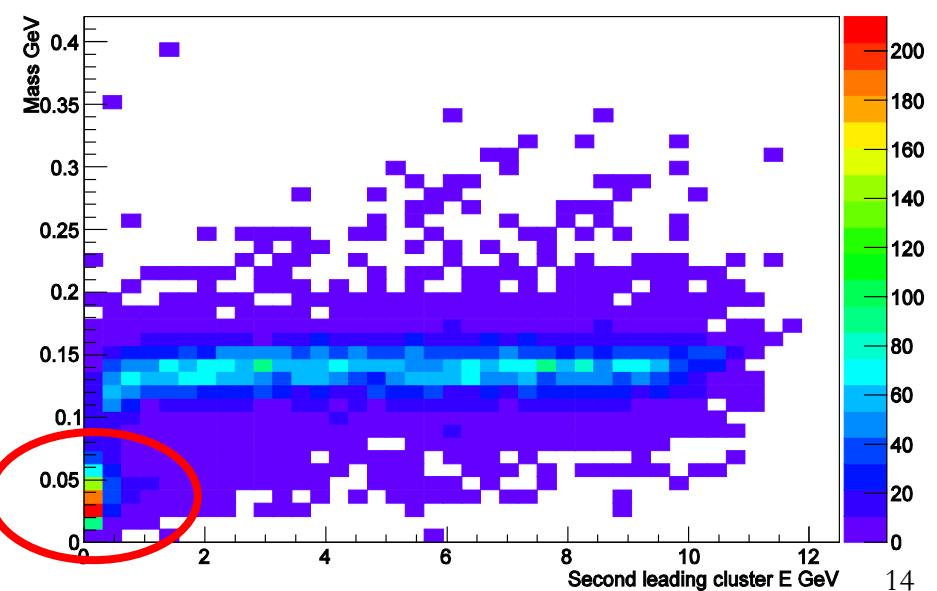
M_{π^0}



Mass vs leading cluster



Mass vs second leading cluster



Event display (14 MCParticle)

Viewer 1

collection name : MCParticle
parameters:

----- print out of MCParticle collection -----

flag: 0x0
simulator status bits: [sbvtcls] s: created in simulation b: backscatter v: vertex is not endpoint of parent t: decayed in tracker c: decayed in calorimeter l: has left detector s: stopped o: overlay

[id]index	PDG	px, py, pz	energy gen [simstat] vertex x, y , z	endpoint x, y , z
z	mass	charge	spin	colorflow [parents] - [daughters]	
[00015616]	0	111	2.81e-01, 2.01e+01, 9.74e-01 2.01e+01 0 [s t] 0.00e+00, 0.00e+00, 0.00e+00 6.67e-08, 4.77e-06, 2		
.31e-07	1.35e-01	0.00e+00	0.00e+00, 0.00e+00, 0.00e+00 (0, 0) [] - [1,2]		
[00015617]	1	22	2.36e-02, 3.78e-01, 1.81e-02 3.79e-01 0 [s v c s] 6.67e-08, 4.77e-06, 2.31e-07 1.16e+02, 1.86e+03, 8		
.93e+01	0.00e+00	0.00e+00	0.00e+00, 0.00e+00, 0.00e+00 (0, 0) [0] - []		
[00015618]	2	22	2.57e-01, 1.97e+01, 9.56e-01 1.98e+01 0 [s v c s] 6.67e-08, 4.77e-06, 2.31e-07 2.44e+01, 1.87e+03, 9		
.06e+01	0.00e+00	0.00e+00	0.00e+00, 0.00e+00, 0.00e+00 (0, 0) [0] - []		

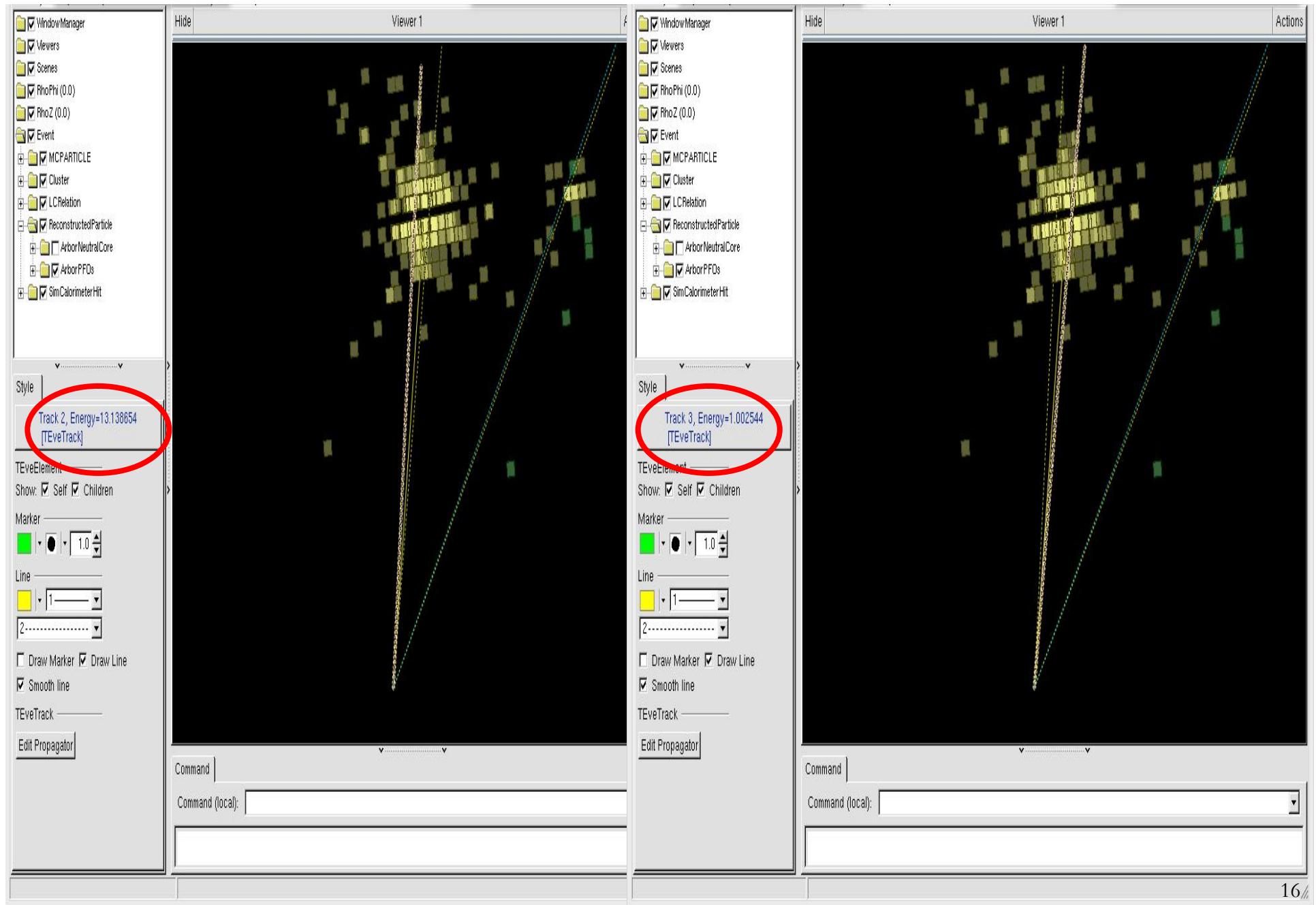
collection name : MCTruthMarlinTrkTracksLink
parameters:

Connected to lxslc6.hep.ac.cn.22.

无法识别的 USB 设备
这台计算机连接的前一个 USB 设备工作不正常。
Windows 无法识别它。
SSH2 xterm 134x26 26.2 3 sessions CAP NUM

15

Event display (14 ArborPFOs)



Event display (20 MCParticle)

Viewer 1

wangf@lxslc604:/cefs/tmp_storage/wangf/Pi/pi0_20GeV - Xshell 4

File Edit View Tools Window Help

New Reconnect

1 lxslc6.hep.ac.cn:22 x 2 lxslc6.hep.ac.cn:22 3 lxslc6.hep.ac.cn:22

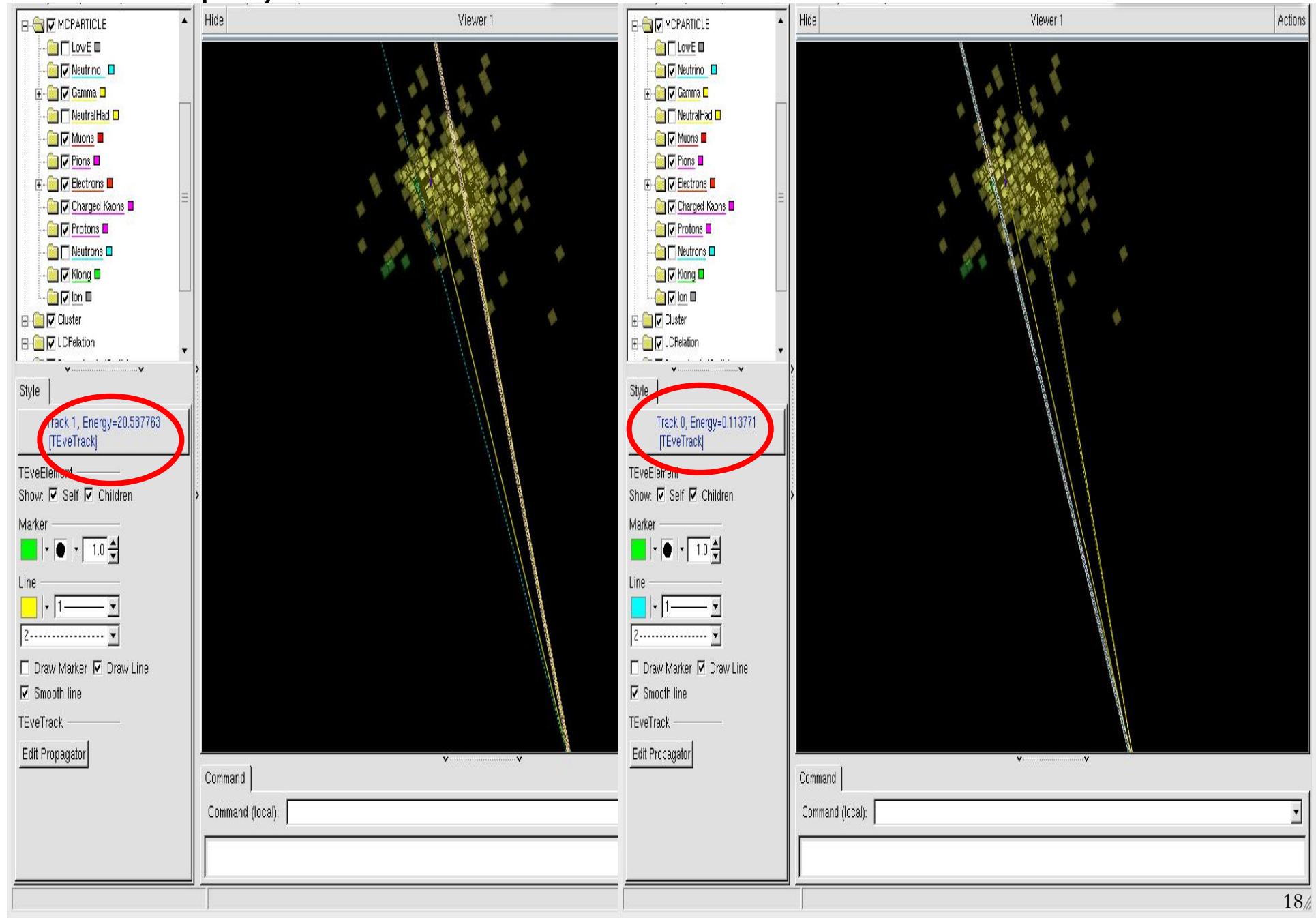
[id]	index	PDG	px,	py,	pz	energy	gen[[simstat]]	vertex x,	y ,	z	endpoint x,	y ,	^
z	mass	charge				colorflow		[parents]	- [daughters]				
[00020572]	0	111	3.32e-01, 2.01e+01, 5.80e-01	2.01e+01	0	[s t]	0.00e+00, 0.00e+00, 0.00e+00	1.52e-05, 9.24e-04, 2	.66e-05	1.35e-01	0.00e+00	0.00e+00, 0.00e+00, 0.00e+00	(0, 0) [] - [1,2]
[00020573]	1	22	1.83e-01, 1.37e+01, 3.47e-01	1.37e+01	0	[s v c s]	1.52e-05, 9.24e-04, 2.66e-05	2.48e+01, 1.85e+03, 4	.69e+01	0.00e+00	0.00e+00	0.00e+00, 0.00e+00, 0.00e+00	(0, 0) [0] - []
[00020574]	2	22	1.49e-01, 6.47e+00, 2.33e-01	6.47e+00	0	[s v c s]	1.52e-05, 9.24e-04, 2.66e-05	4.31e+01, 1.88e+03, 6	.76e+01	0.00e+00	0.00e+00	0.00e+00, 0.00e+00, 0.00e+00	(0, 0) [0] - [3]
[00020575]	3	-11	1.35e-01, 5.80e+00, 2.10e-01	5.81e+00	0	[s v c s]	4.31e+01, 1.88e+03, 6.76e+01	4.86e+01, 1.91e+03, 6	.64e+01	5.11e-04	1.00e+00	0.00e+00, 0.00e+00, 0.00e+00	(0, 0) [2] - [4]
[00020576]	4	22	8.72e-02, 3.71e+00, 1.37e-01	3.71e+00	0	[s c s]	4.32e+01, 1.88e+03, 6.76e+01	4.33e+01, 1.88e+03, 6	.78e+01	0.00e+00	0.00e+00	0.00e+00, 0.00e+00, 0.00e+00	(0, 0) [3] - [5]
[00020577]	5	-11	3.17e-02, 1.37e+00, 5.07e-02	1.37e+00	0	[s v c s]	4.33e+01, 1.88e+03, 6.78e+01	4.40e+01, 1.88e+03, 6	.83e+01	5.11e-04	1.00e+00	0.00e+00, 0.00e+00, 0.00e+00	(0, 0) [4] - [6]
[00020578]	6	22	3.71e-02, 1.26e+00, 4.25e-02	1.26e+00	0	[s c s]	4.33e+01, 1.88e+03, 6.78e+01	4.36e+01, 1.89e+03, 6	.82e+01	0.00e+00	0.00e+00	0.00e+00, 0.00e+00, 0.00e+00	(0, 0) [5] - [7]
[00020579]	7	-11	2.72e-02, 9.40e-01, 3.12e-02	9.41e-01	0	[s v c s]	4.36e+01, 1.89e+03, 6.82e+01	4.72e+01, 1.90e+03, 7	.15e+01	5.11e-04	1.00e+00	0.00e+00, 0.00e+00, 0.00e+00	(0, 0) [6] - [8]
[00020580]	8	22	3.59e-03, 1.08e-02, 5.64e-03	1.27e-02	0	[s c s]	4.45e+01, 1.90e+03, 6.88e+01	4.57e+01, 1.90e+03, 7	.07e+01	0.00e+00	0.00e+00	0.00e+00, 0.00e+00, 0.00e+00	(0, 0) [7] - [9]
[00020581]	9	2112	-4.33e-02, -3.00e-02, -1.09e-02	9.41e-01	0	[s v c s]	4.57e+01, 1.90e+03, 7.07e+01	-3.21e+01, 1.85e+03, 5	.11e+01	9.40e-01	0.00e+00	0.00e+00, 0.00e+00, 0.00e+00	(0, 0) [8] - [10]
[00020582]	10	2112	2.87e-04, 2.79e-02, 1.68e-04	9.40e-01	0	[sbv c s]	-3.21e+01, 1.85e+03, 5.11e+01	-1.48e+03, -1.47e+03, -4	.83e-01	9.40e-01	0.00e+00	0.00e+00, 0.00e+00, 0.00e+00	(0, 0) [9] - []

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SSH2 xterm 134x26 26.2 3 sessions CAP NUM

17

Event display (20 ArborPFOs)



Event display (567 MCParticle)

Viewer 1

File Edit View Tools Window Help

wangf@lxslc604:~/efs/tmp_storage/wangf/Pi/pi0_20GeV - Xshell 4

SSH2 xterm 134x26 26.2 sessions CAP NUM

Connected to lxslc6.ihpc.ac.cn.22

Hide

Window Manager
Viewers
Scenes
RhoPhi (0.0)
RhoZ (0.0)
Event
MCPARTICLE
Cluster
LCRelation
ReconstructedParticle
ArborNeutralCore
ArborPFDs
SimCalorimeterHit

Style
Track 0, Energy=19.088728 [TEveTrack]

TEveElement
Show: Self Children
Marker
Line
Line
Draw Marker Draw Line
 Smooth line
TEveTrack
Edit Propagator

Command
Command (local):

Viewer 1 displays a 3D event display showing a central cluster of yellow cubes representing reconstructed particles. A single yellow line represents a track, starting from the bottom and curving upwards towards the center. The left panel contains a tree view of event components and a style editor for tracks.

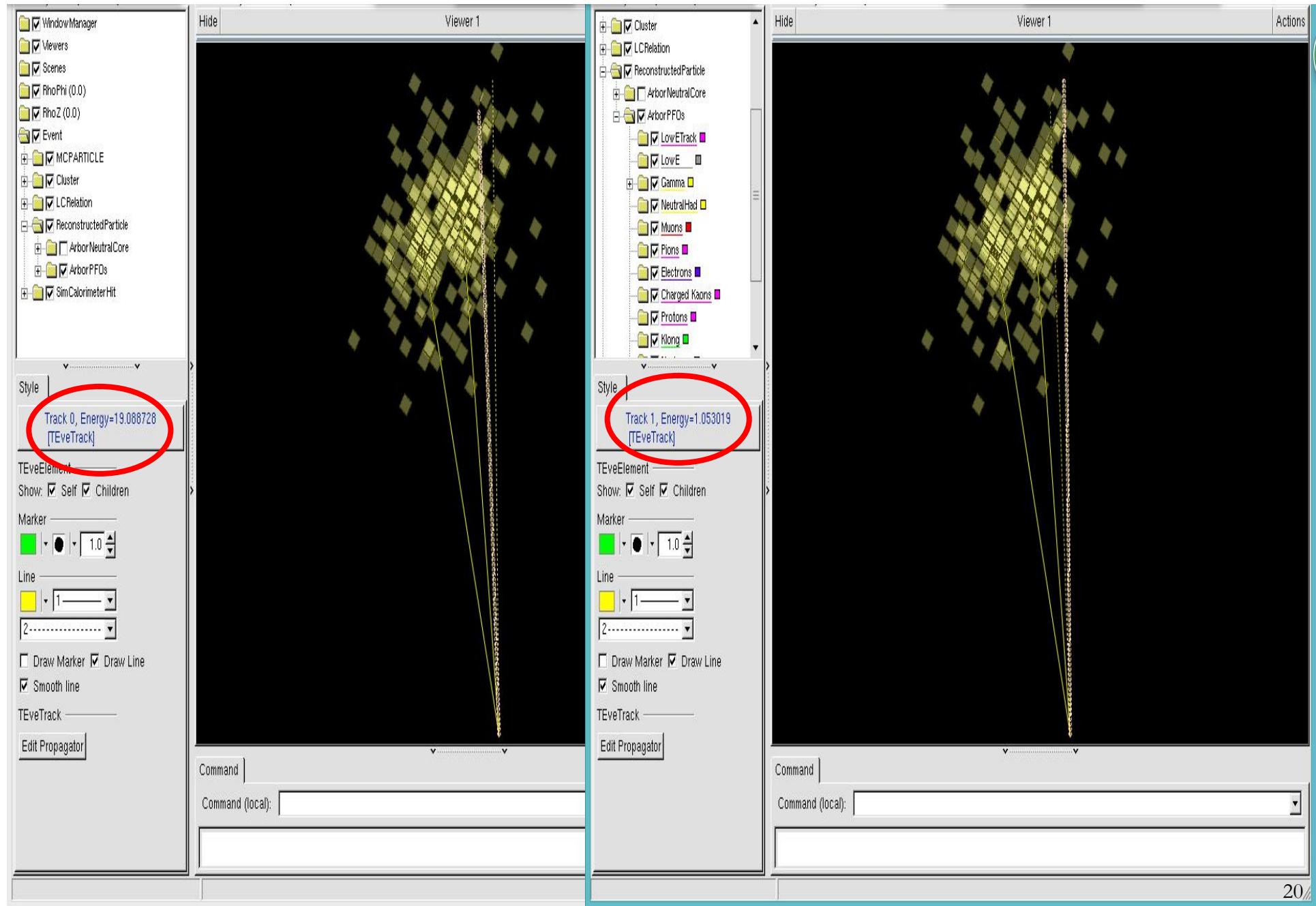
The right panel shows a terminal window titled "wangf@lxslc604:~/efs/tmp_storage/wangf/Pi/pi0_20GeV - Xshell 4". It lists 567 reconstructed particles (ReconstructedParticle) with their properties. Two specific particles are highlighted with red circles: particle 22 at index 1 (line 2) and particle 22 at index 2 (line 3). Both have a "v c s" status and are associated with a "1.27e+01" weight.

```

[00107427] 0| 111| 2.51e-01, 2.01e+01, 4.55e-01| 2.01e+01| 0|[s t ]| 0.00e+00, 0.00e+00, 0.00e+00| 2.93e-05, 2.35e-03, 5.31e-05| 1.35e-01| 0.00e+00| 0.00e+00, 0.00e+00| (0, 0)| [] - [1,2]
[00107428] 1| 22| 2.21e-01, 1.27e+01, 2.69e-01| 1.27e+01| 0|[s v c s ]| 2.93e-05, 2.35e-03, 5.31e-05| 3.23e+01, 1.85e+03, 3.93e+01| 0.00e+00| 0.00e+00, 0.00e+00| (0, 0)| [0] - [3]
[00107429] 2| 22| 2.99e-02, 7.44e+00, 1.86e-01| 7.45e+00| 0|[s v c s ]| 2.93e-05, 2.35e-03, 5.31e-05| 7.64e+00, 1.90e+03, 4.74e+01| 0.00e+00| 0.00e+00, 0.00e+00| (0, 0)| [0] - []
[00107430] 3| 11| 2.20e-01, 1.26e+01, 2.68e-01| 1.26e+01| 0|[s v c s ]| 3.23e+01, 1.85e+03, 3.93e+01| 3.28e+01, 1.89e+03, 4.18e+01| 5.11e-04| -1.00e+00| 0.00e+00, 0.00e+00| (0, 0)| [1] - [4,5,6]
[00107431] 4| 22| 4.24e-02, 2.62e+00, 5.80e-02| 2.62e+00| 0|[s c s ]| 3.23e+01, 1.86e+03, 3.95e+01| 3.24e+01, 1.86e+03, 3.95e+01| 0.00e+00| 0.00e+00, 0.00e+00| (0, 0)| [3] - [19]
[00107432] 5| 22| 2.35e-02, 1.37e+00, 2.91e-02| 1.37e+00| 0|[s c s ]| 3.23e+01, 1.85e+03, 3.94e+01| 3.23e+01, 1.85e+03, 3.94e+01| 0.00e+00| 0.00e+00, 0.00e+00| (0, 0)| [3] - [8]
[00107433] 6| 22| 3.07e-02, 1.77e+00, 3.75e-02| 1.77e+00| 0|[s c s ]| 3.23e+01, 1.85e+03, 3.94e+01| 3.23e+01, 1.86e+03, 3.94e+01| 0.00e+00| 0.00e+00, 0.00e+00| (0, 0)| [3] - [7]
[00107434] 7| -11| 8.09e-03, 4.64e-01, 1.00e-02| 4.64e-01| 0|[s v c s ]| 3.23e+01, 1.86e+03, 3.94e+01| 3.27e+01, 1.87e+03, 4.21e+01| 5.11e-04| 1.00e+00| 0.00e+00, 0.00e+00| (0, 0)| [6] - [14]
[00107435] 8| -11| 1.42e-02, 7.51e-01, 1.65e-02| 7.51e-01| 0|[s v c s ]| 3.23e+01, 1.85e+03, 3.94e+01| 3.61e+01, 1.87e+03, 4.04e+01| 5.11e-04| 1.00e+00| 0.00e+00, 0.00e+00| (0, 0)| [5] - [9]
[00107436] 9| 22| 1.26e-02, 6.23e-01, 1.38e-02| 6.23e-01| 0|[s c s ]| 3.23e+01, 1.85e+03, 3.94e+01| 3.23e+01, 1.86e+03, 3.94e+01| 0.00e+00| 0.00e+00, 0.00e+00| (0, 0)| [8] - [10]
[00107437] 10| 11| 5.46e-03, 2.41e-01, 4.32e-03| 2.41e-01| 0|[s v c s ]| 3.23e+01, 1.86e+03, 3.94e+01| 3.15e+01, 1.88e+03, 3.76e+01| 5.11e-04| -1.00e+00| 0.00e+00, 0.00e+00| (0, 0)| [9] - [11]
[00107438] 11| 22| -1.89e-02, 7.97e-03, -1.24e-02| 2.40e-02| 0|[s c s ]| 3.18e+01, 1.88e+03, 3.74e+01| 2.18e+01, 1.88e+03, 3.09e+01| 0.00e+00| 0.00e+00, 0.00e+00| (0, 0)| [10] - [12]

```

Event display (567 ArborPFOs)



π^0 mass (20GeV) without γ conversion

