

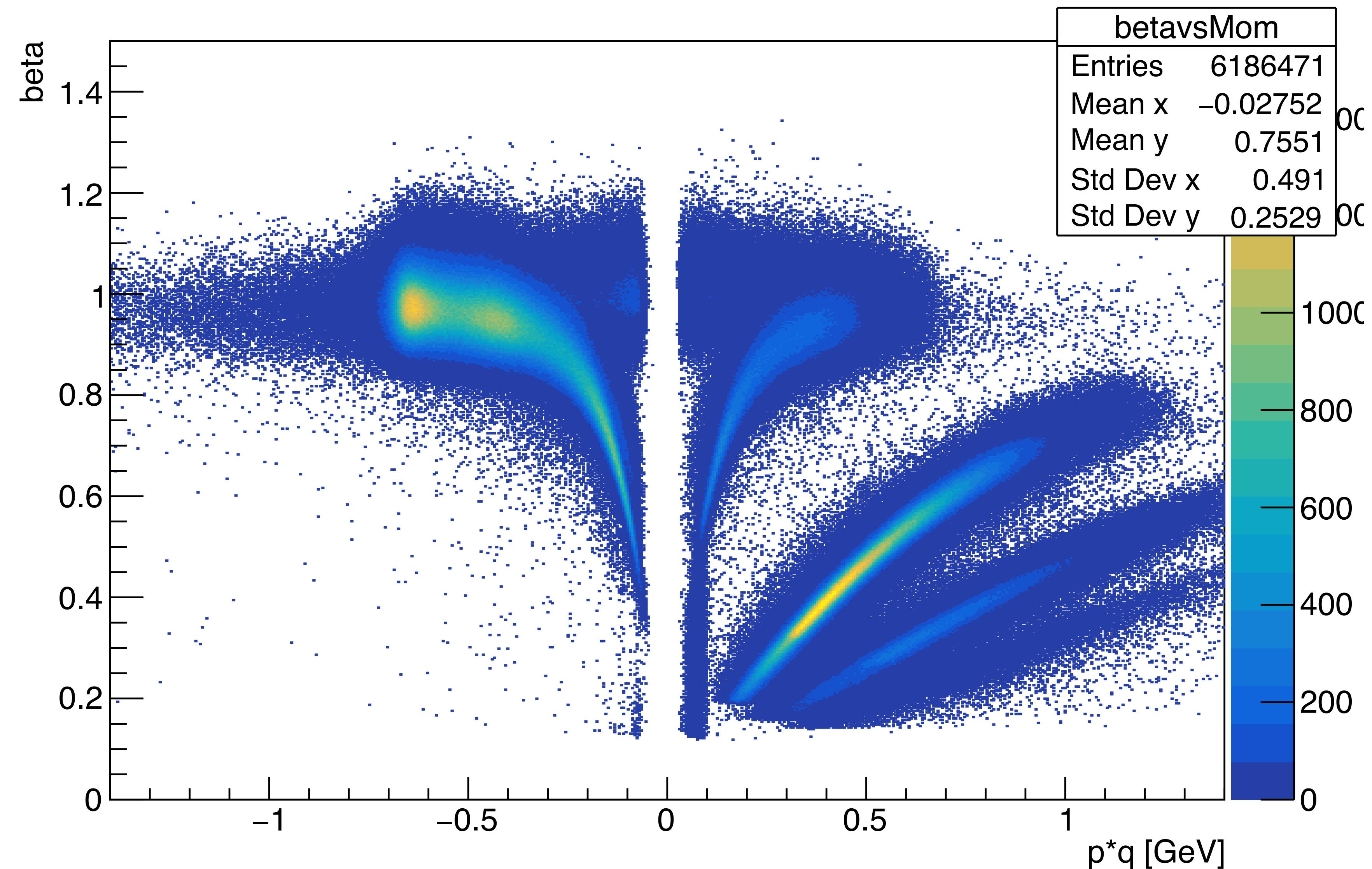
$\pi^- + C$ analysis

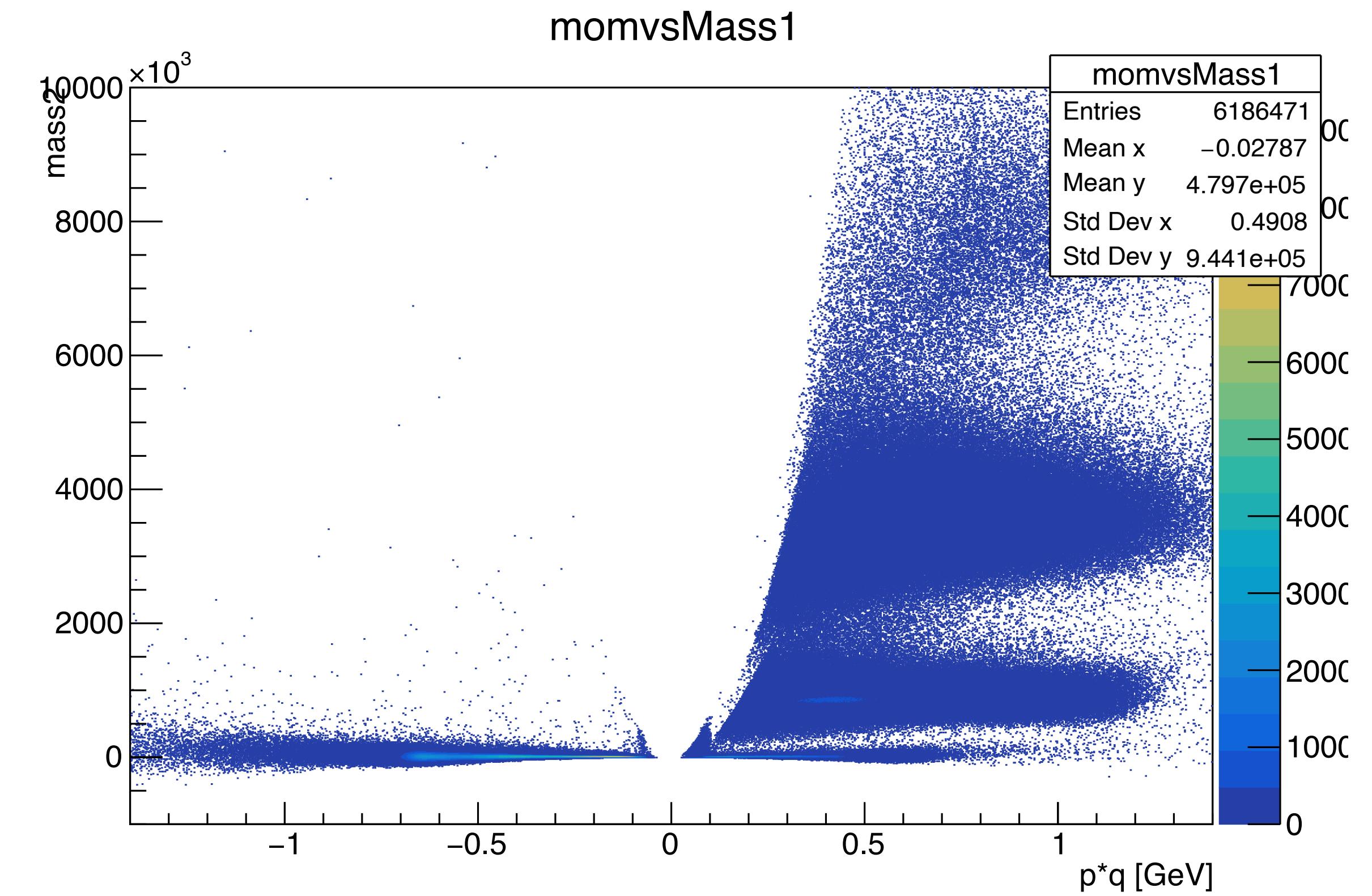
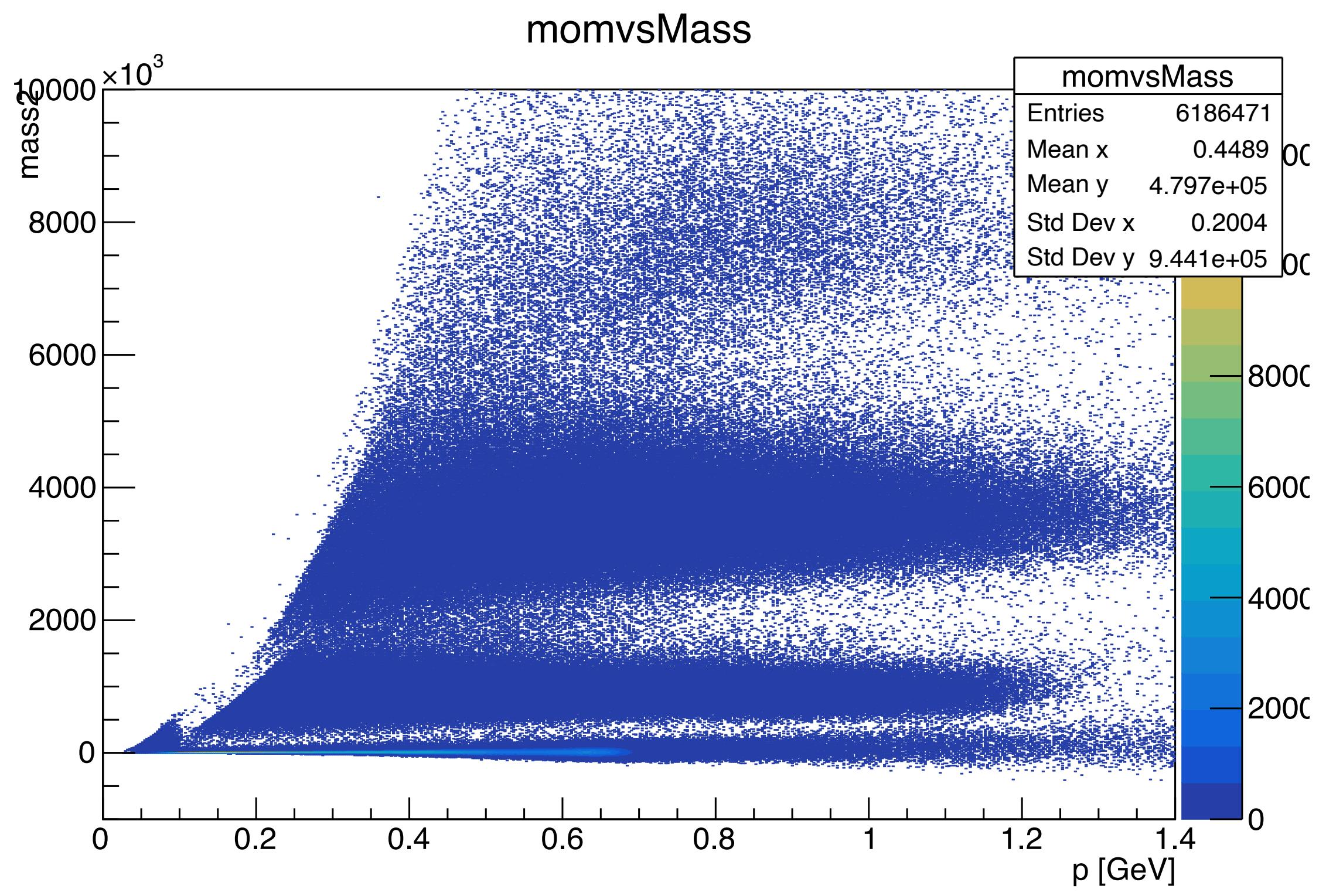
- secondary pion beam (from N + Be reaction) at 685 MeV/C
- proton, deuteron, π^- , π^+ production analysis from INCL
(θ vs p , θ , y , p , p_T , T spectra in 4pi and acceptance)
- differential cross-section T- θ
- mass cuts
- comparison of HADES experimental data with INCL

event selection criteria

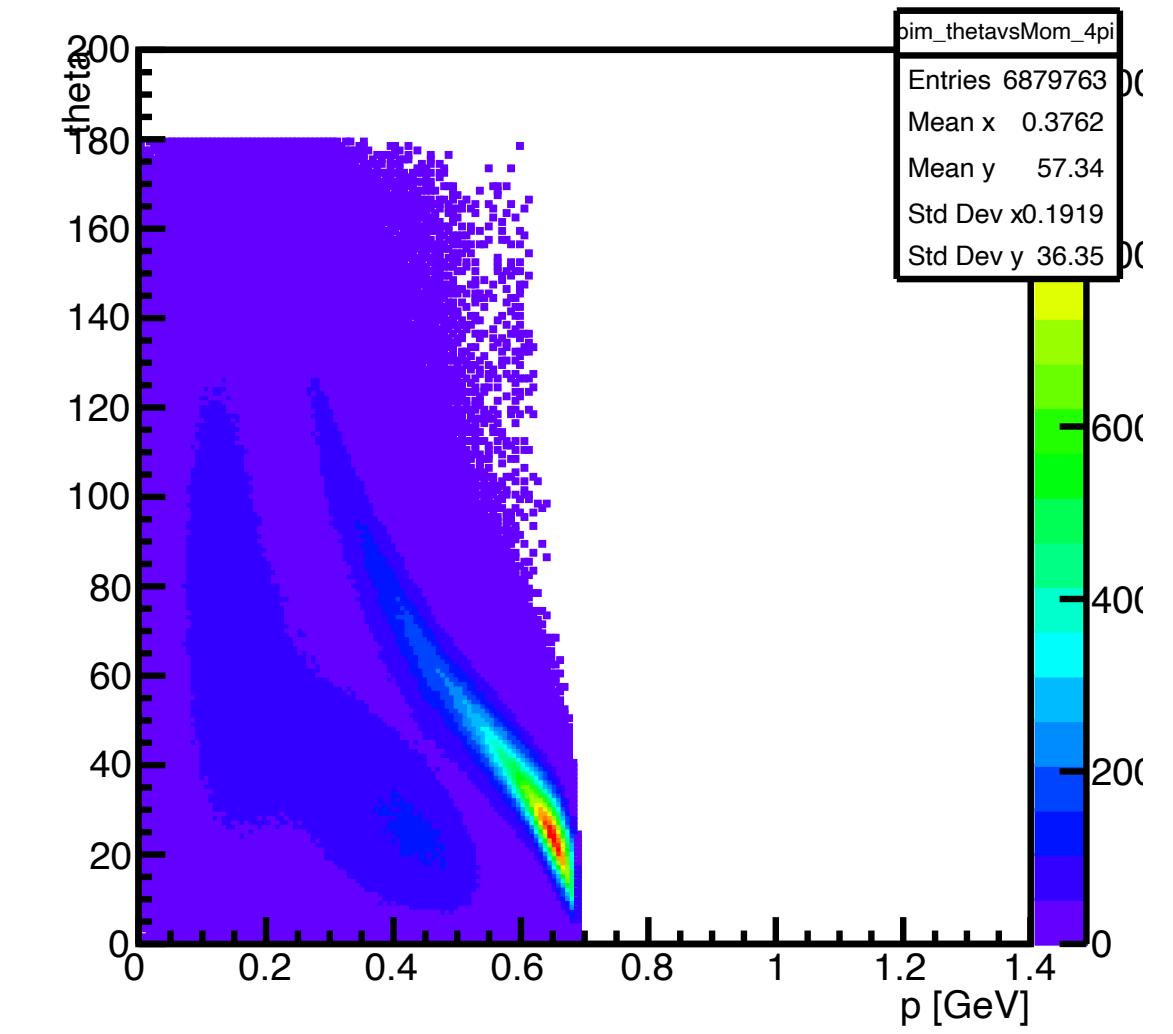
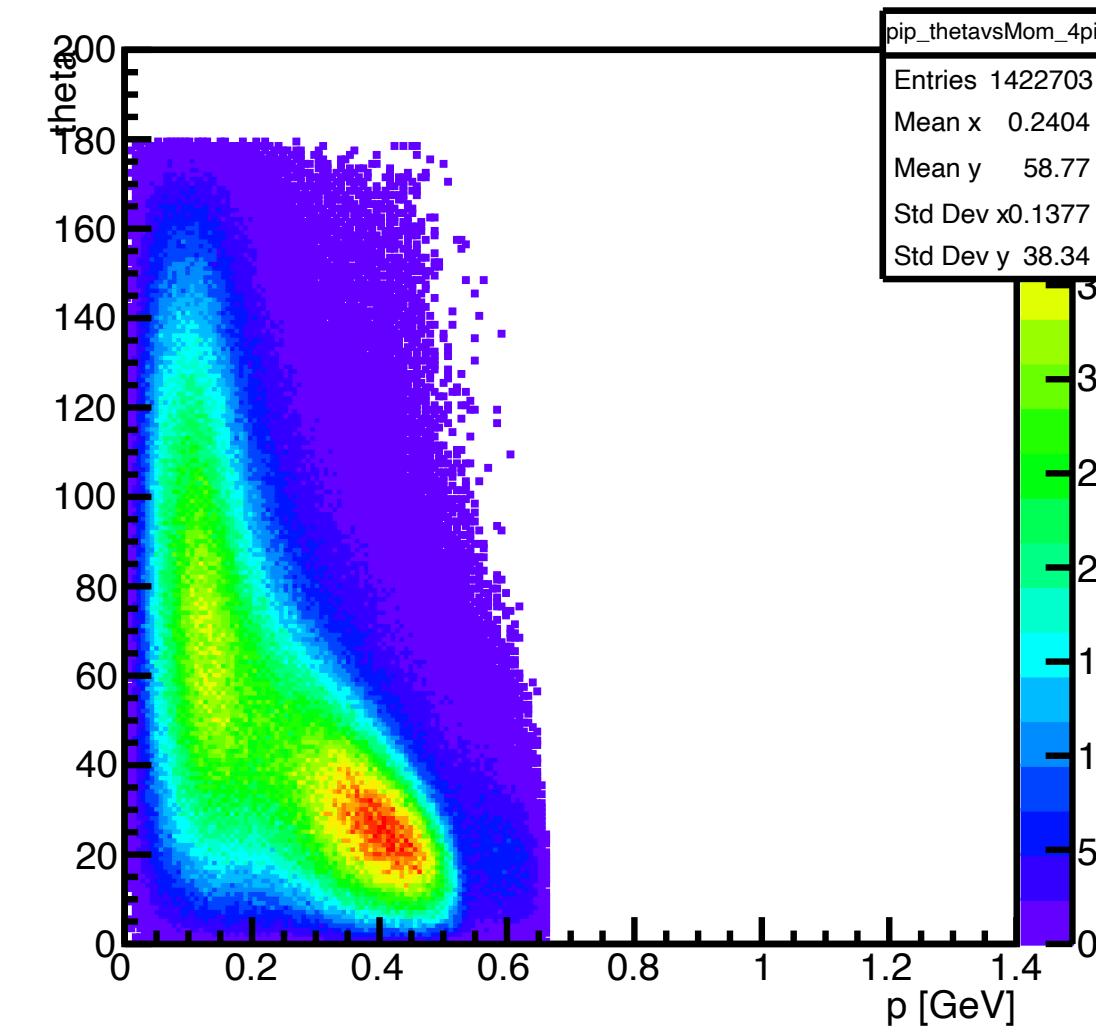
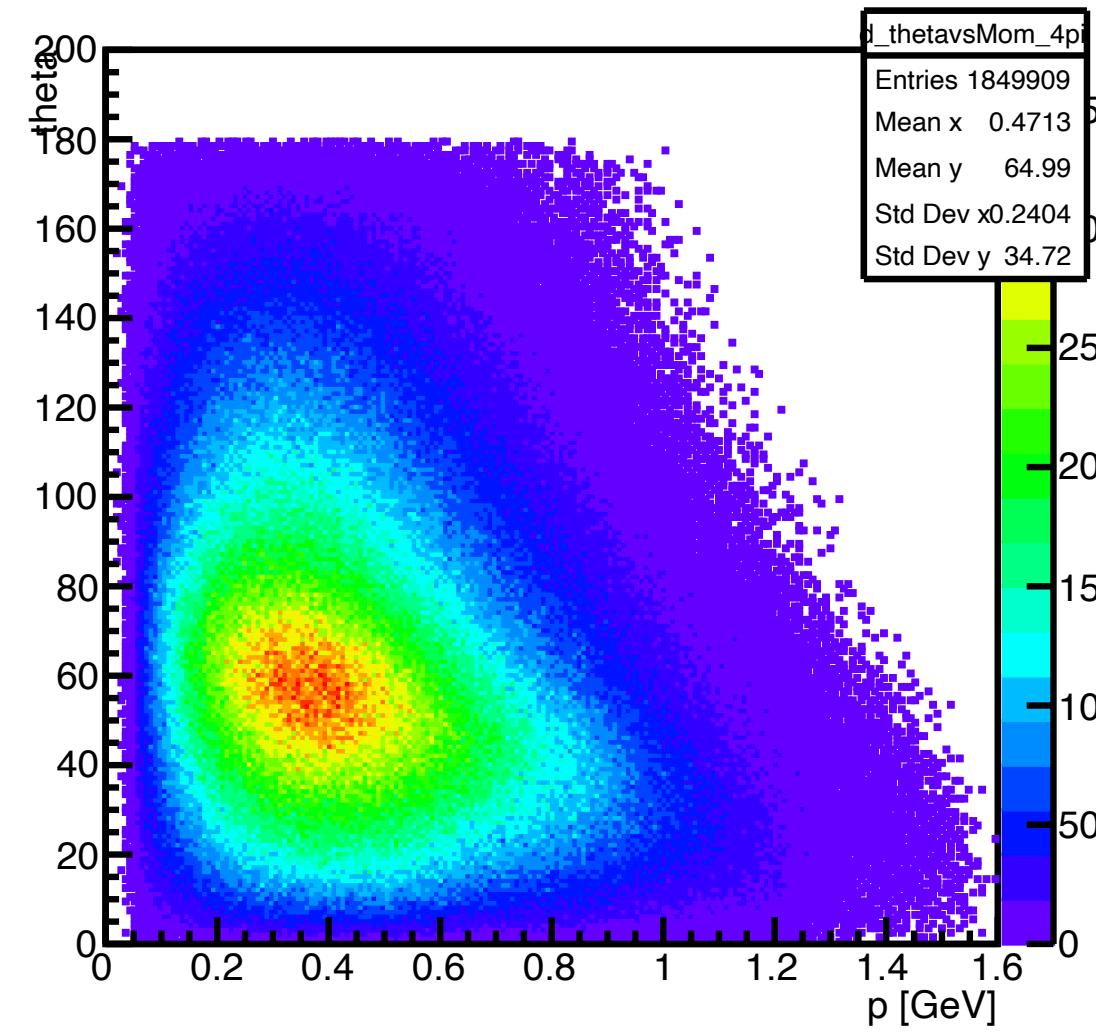
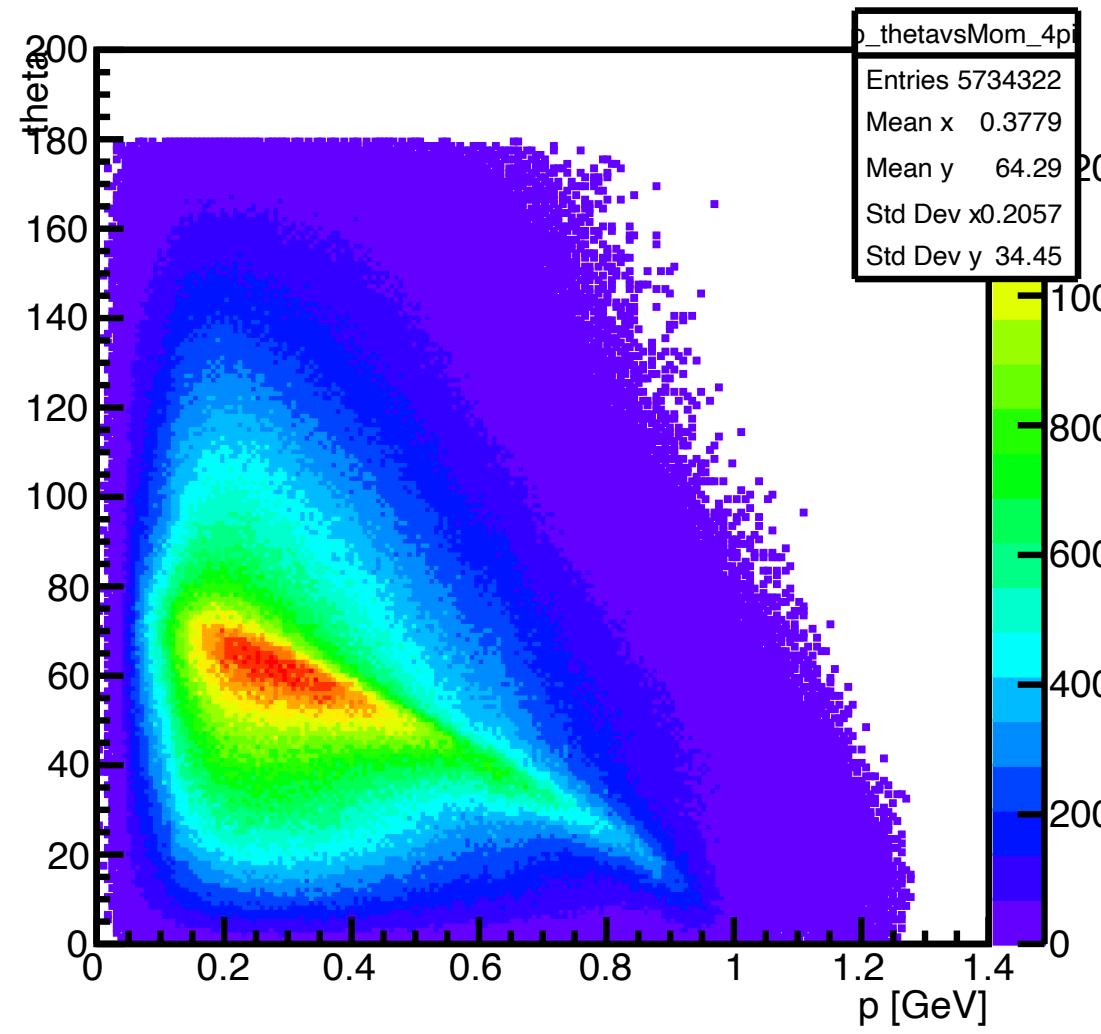
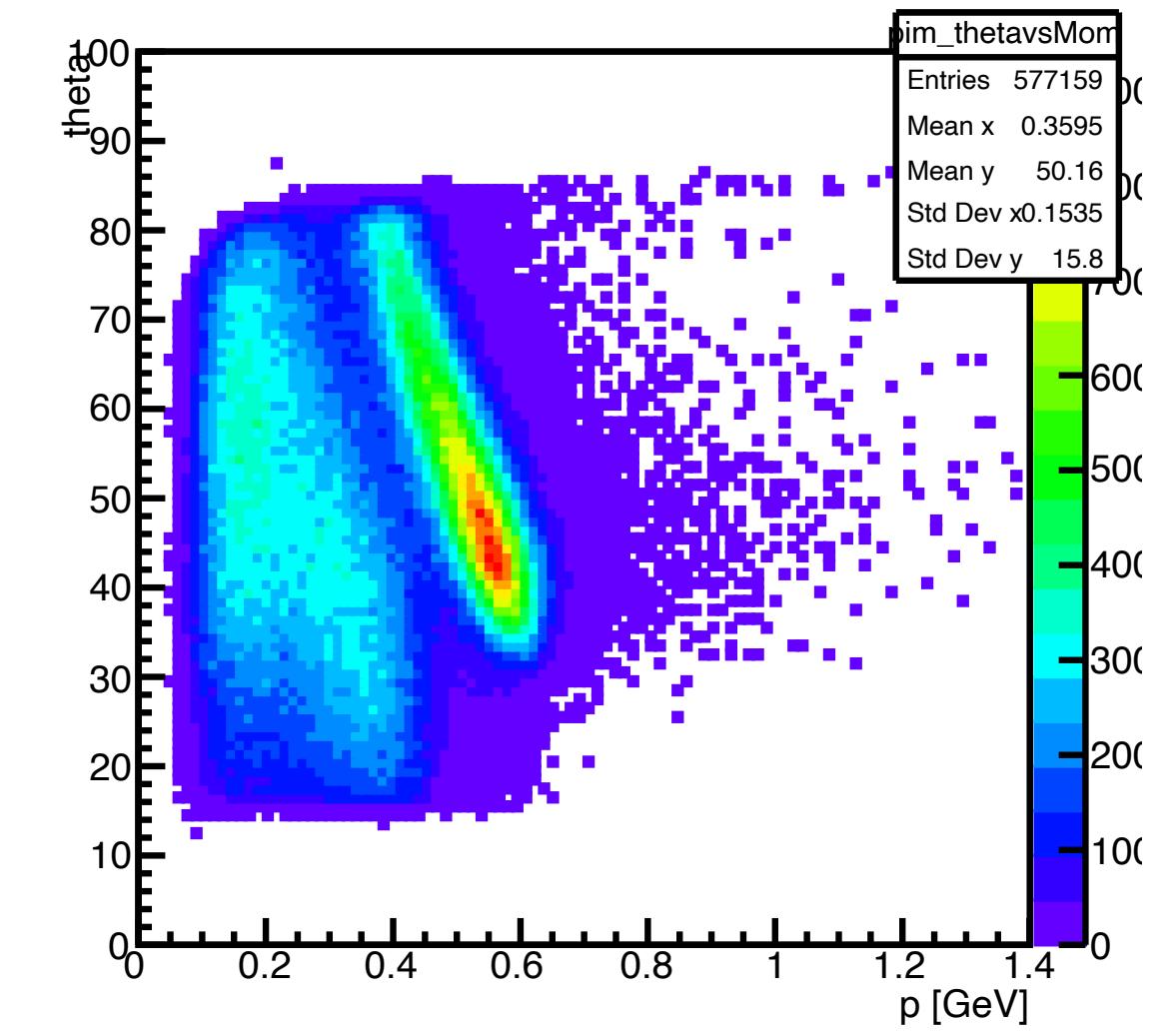
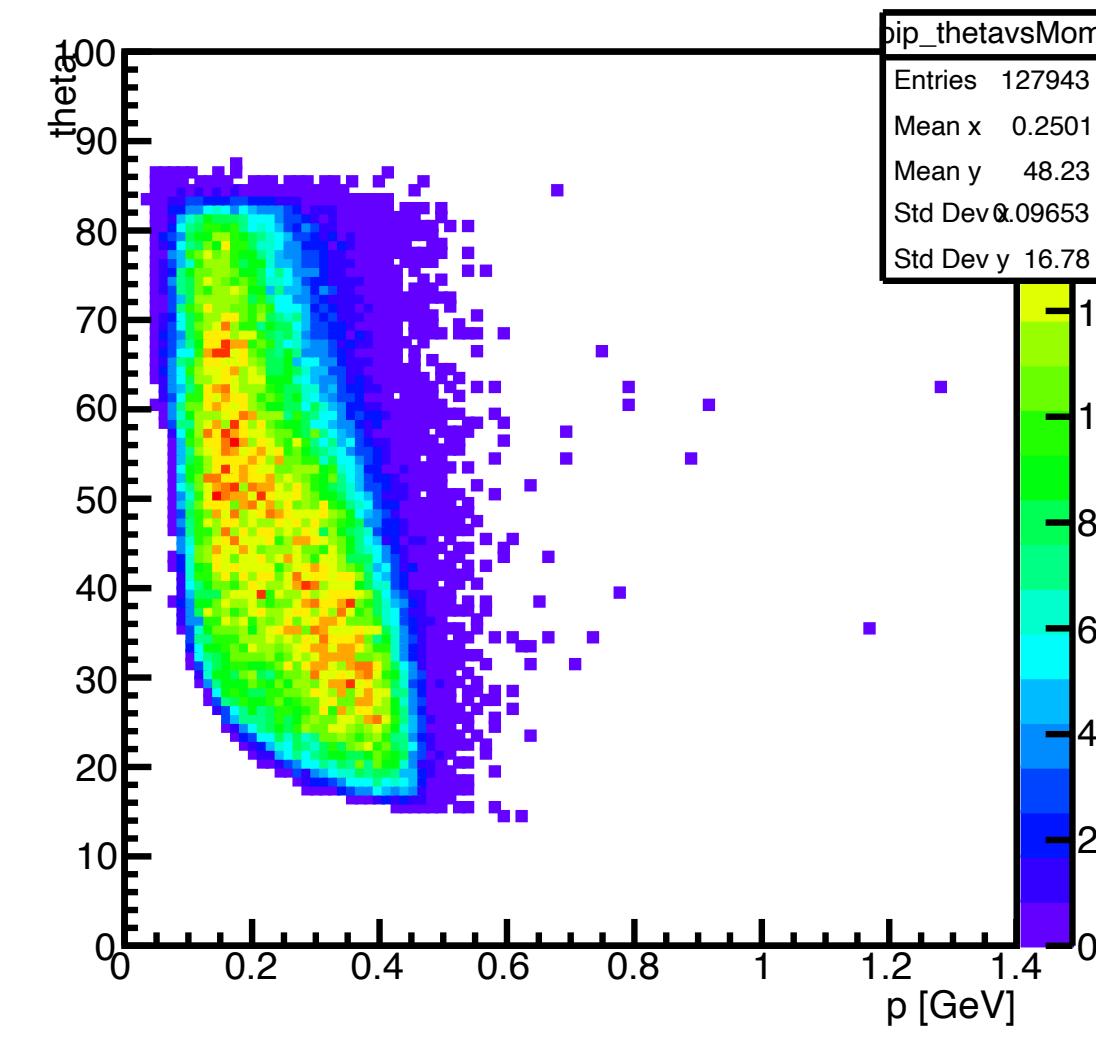
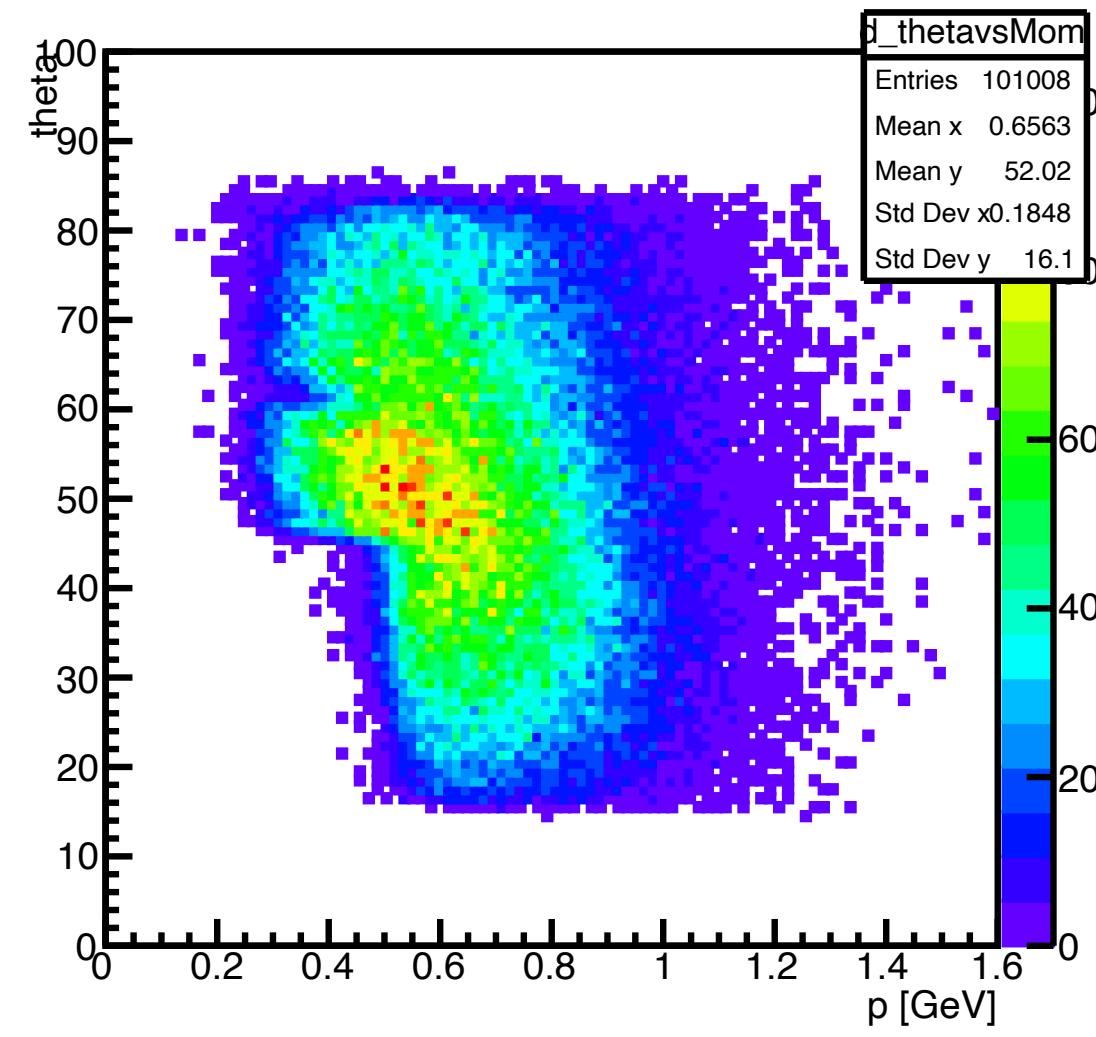
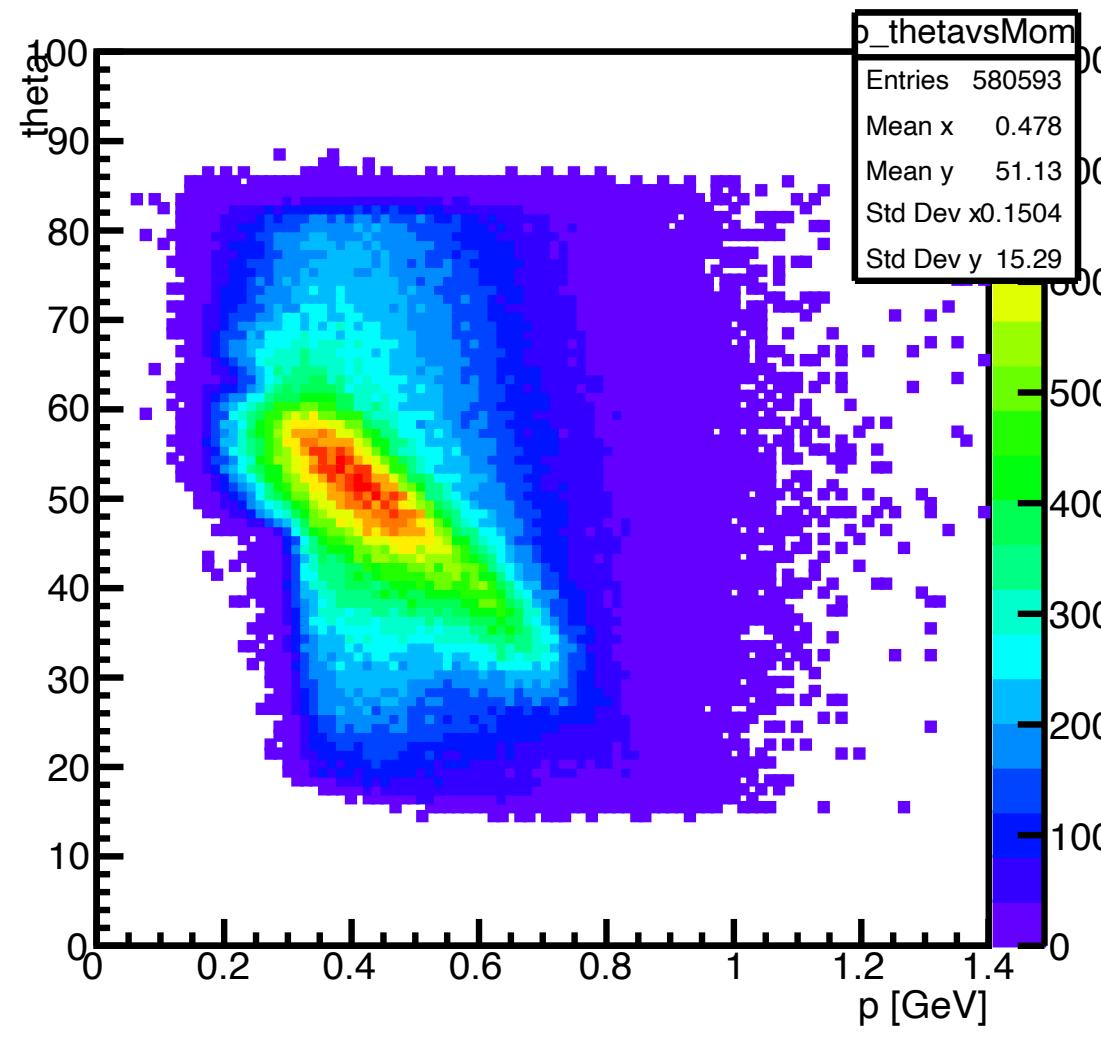
- acceptance: only well reconstructed trajectories (+ M2trigger):
 - `isFlagBit(kIsUsed)`
 - `VertexReco_z > -500`
 - GeantPID / mass cuts
- 4pi: only primary particles
 - `aMech == 0`

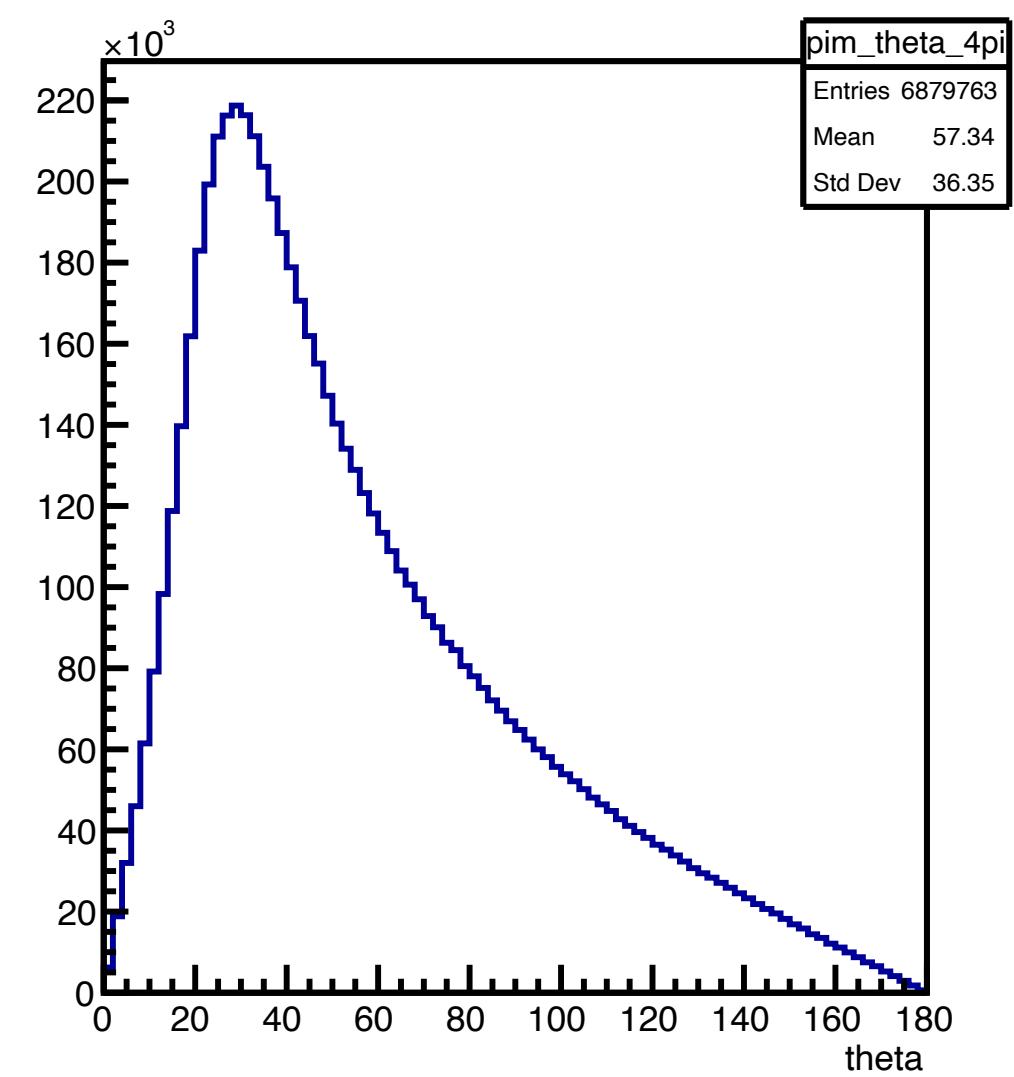
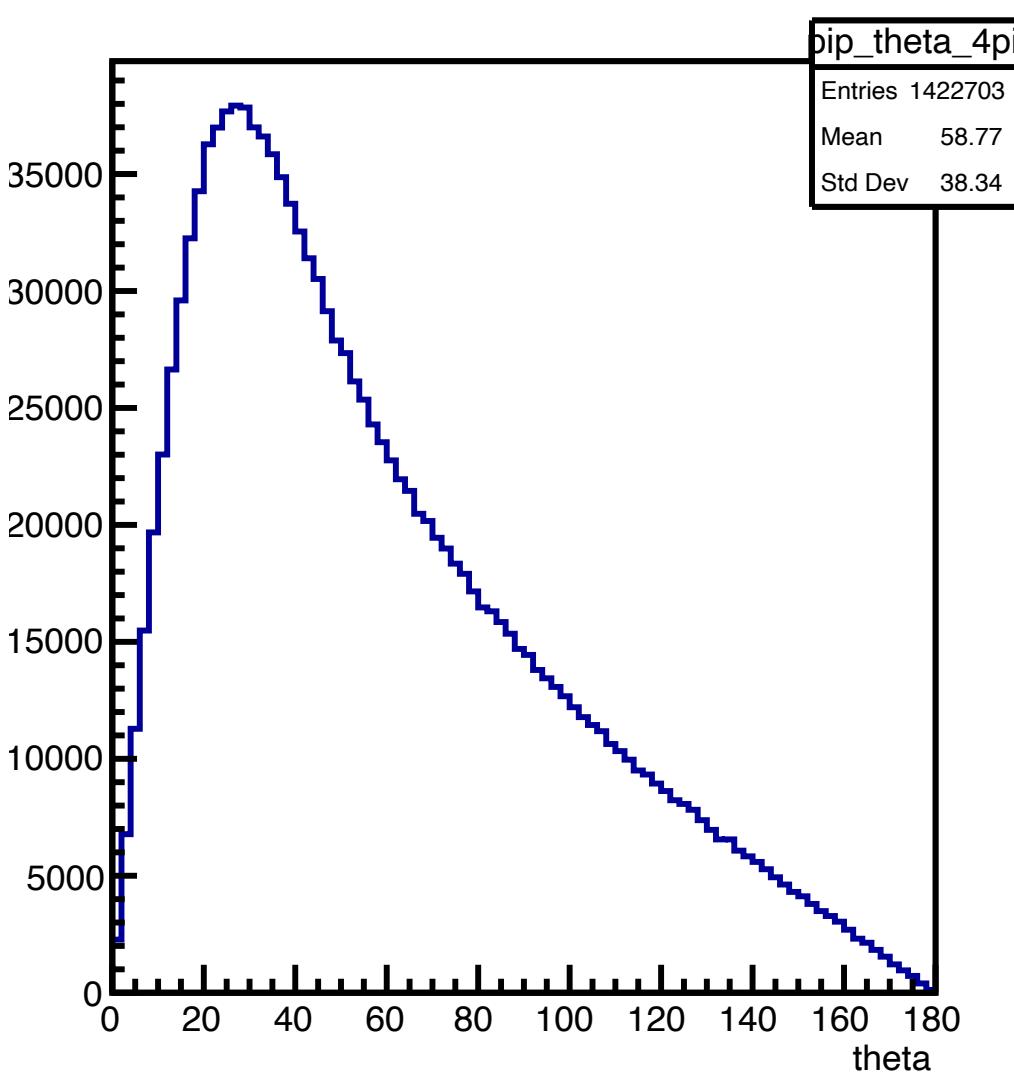
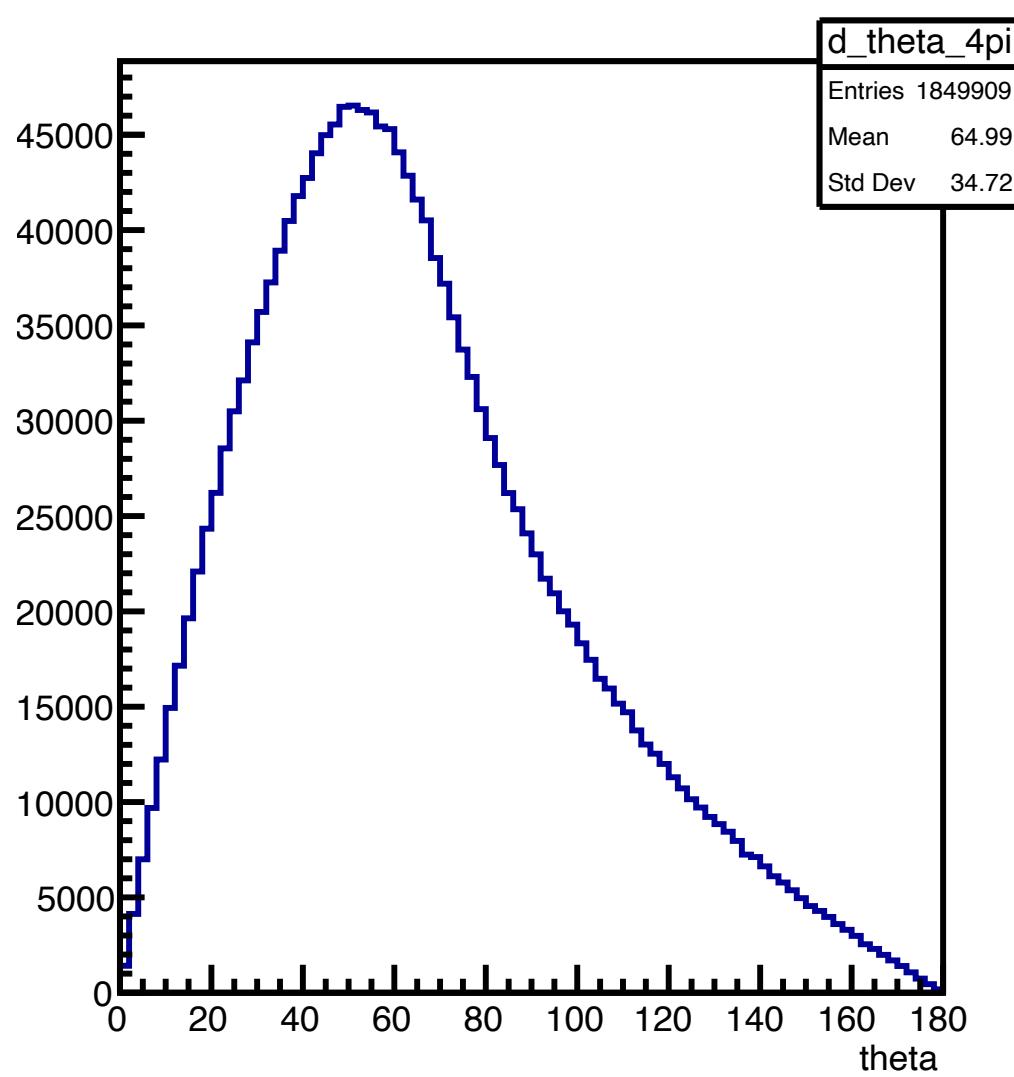
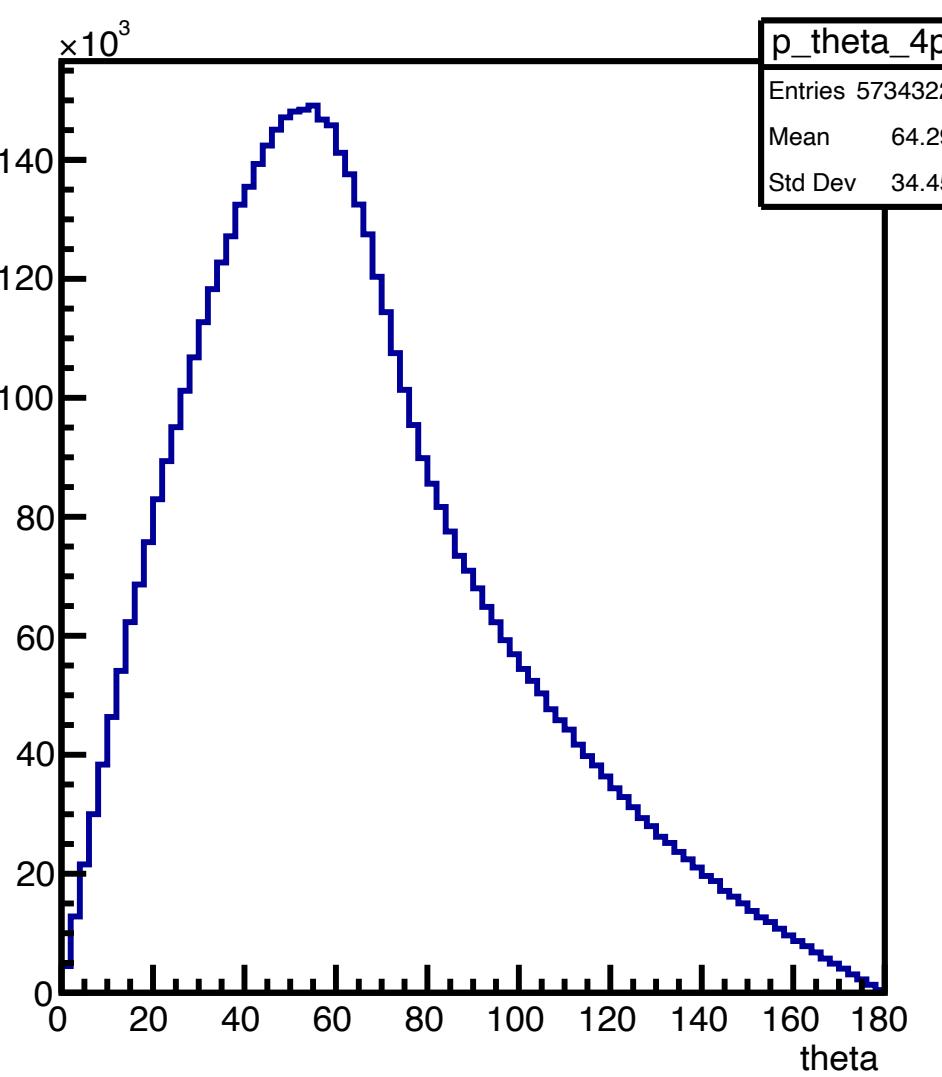
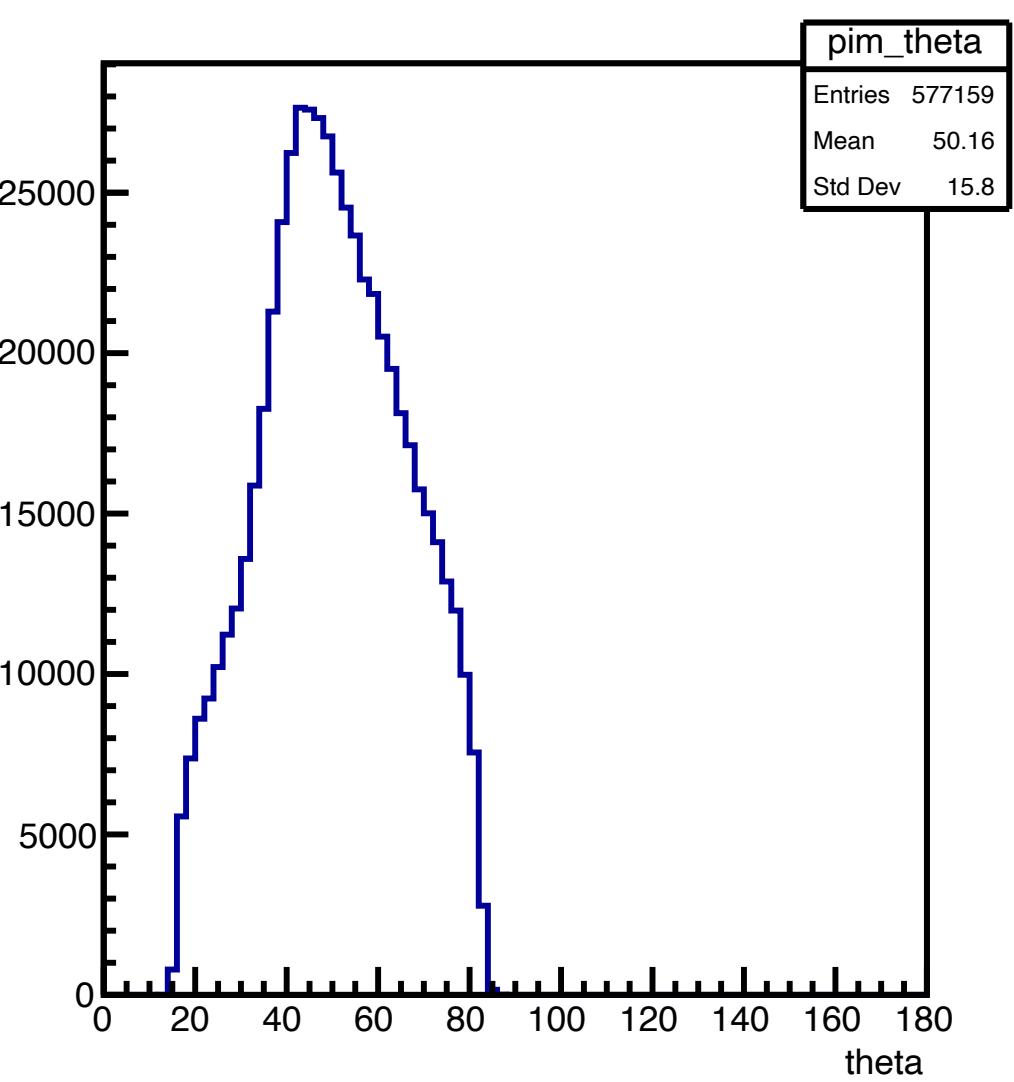
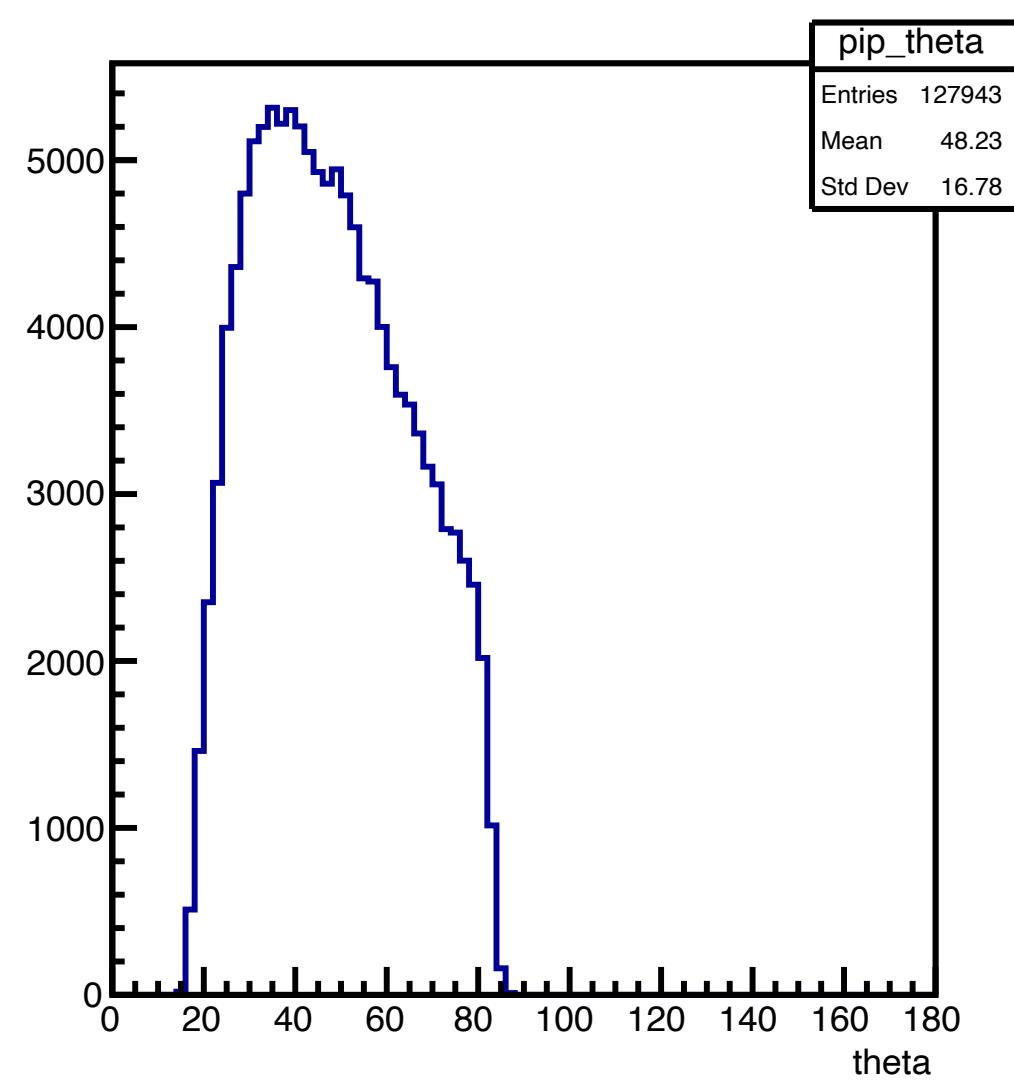
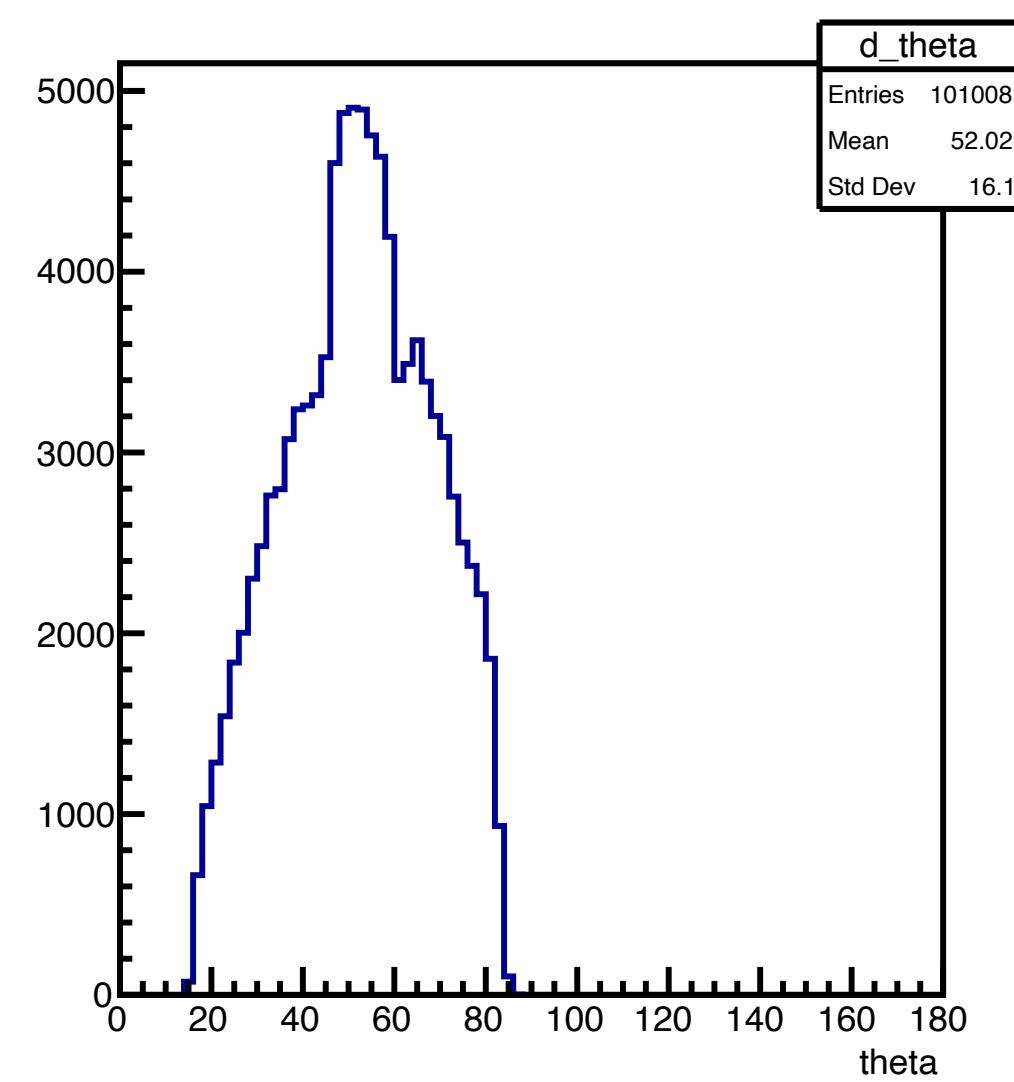
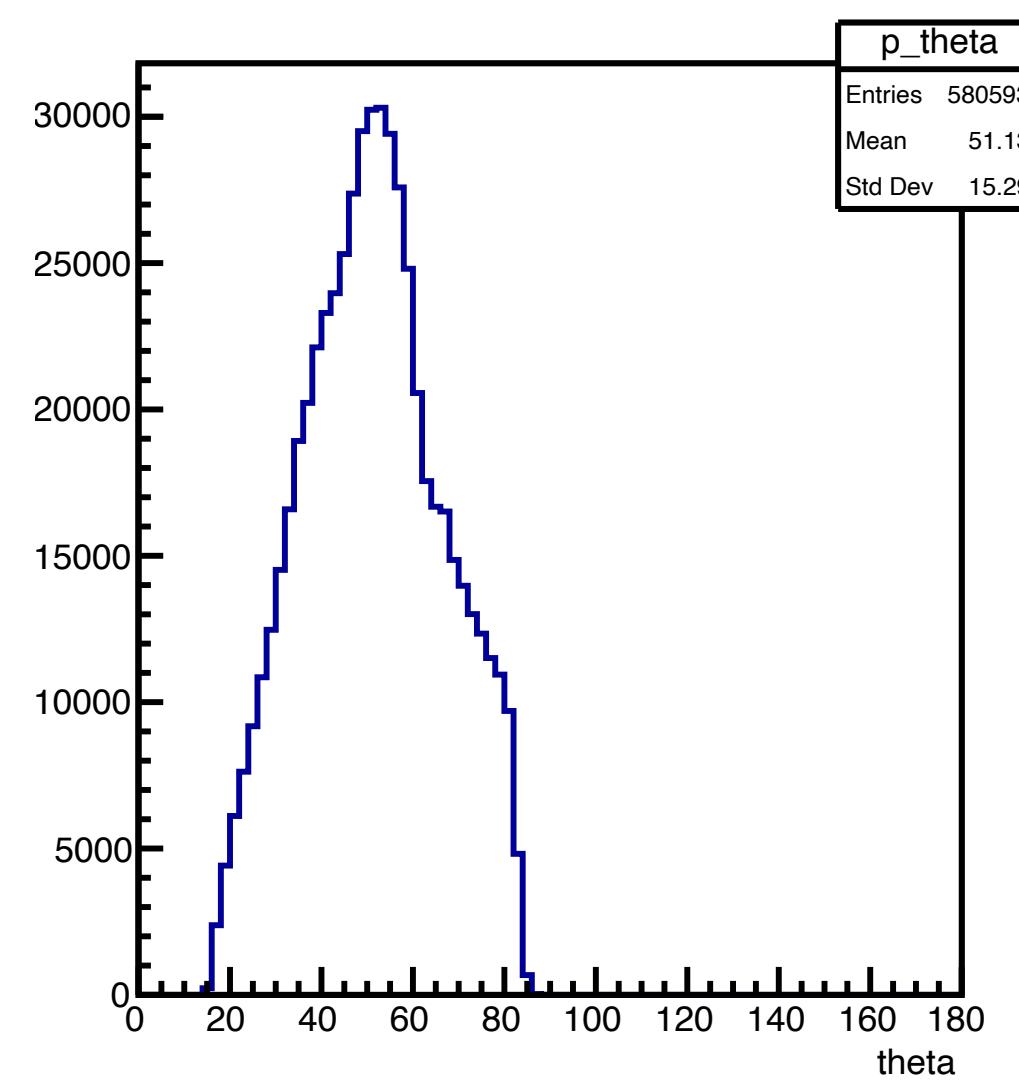
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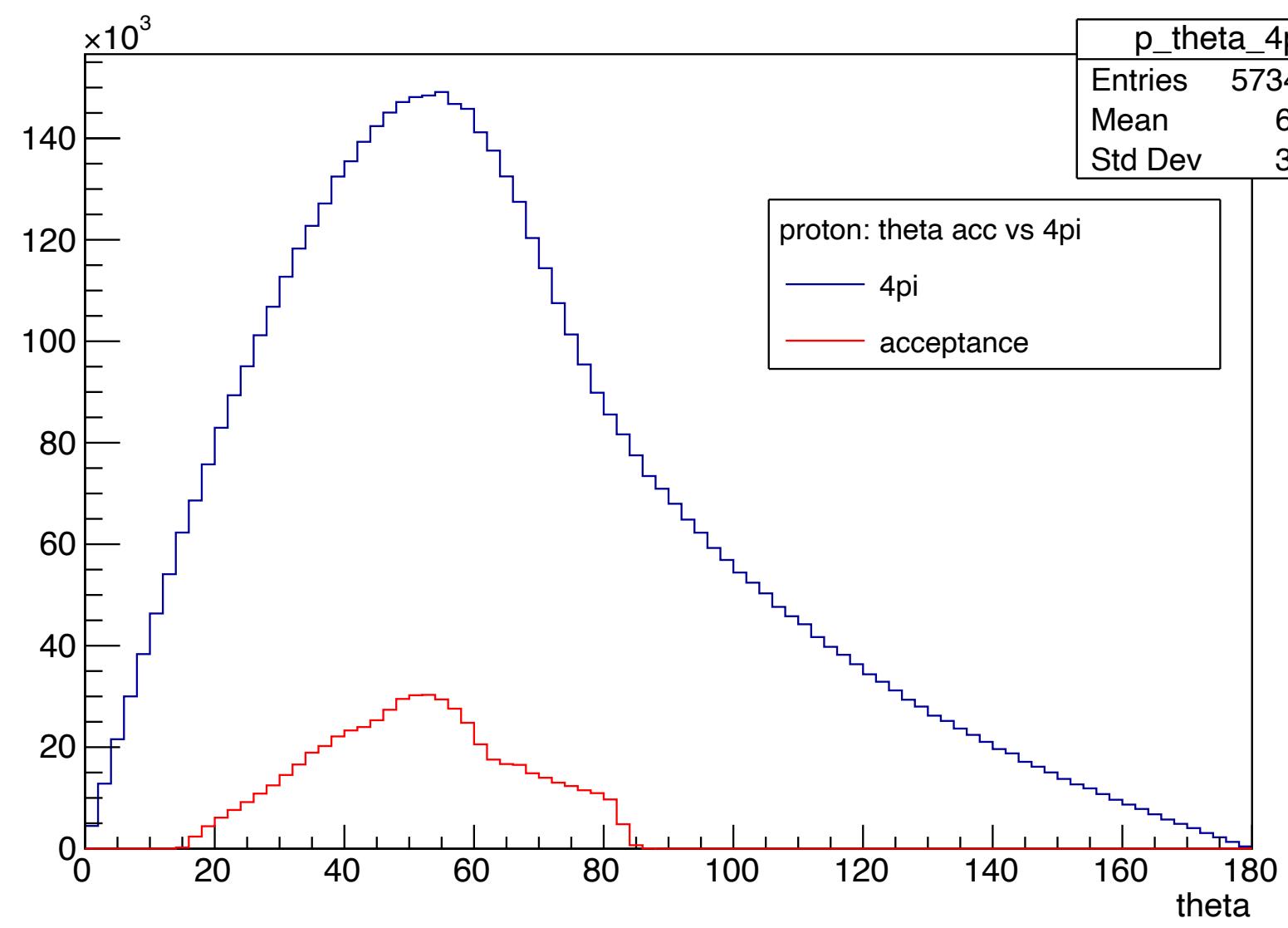
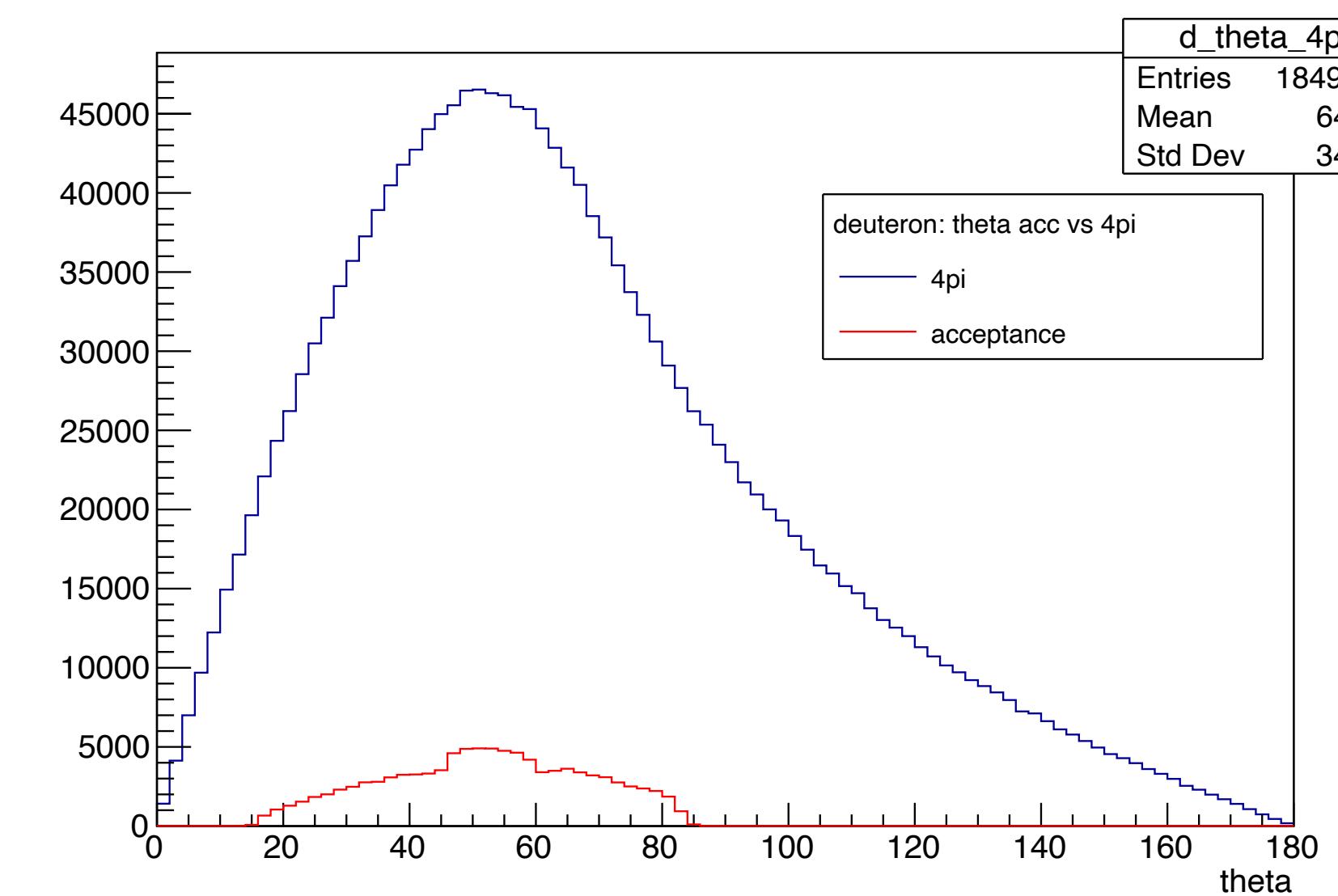
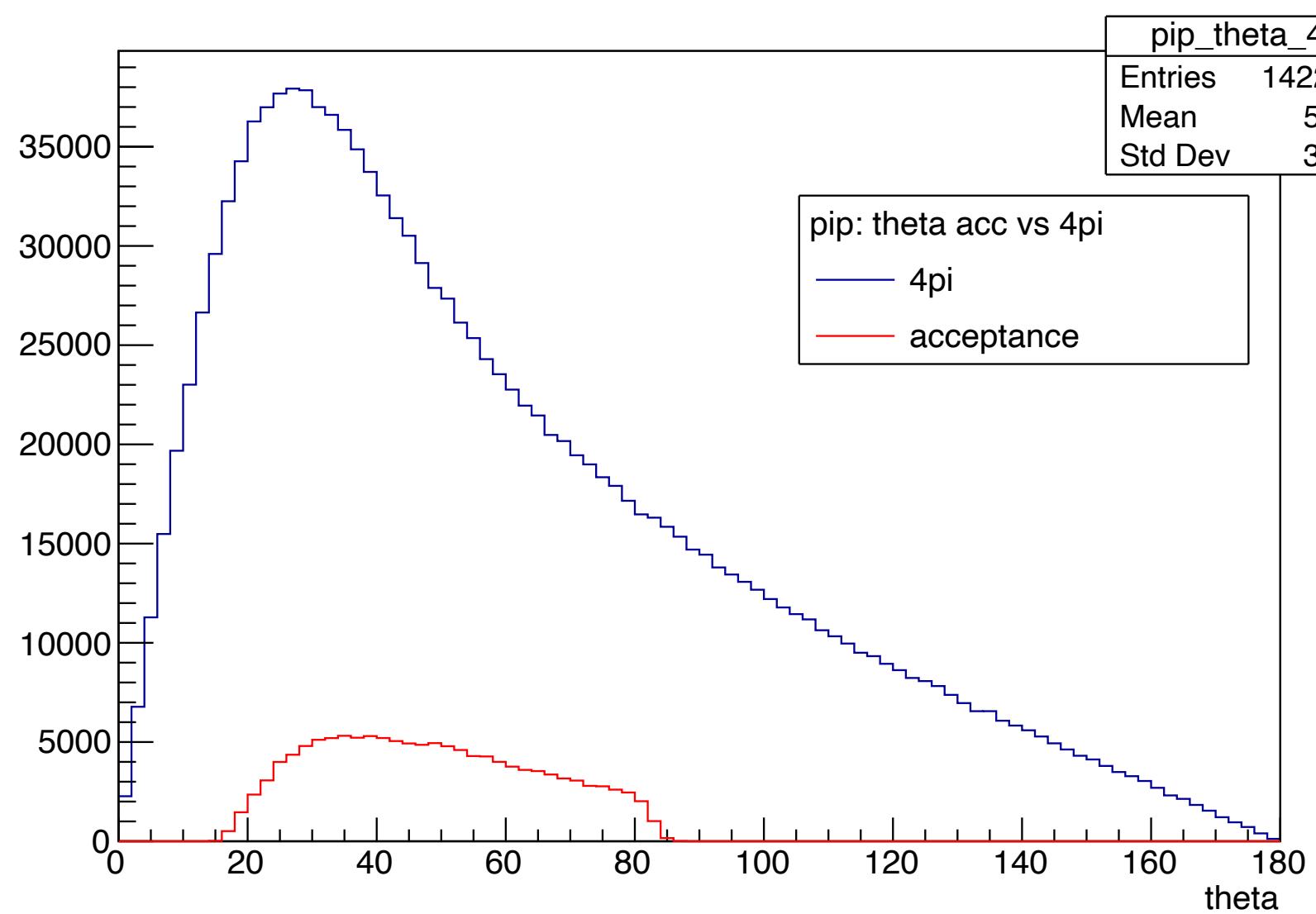
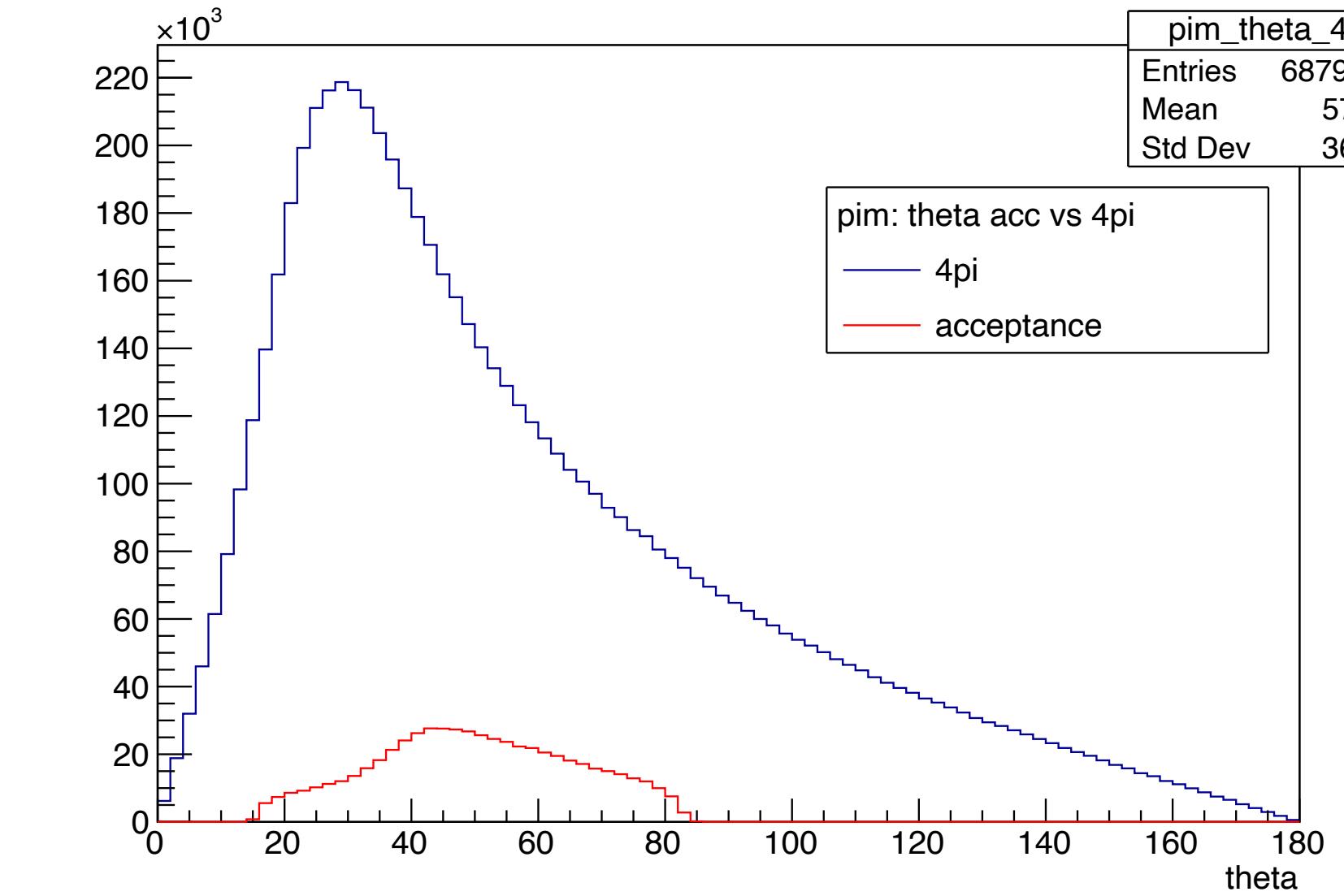




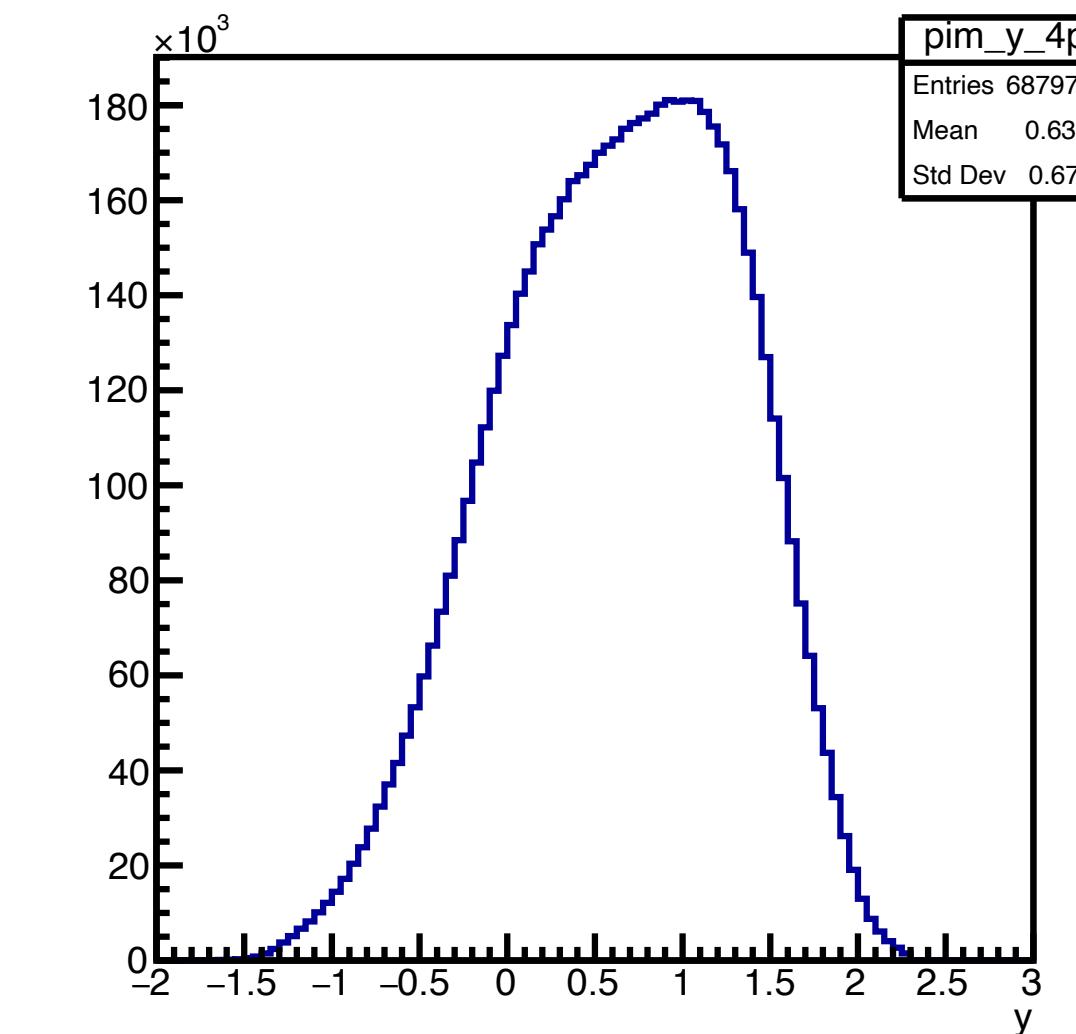
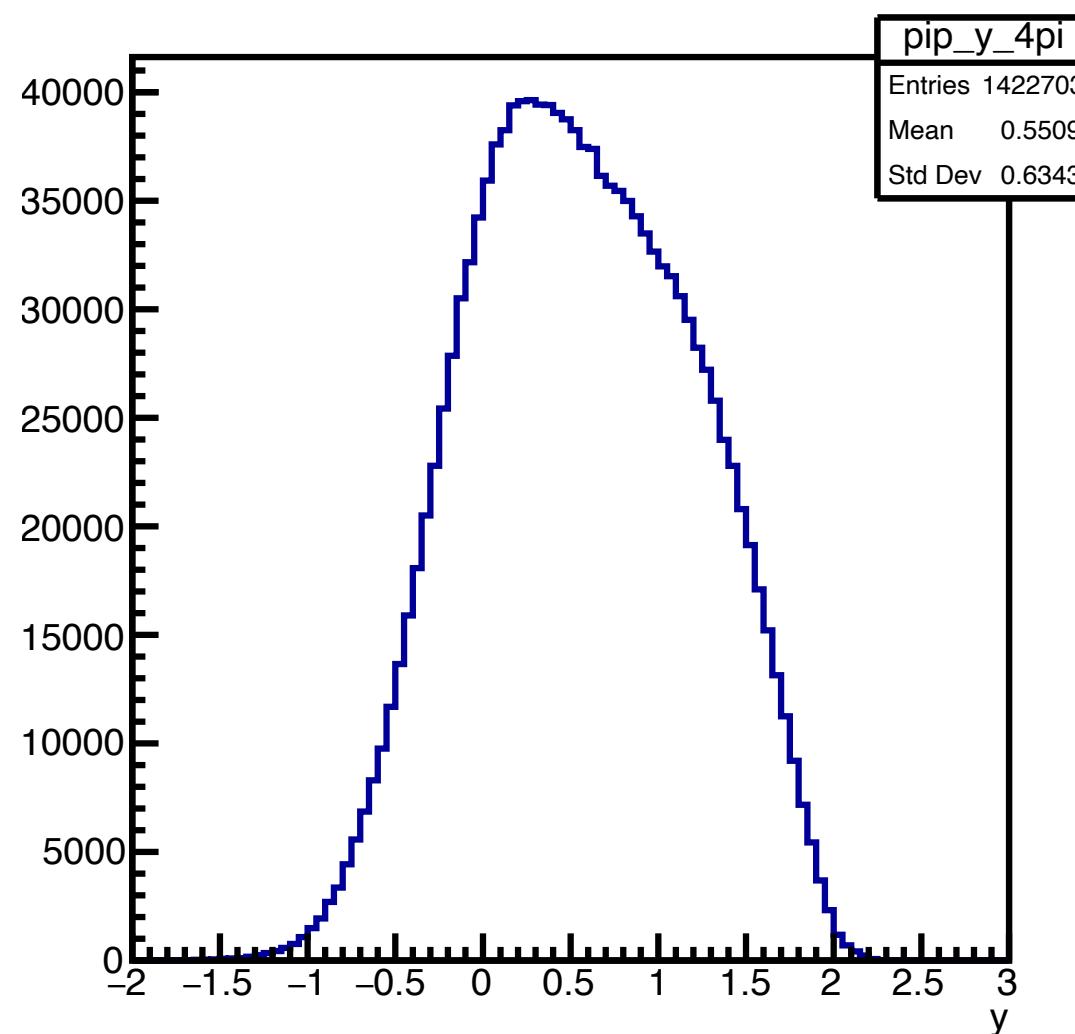
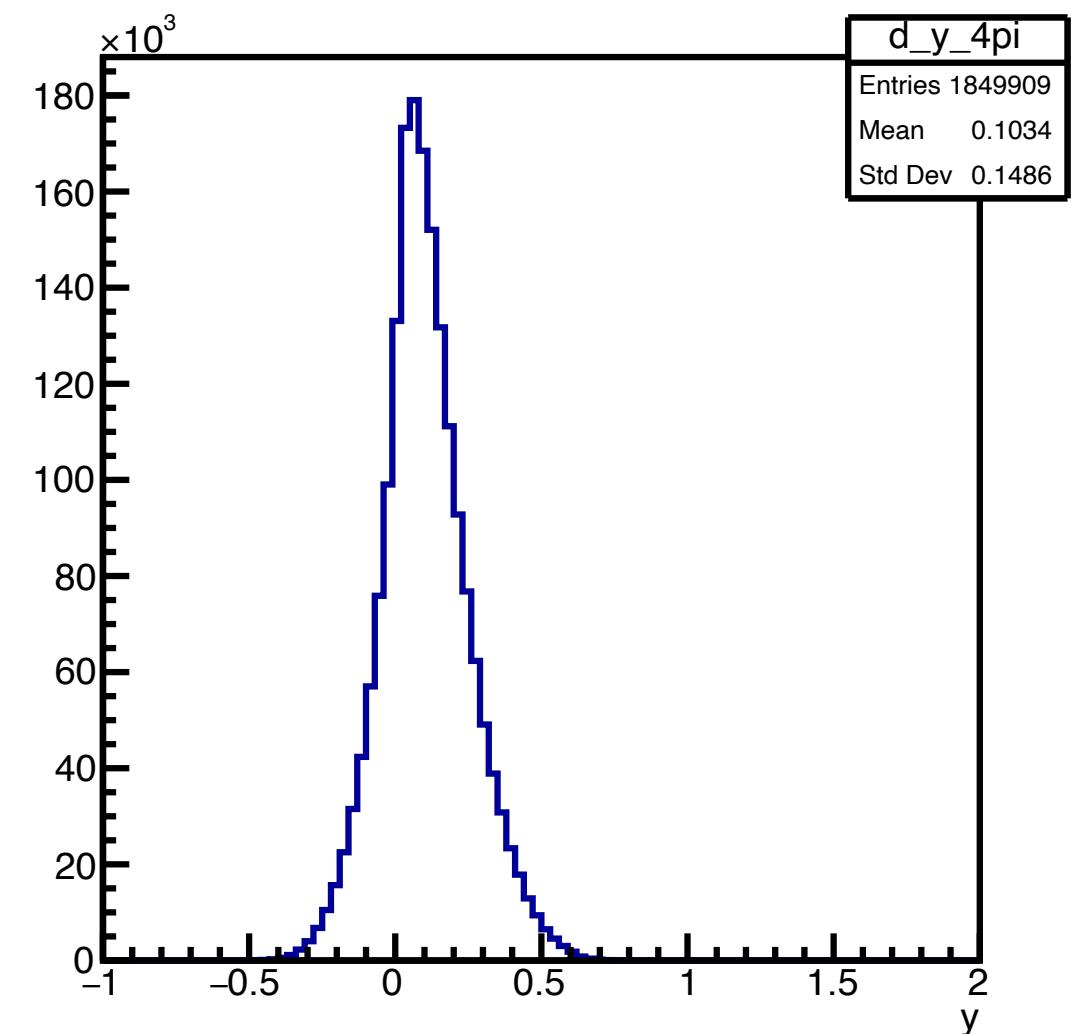
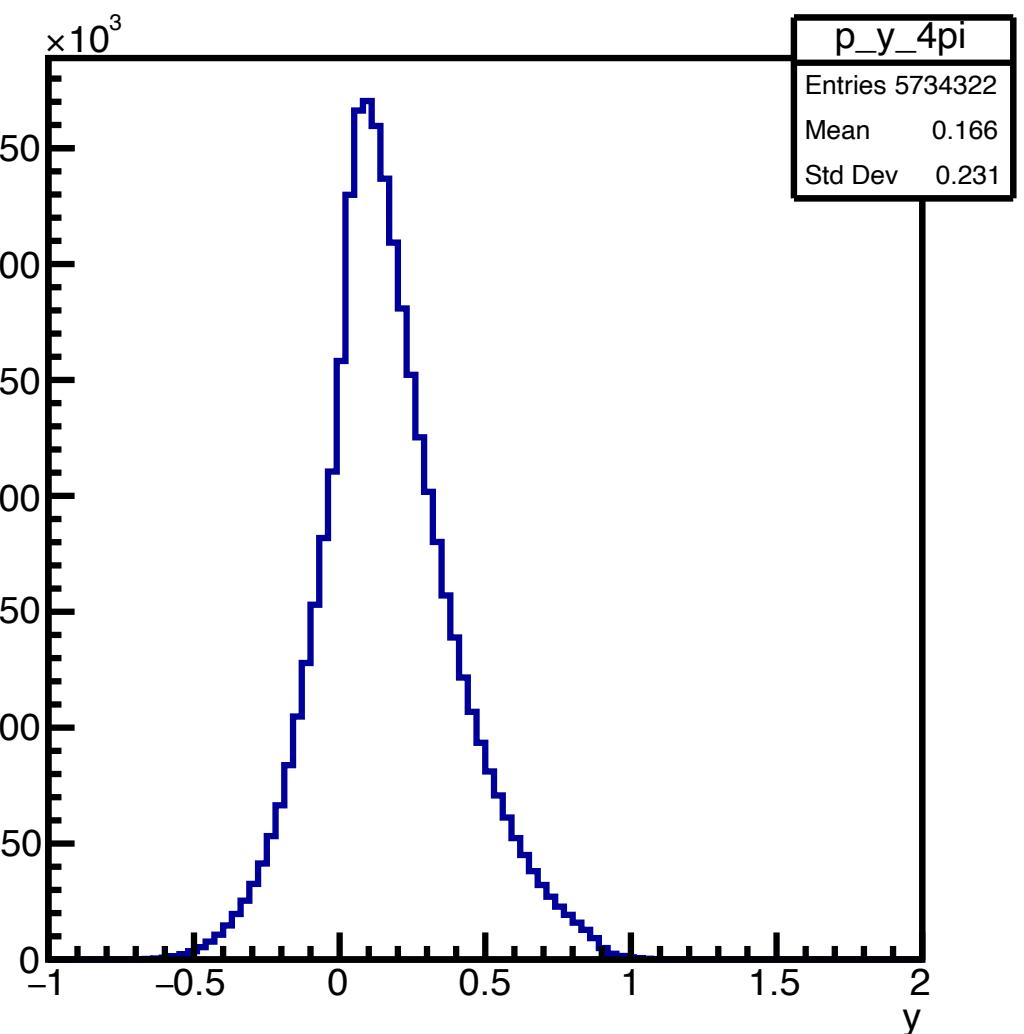
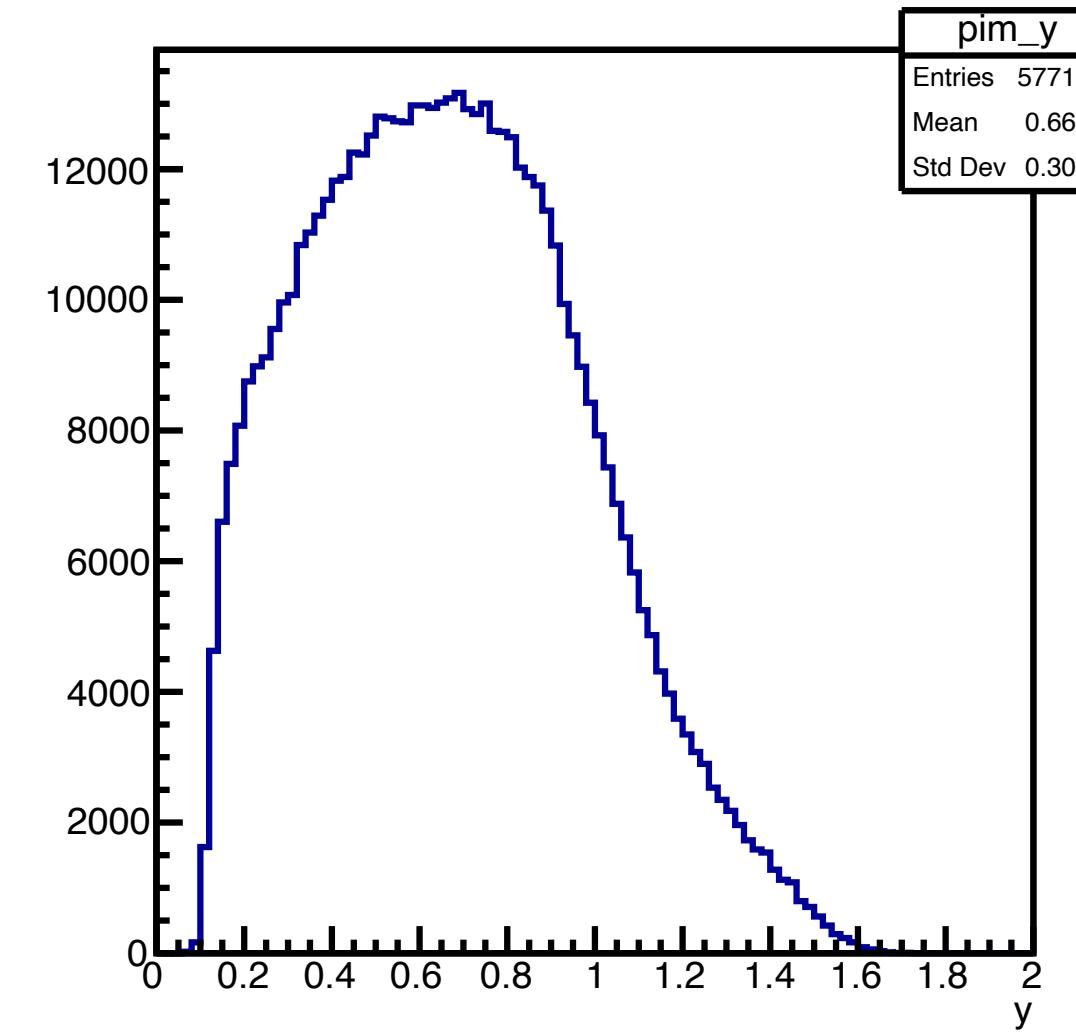
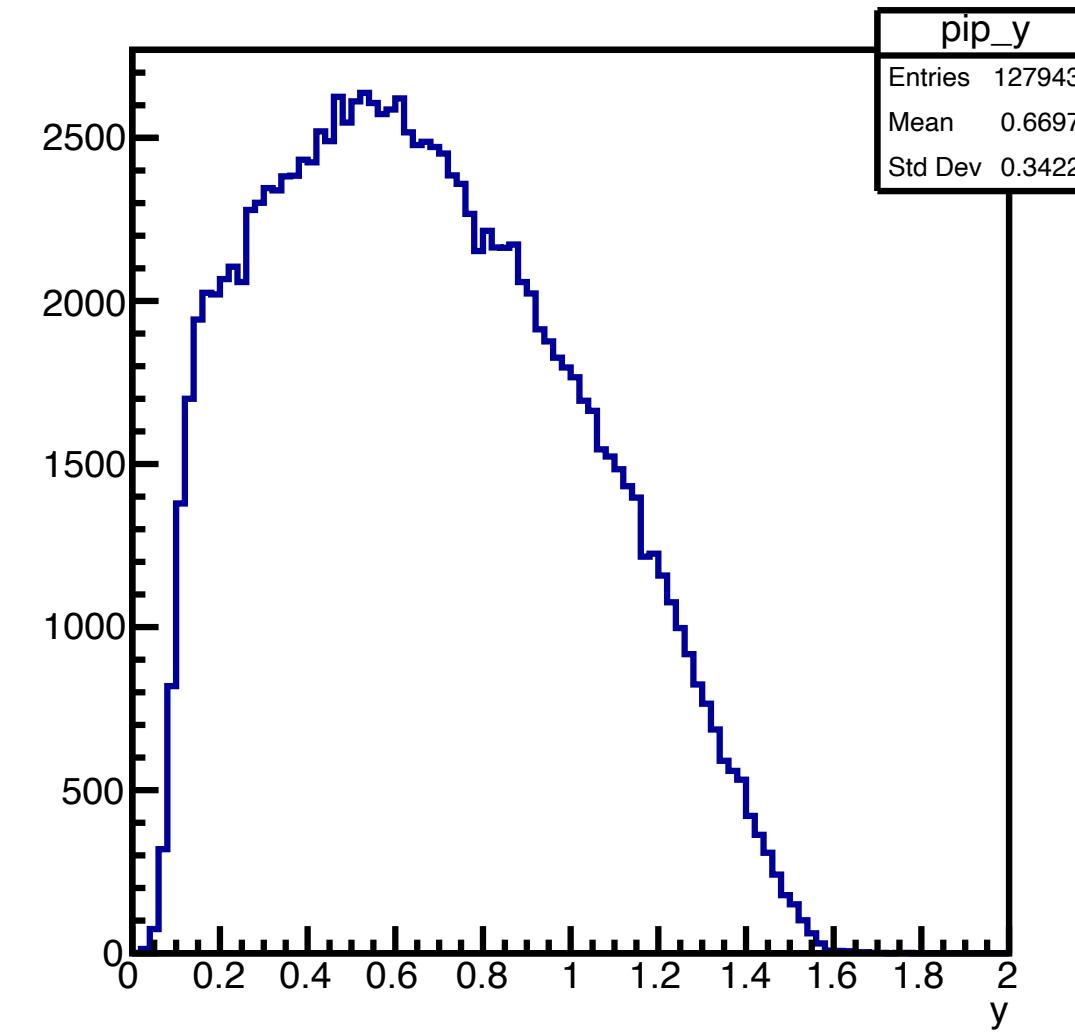
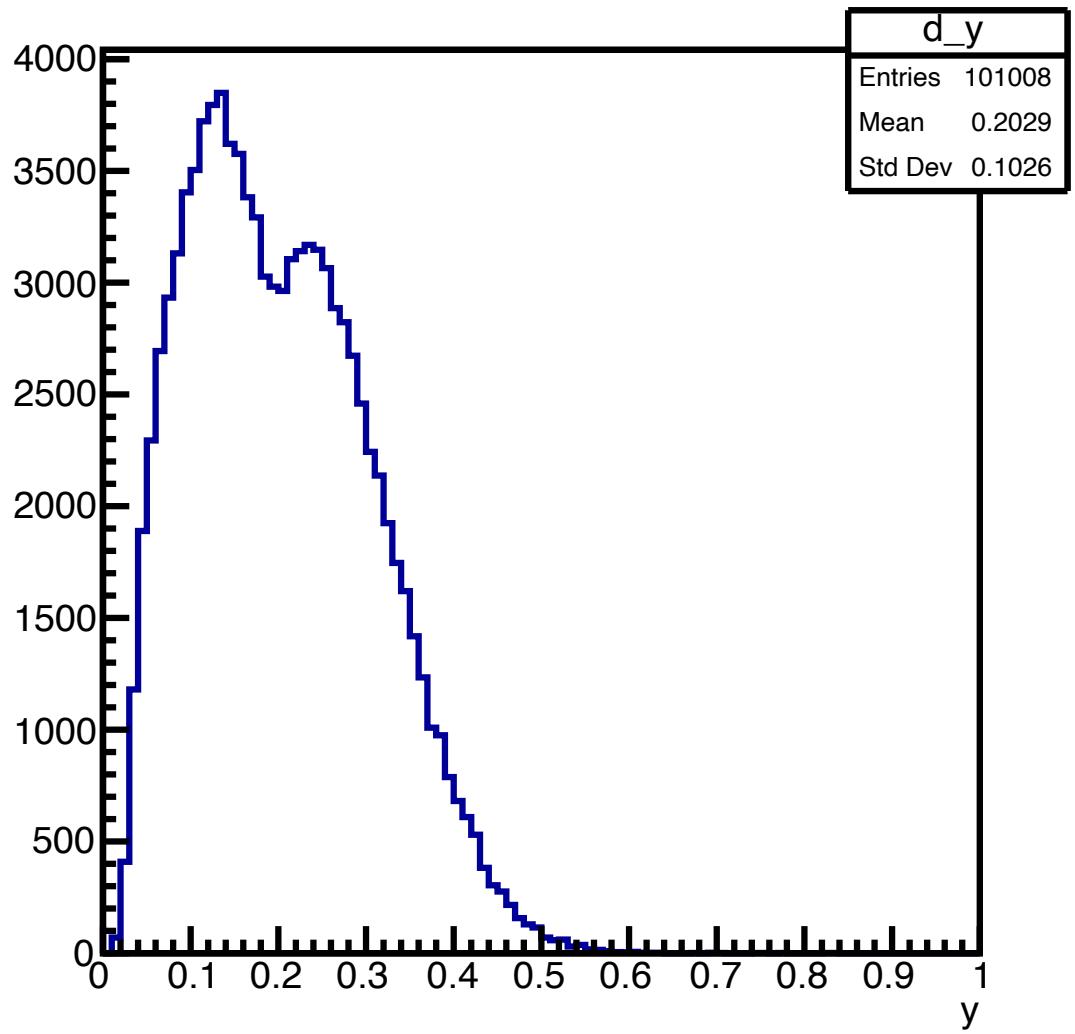
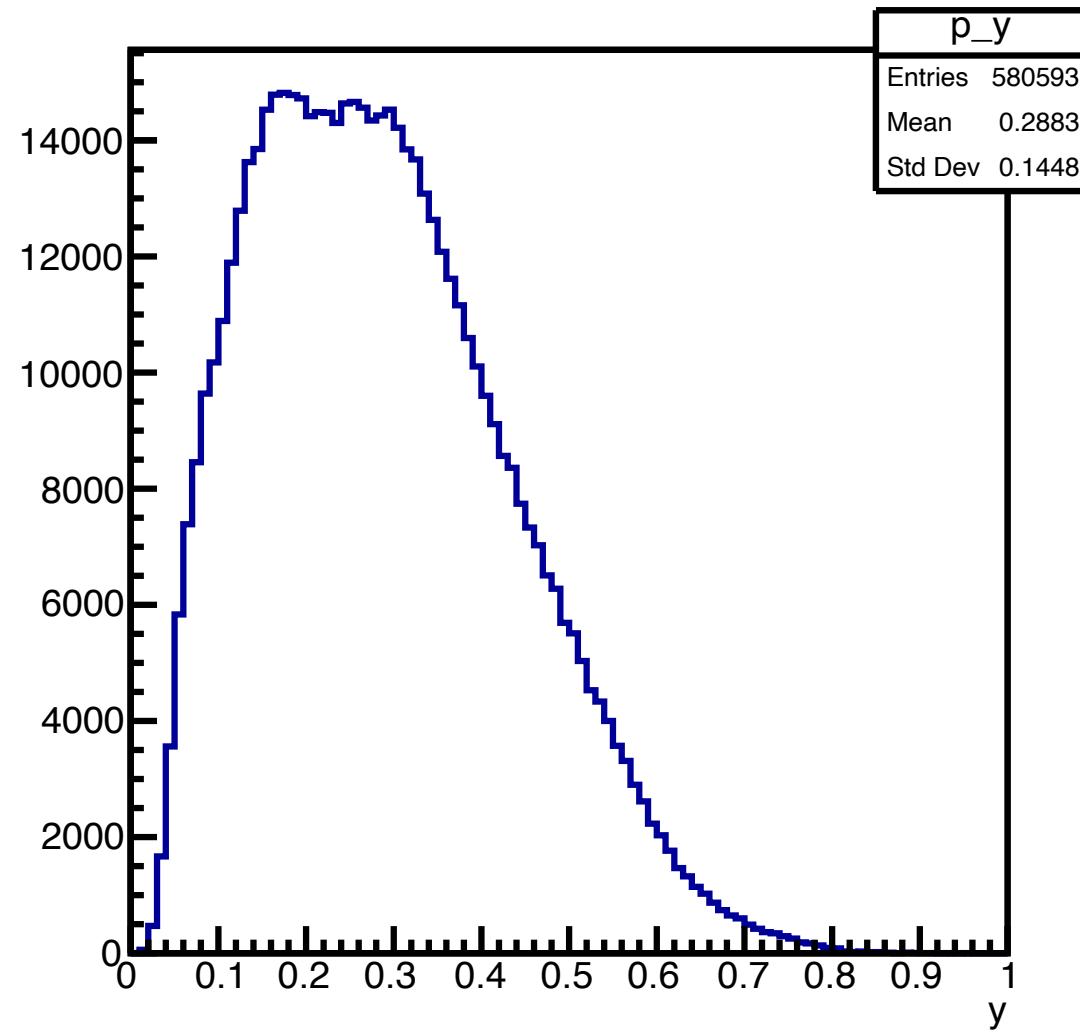
θ vs momentum



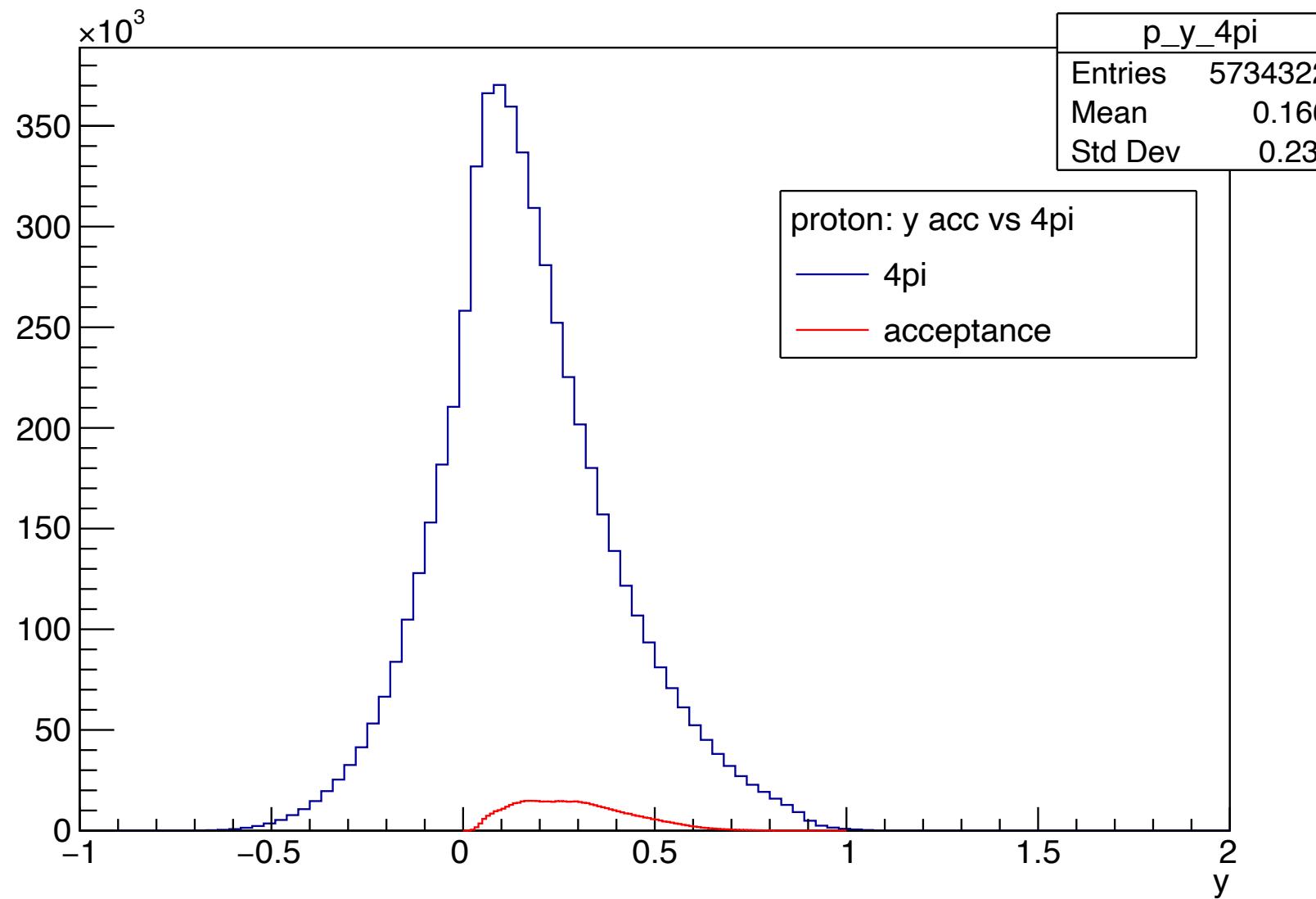
θ 

θ **10.12%****5.46%****8.99%****8.39%**

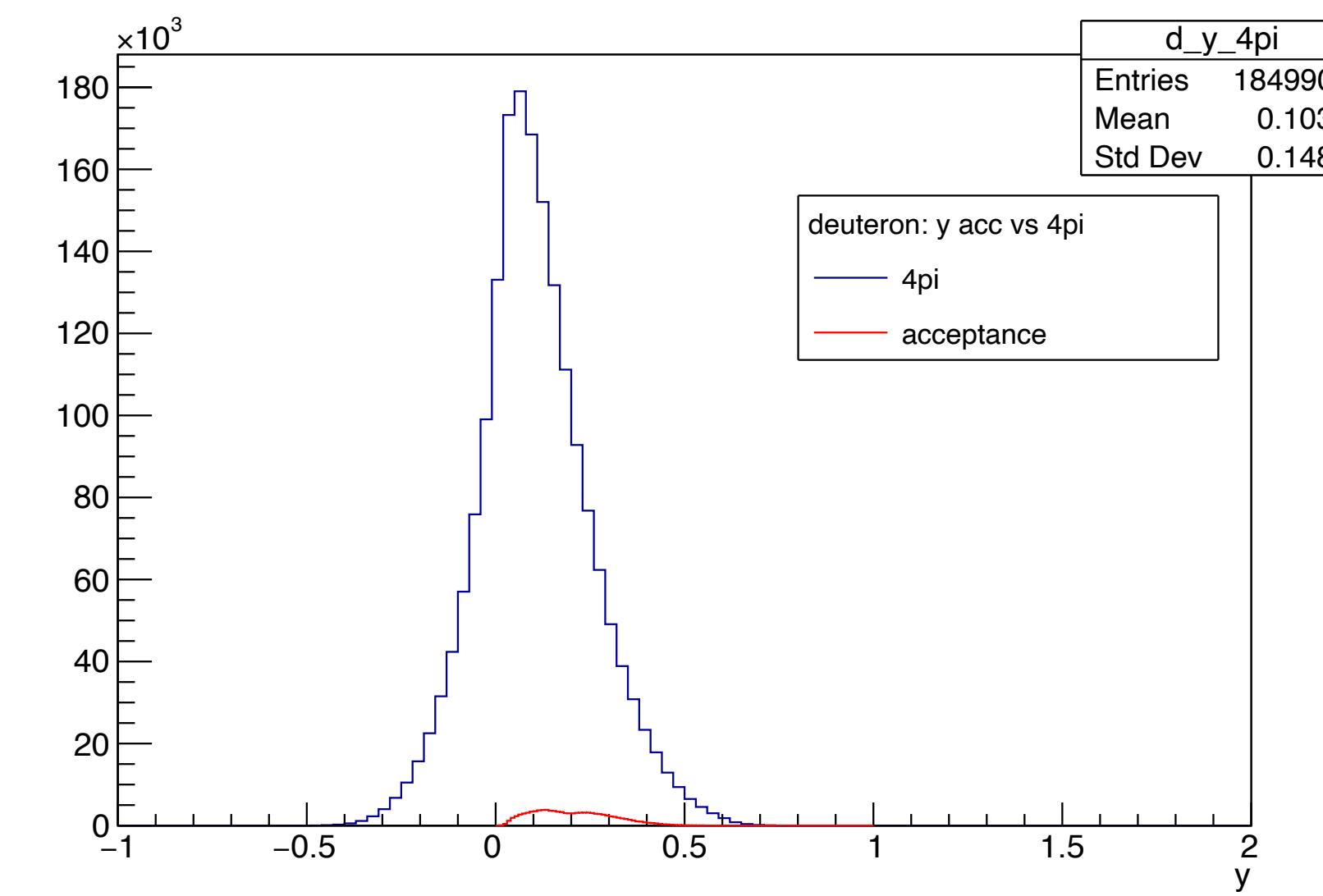
rapidity



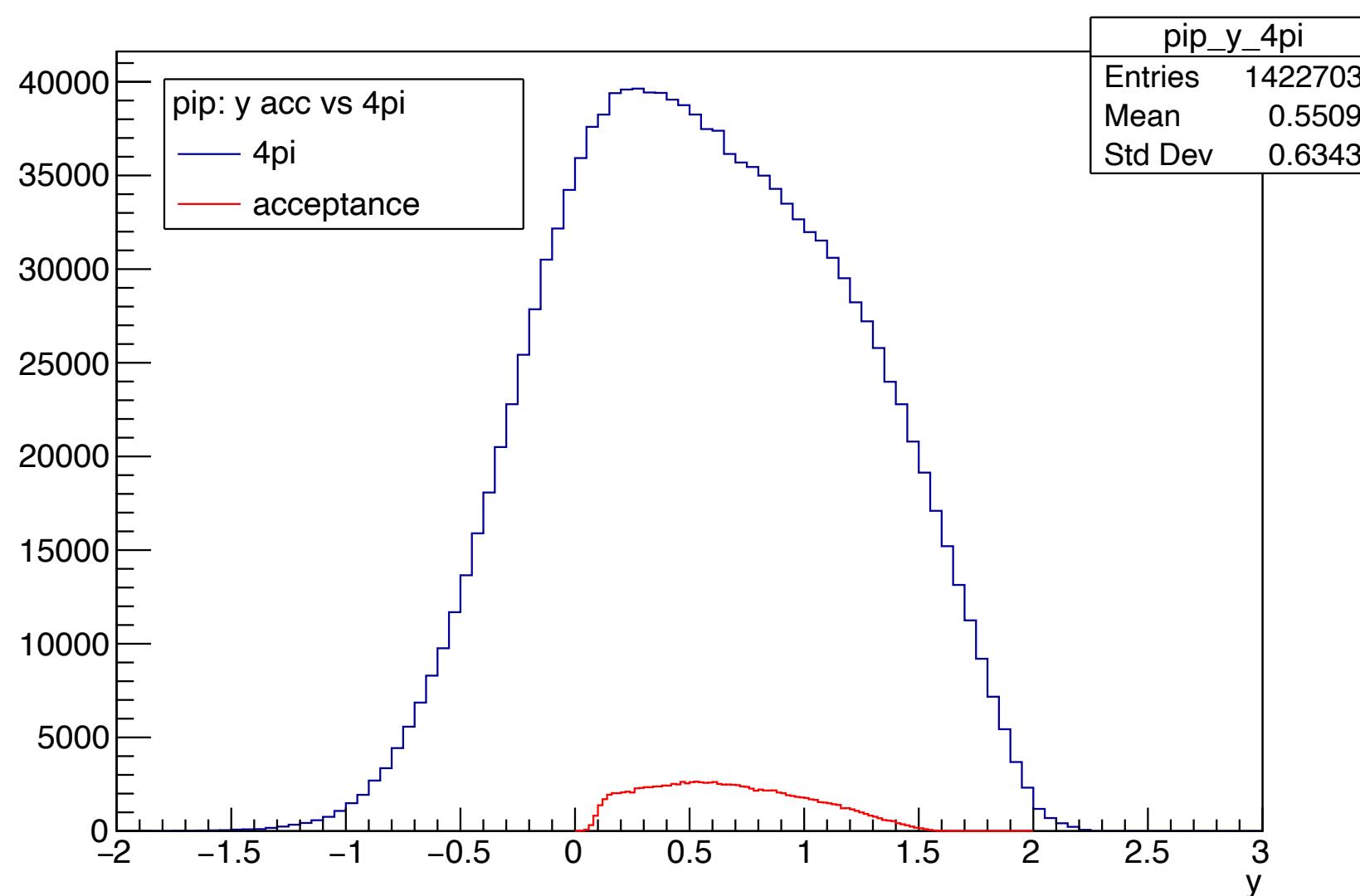
rapidity



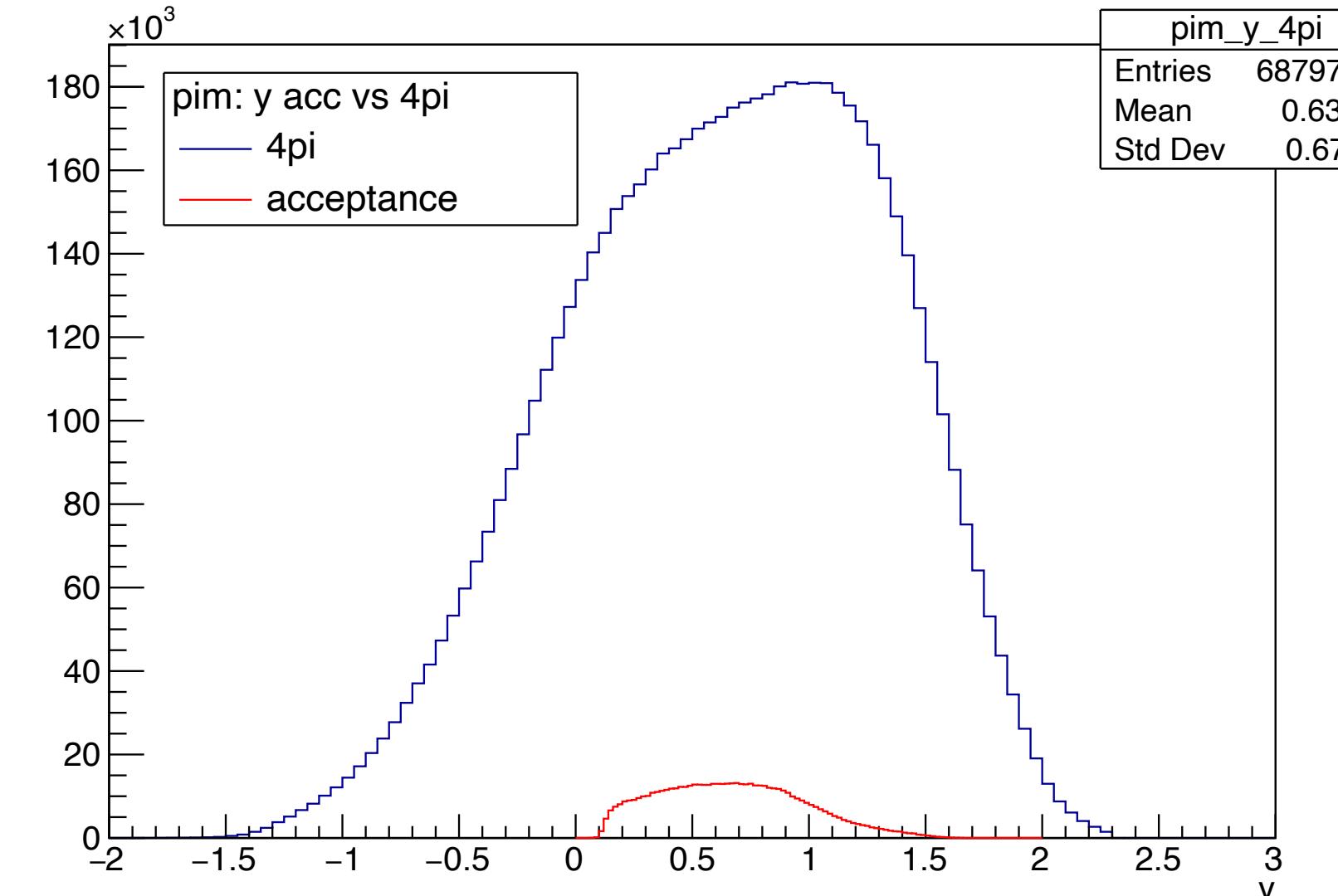
10.12%



5.46%

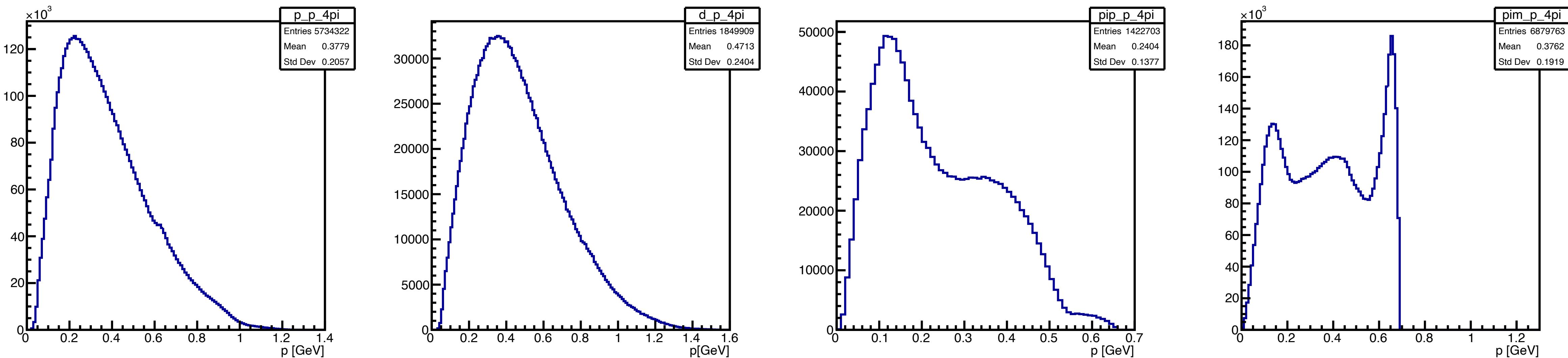
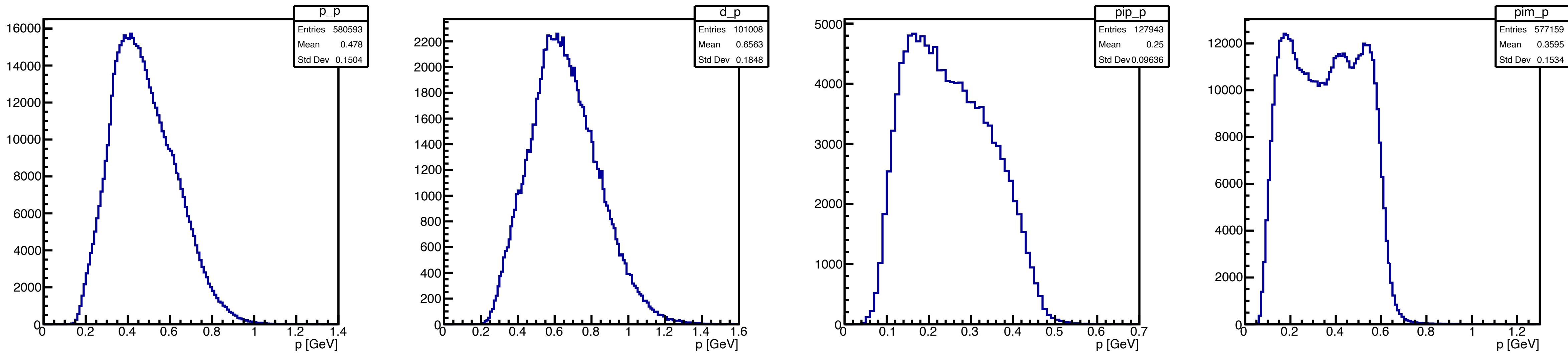


8.99%

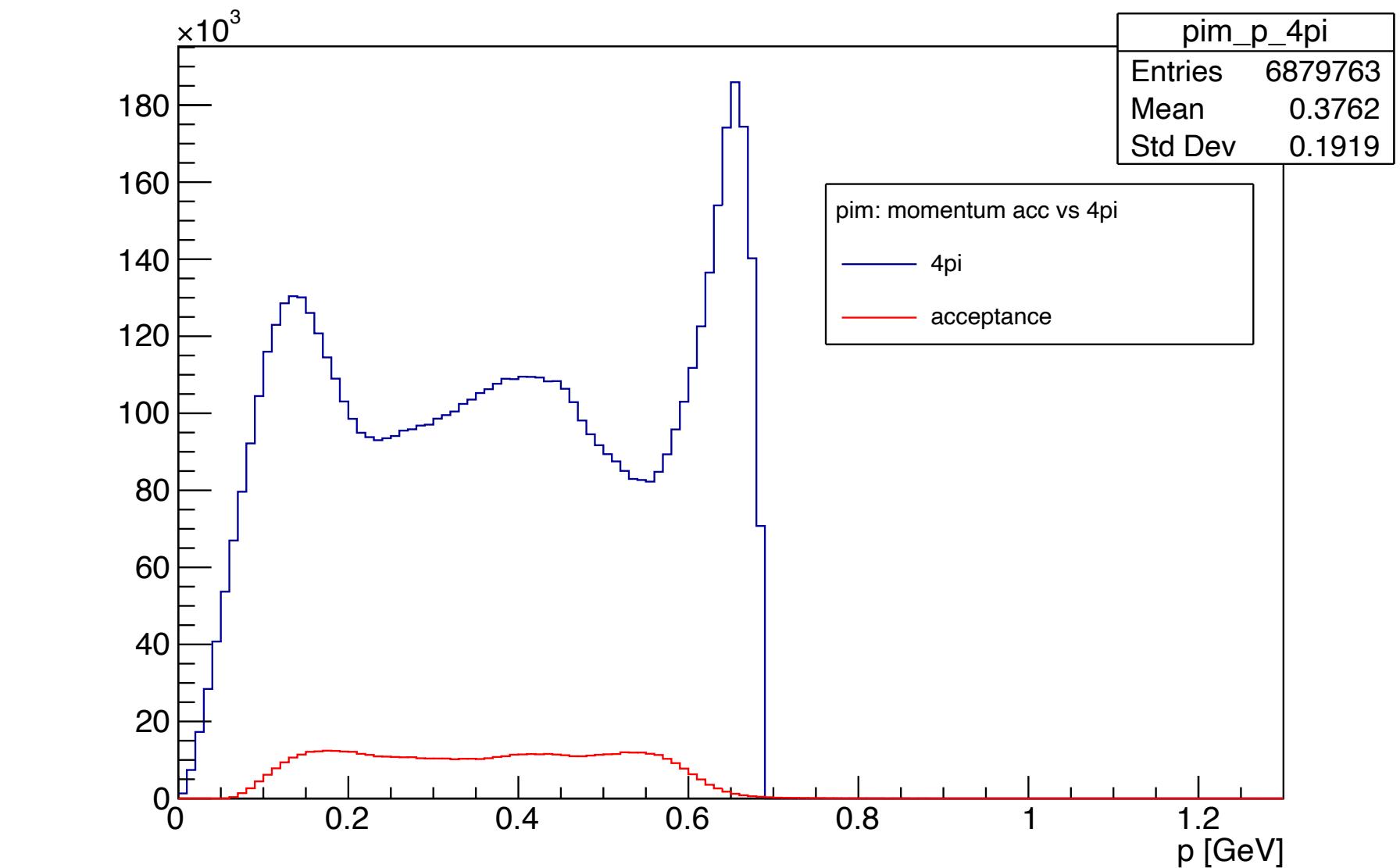
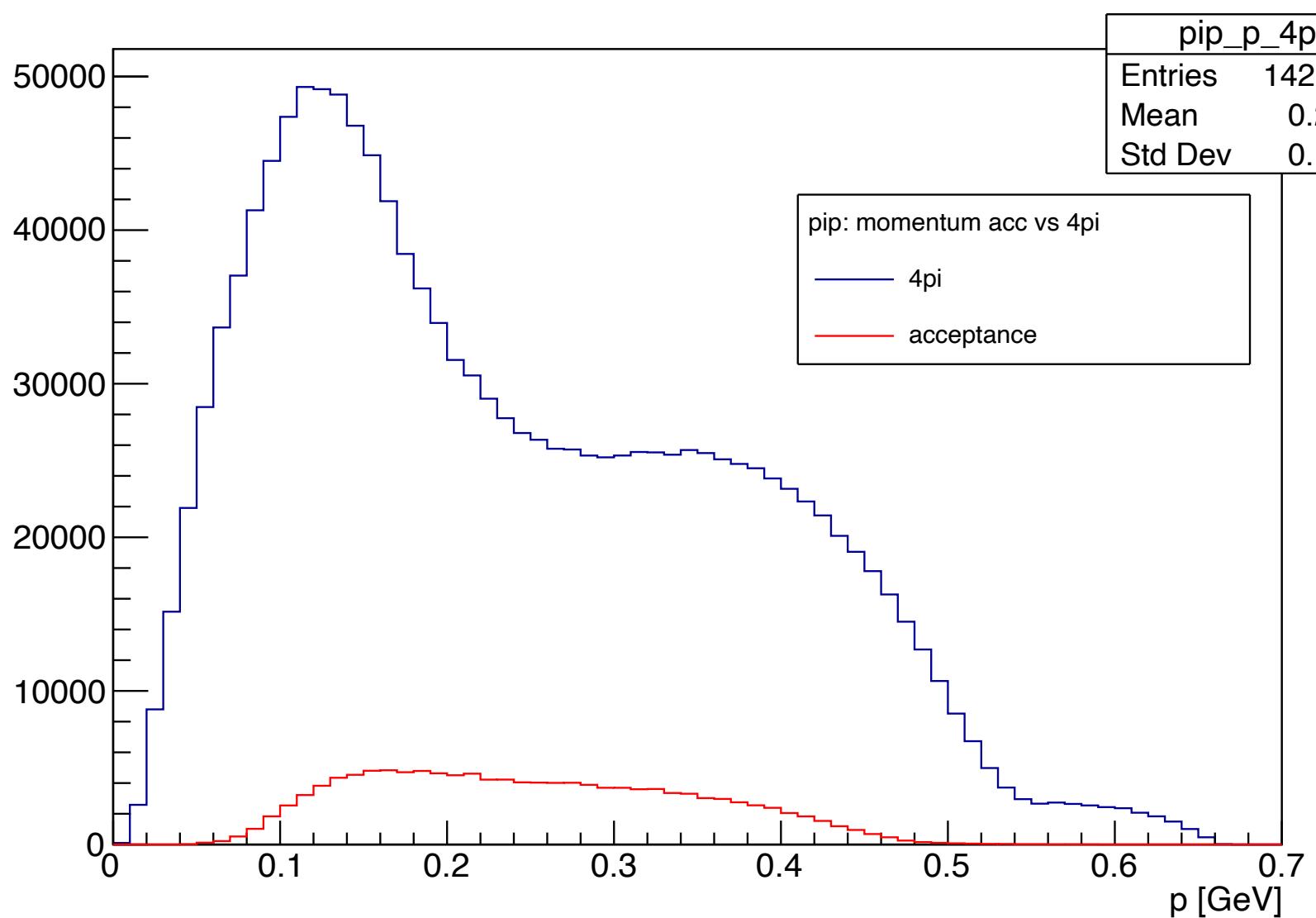
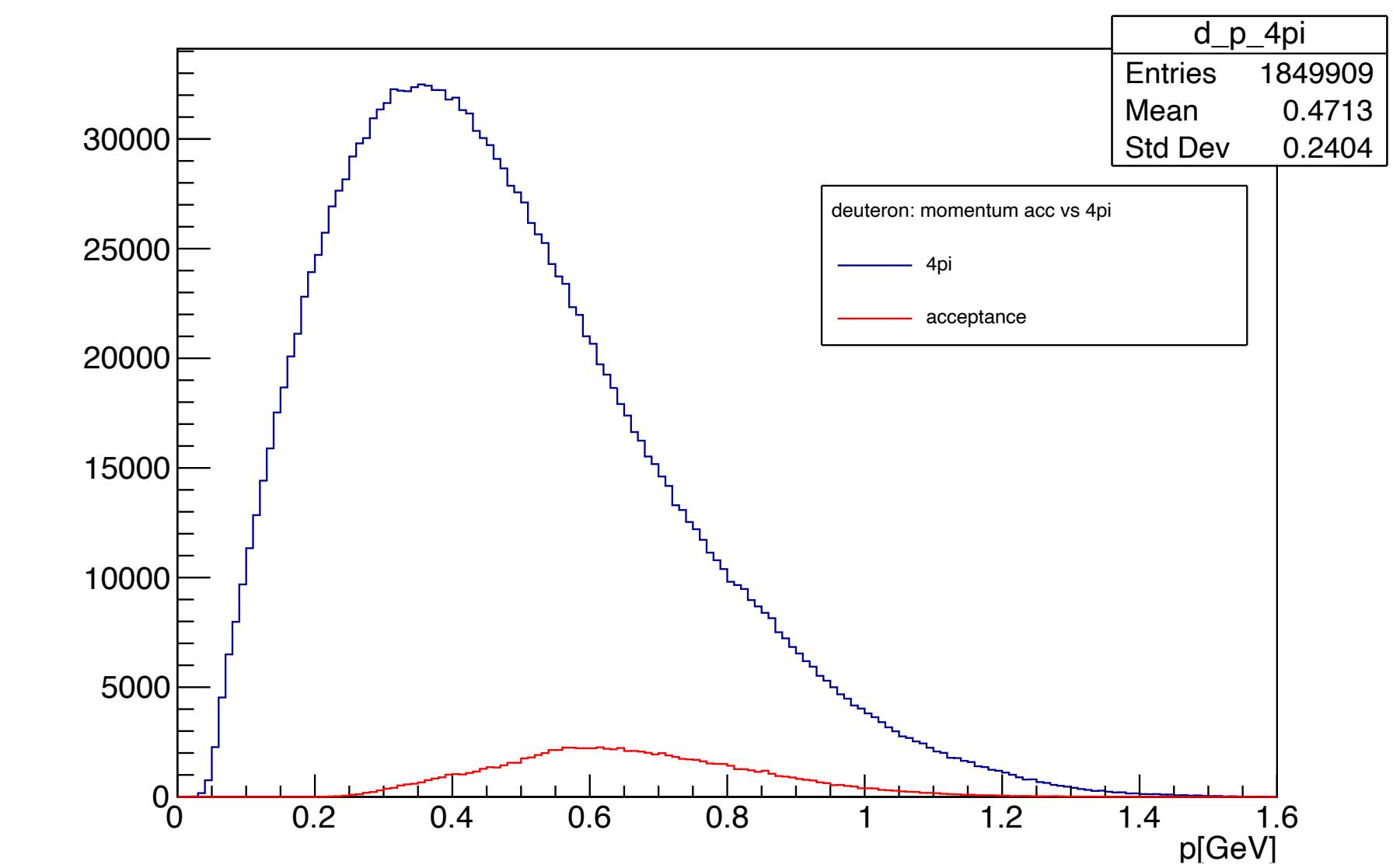
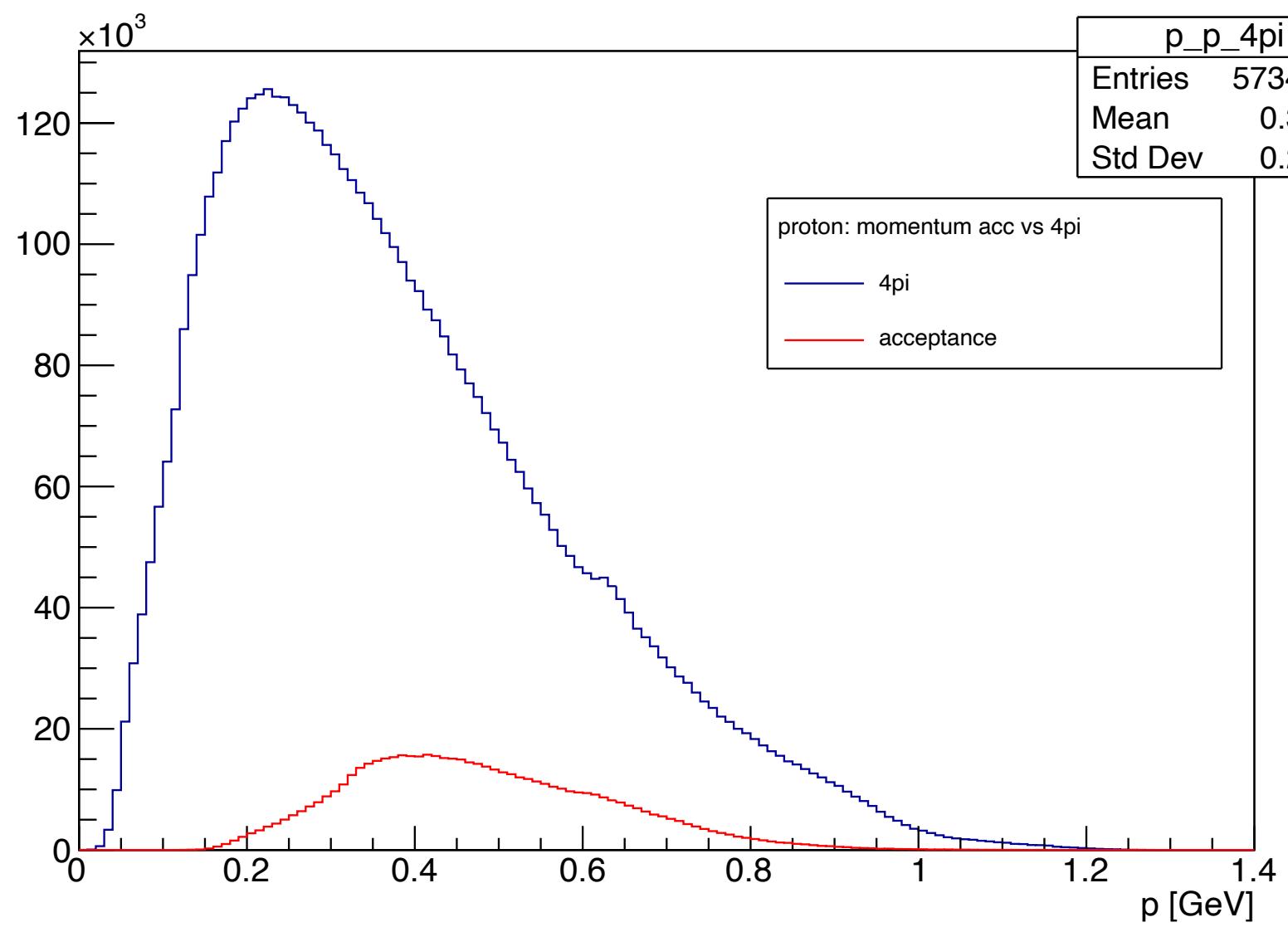


8.39%

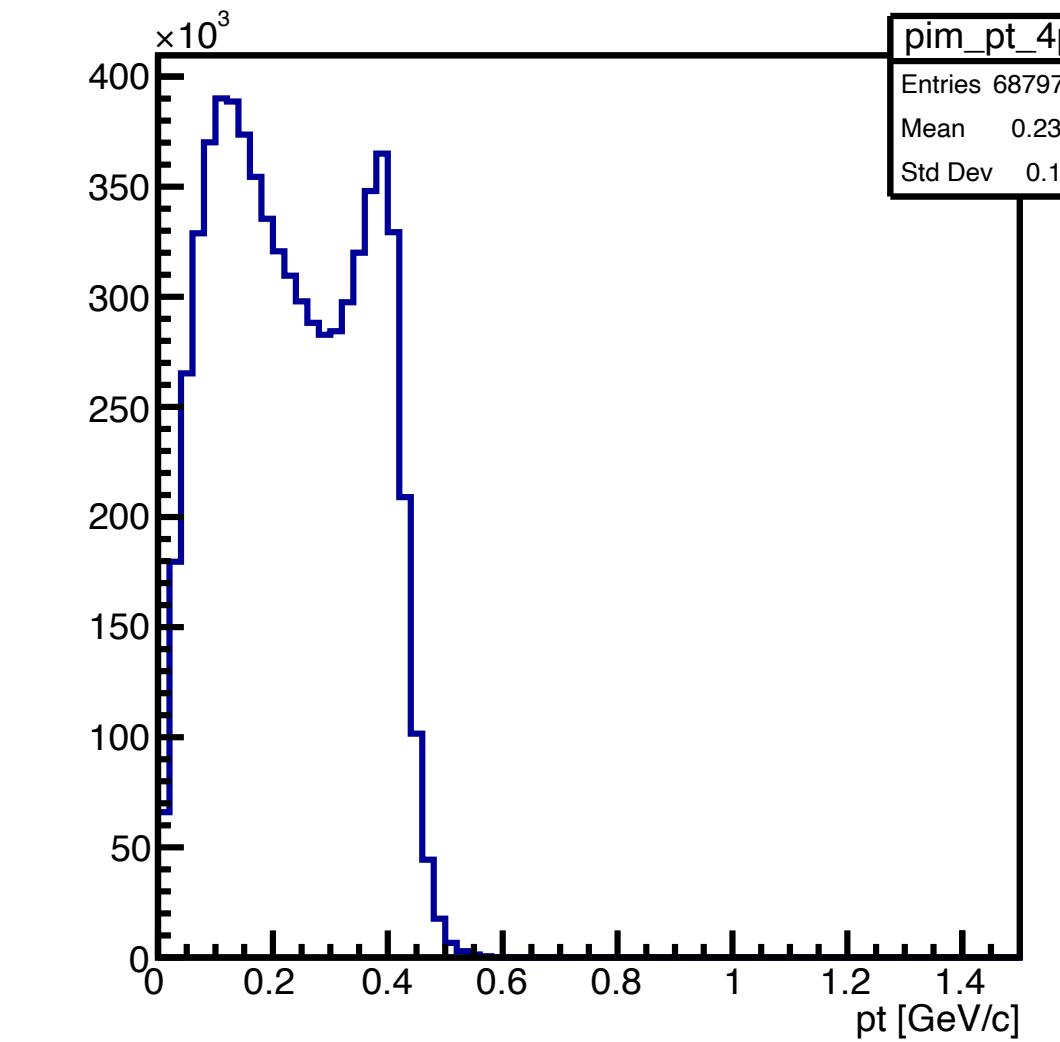
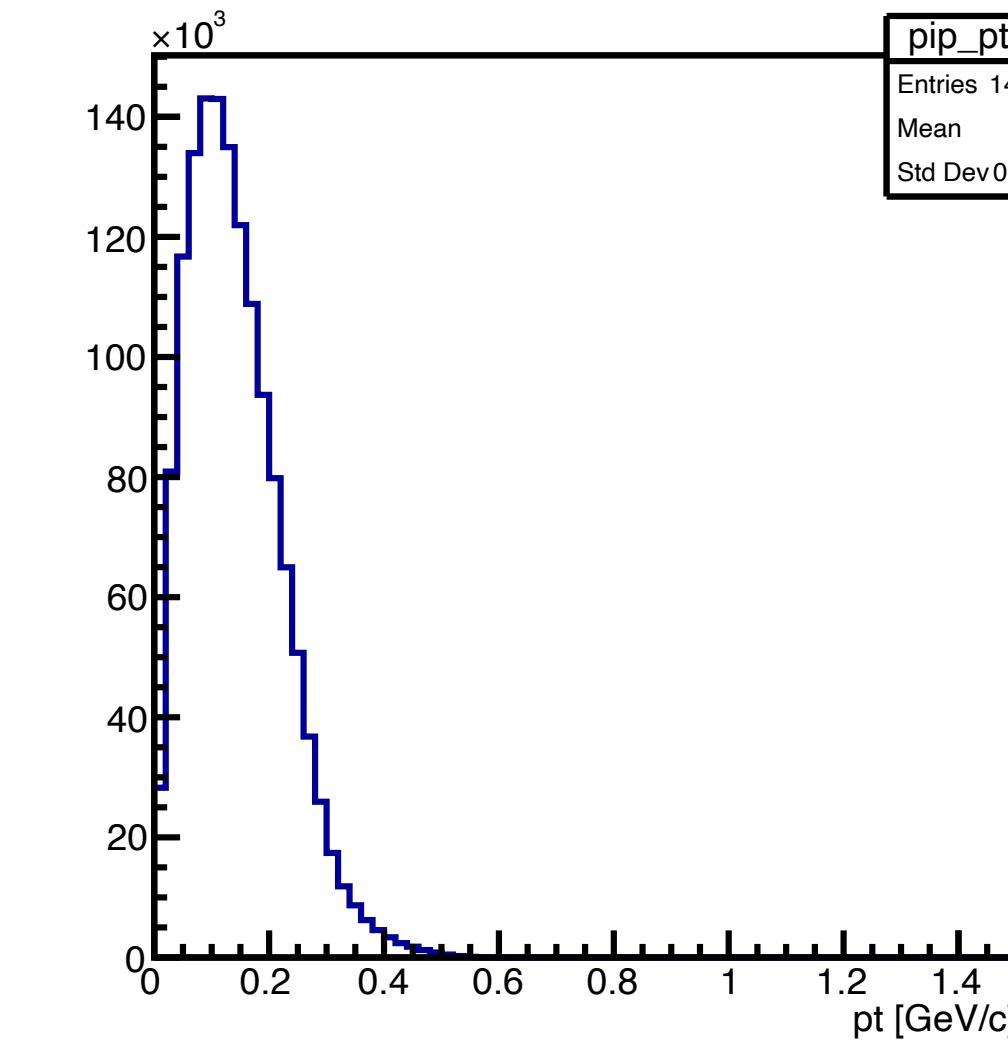
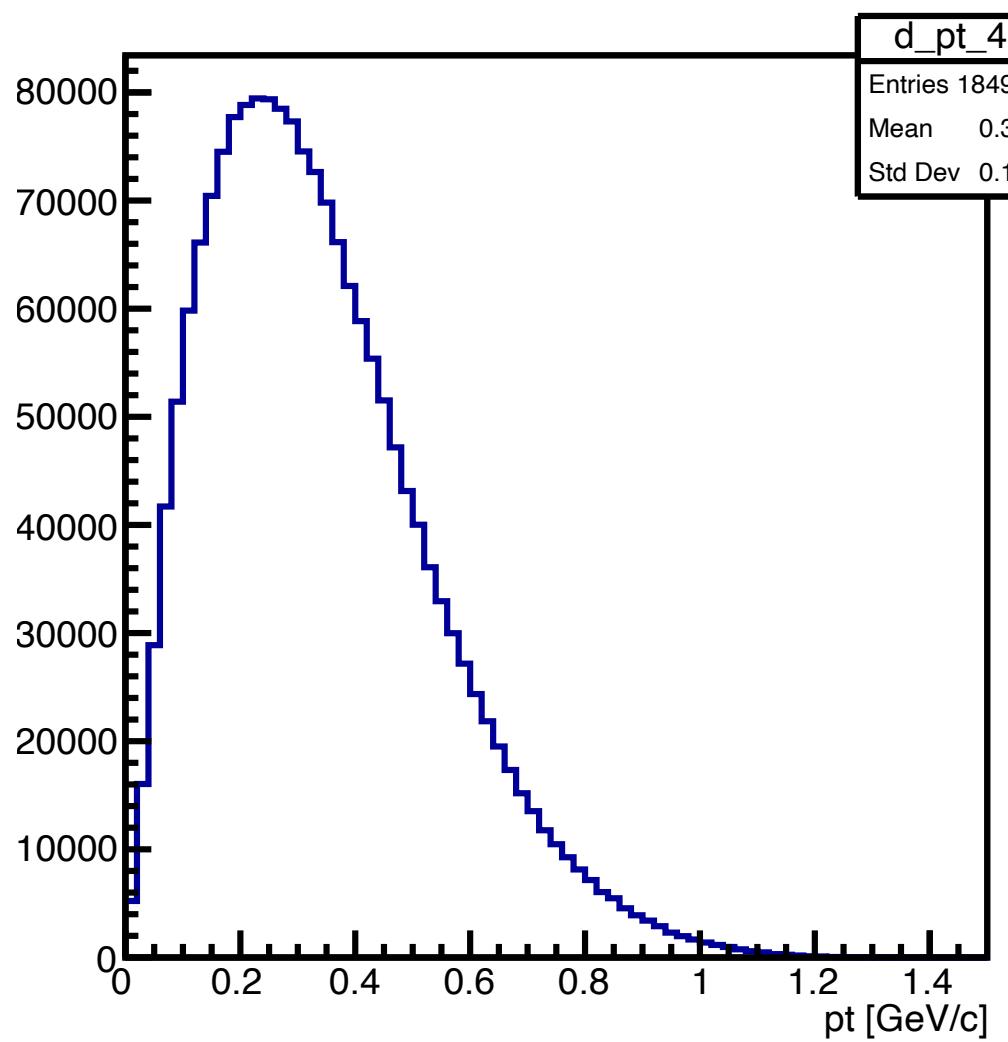
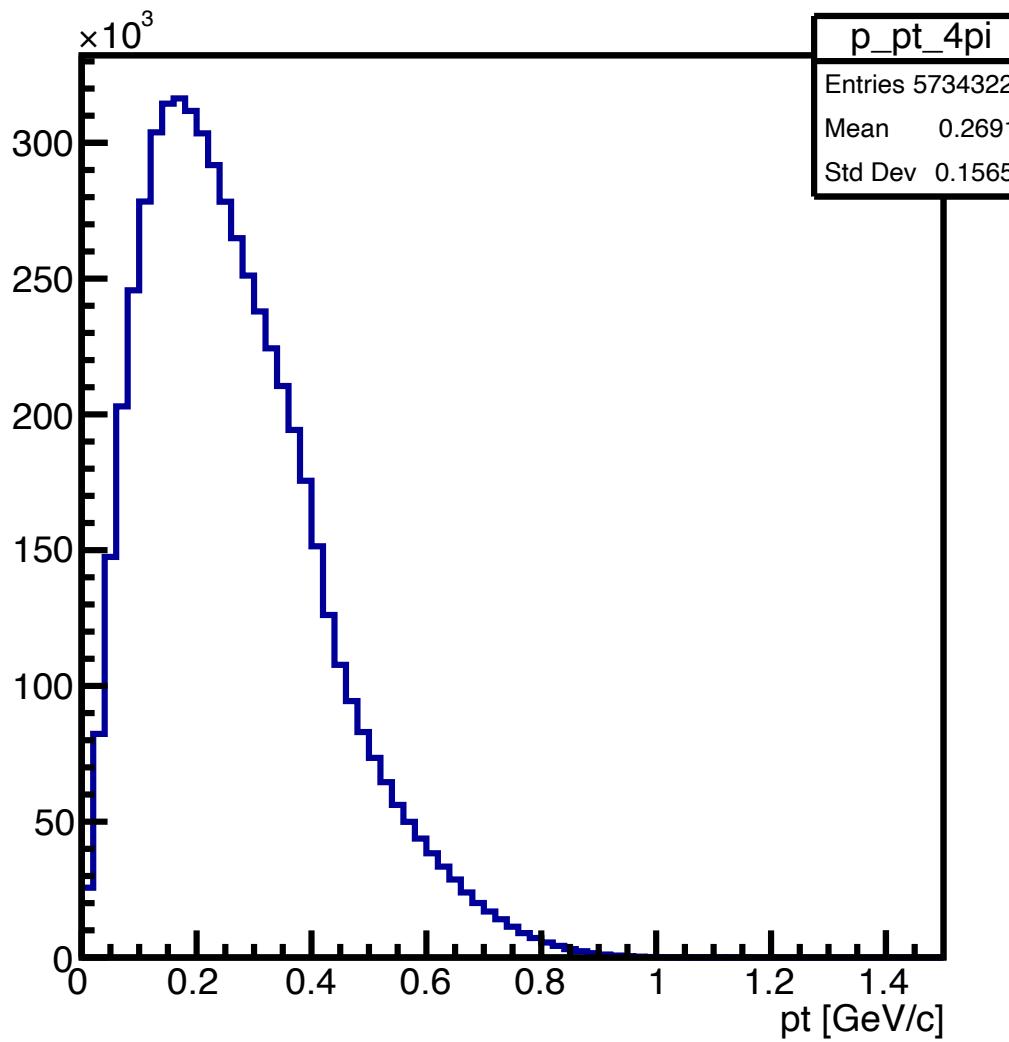
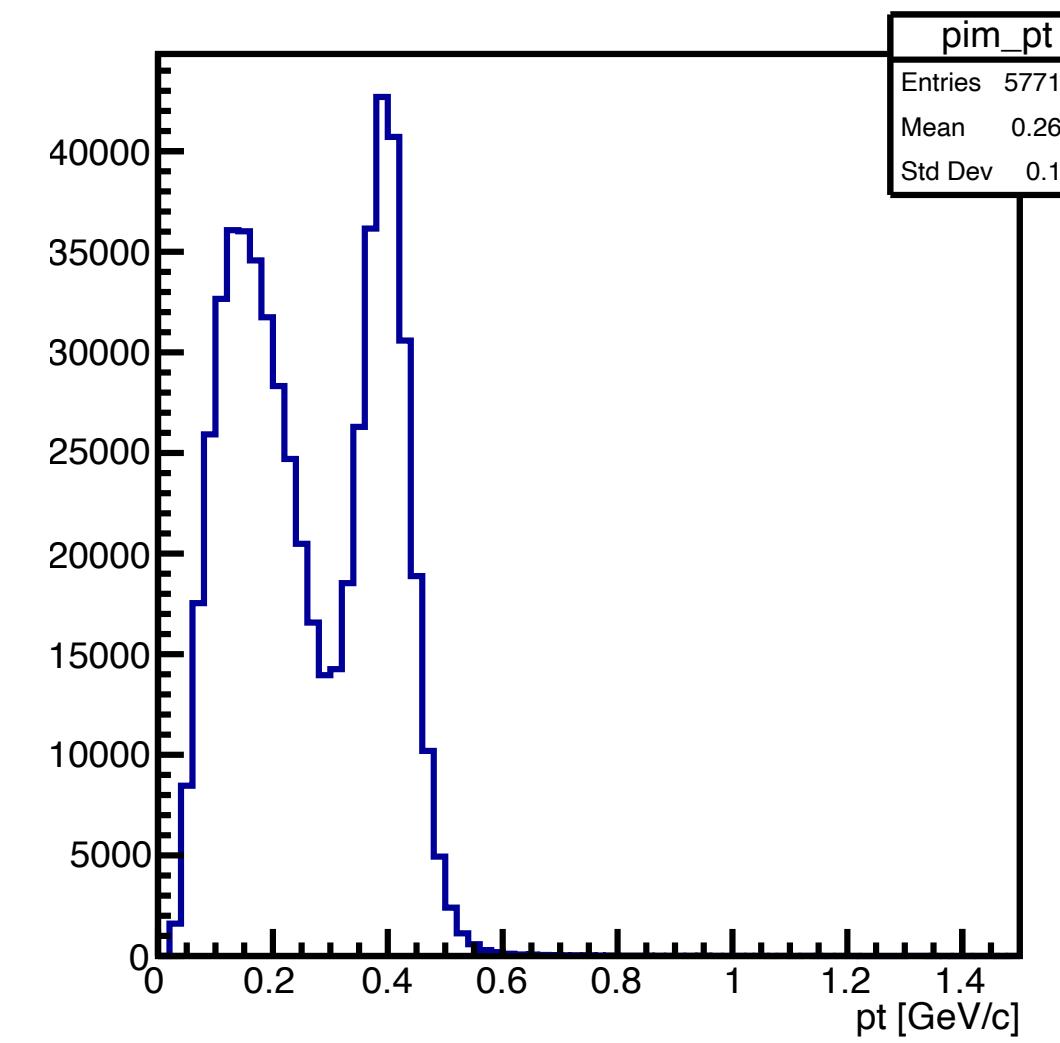
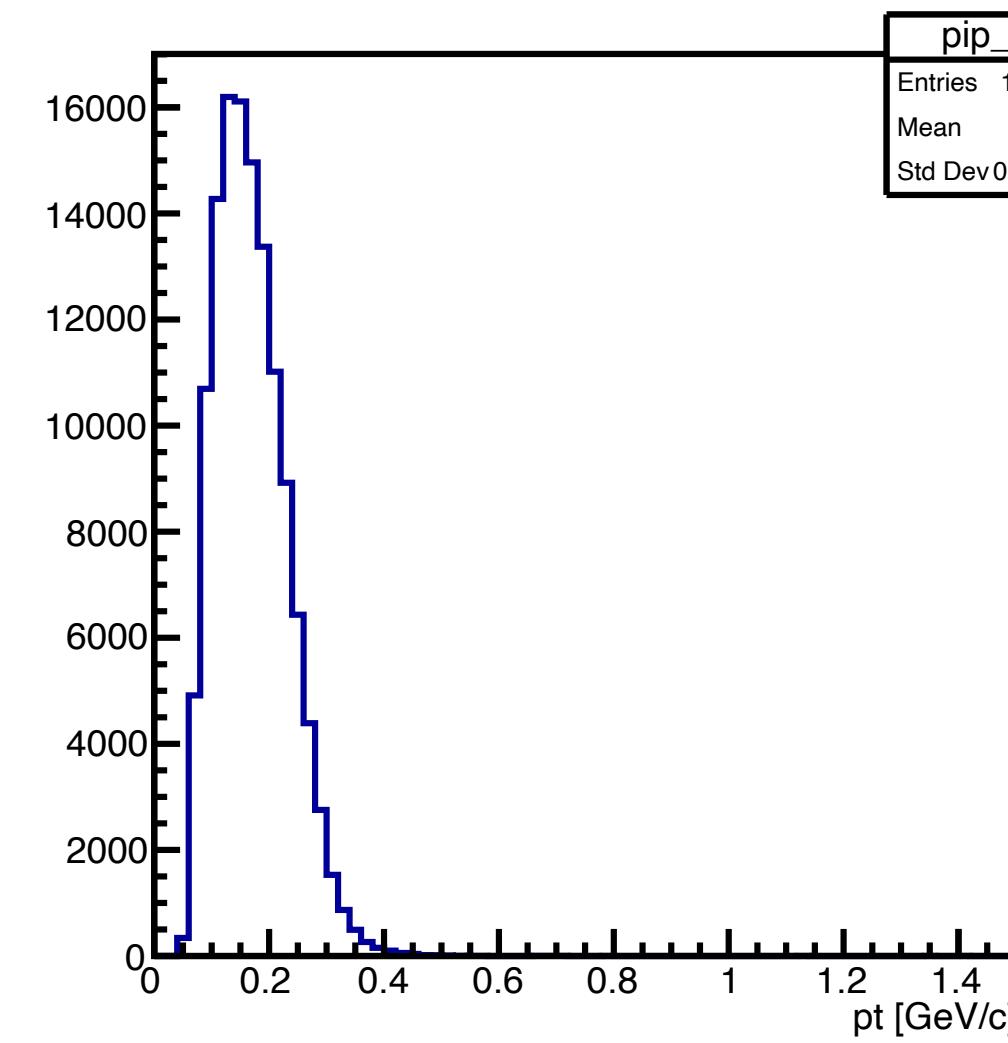
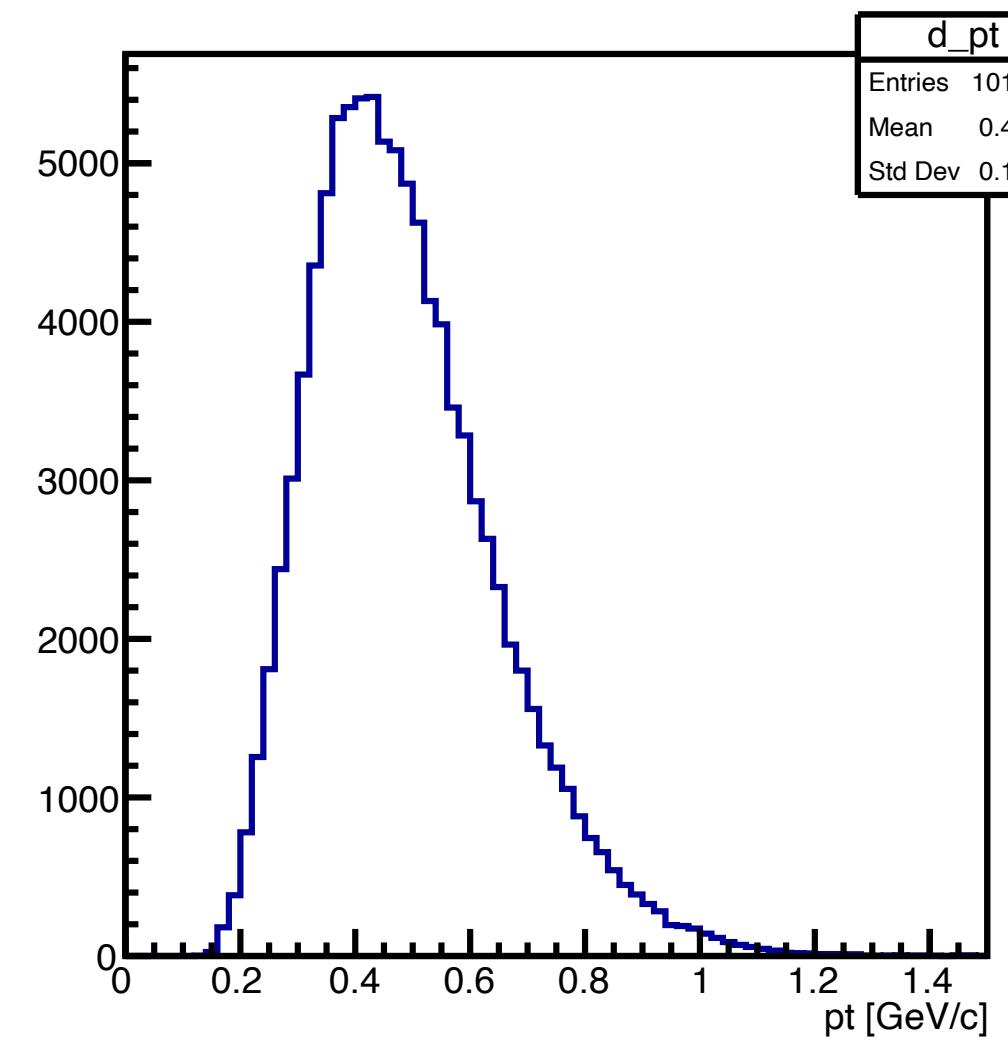
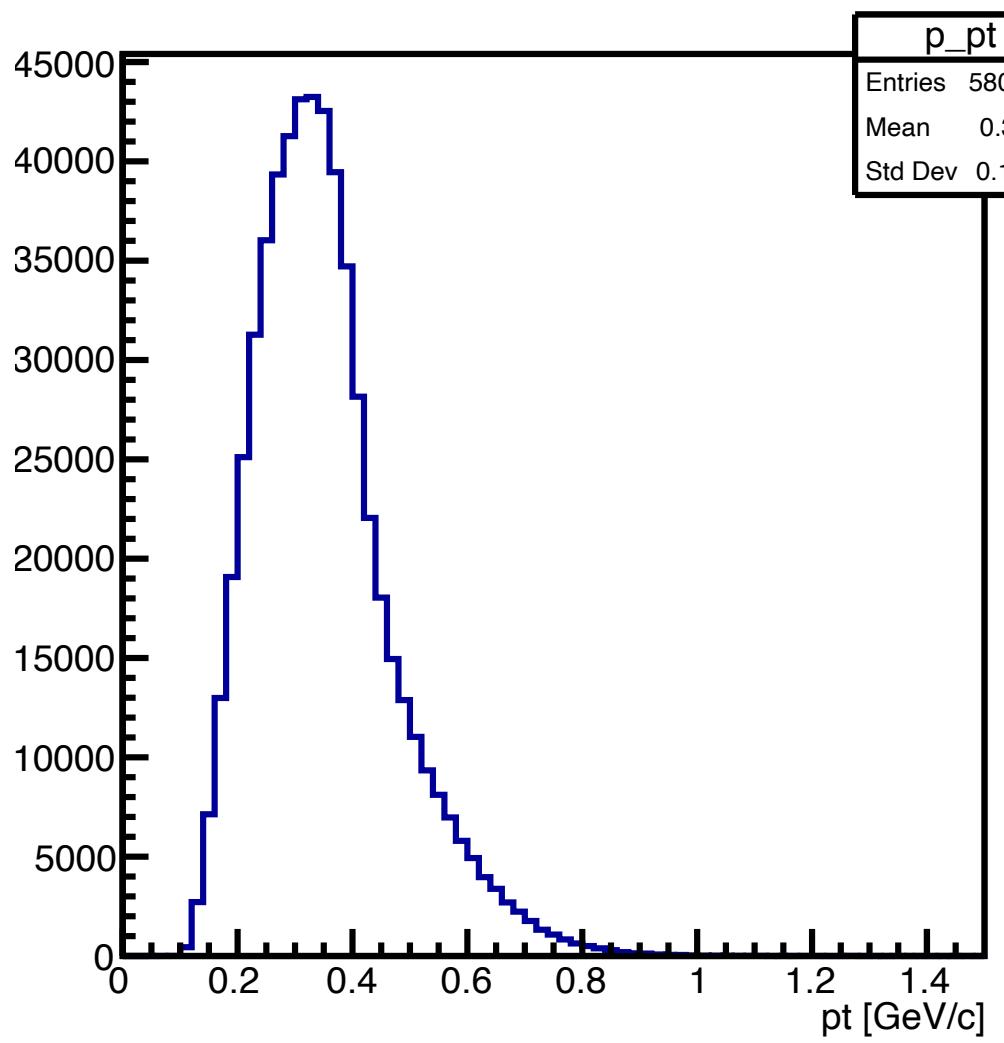
momentum



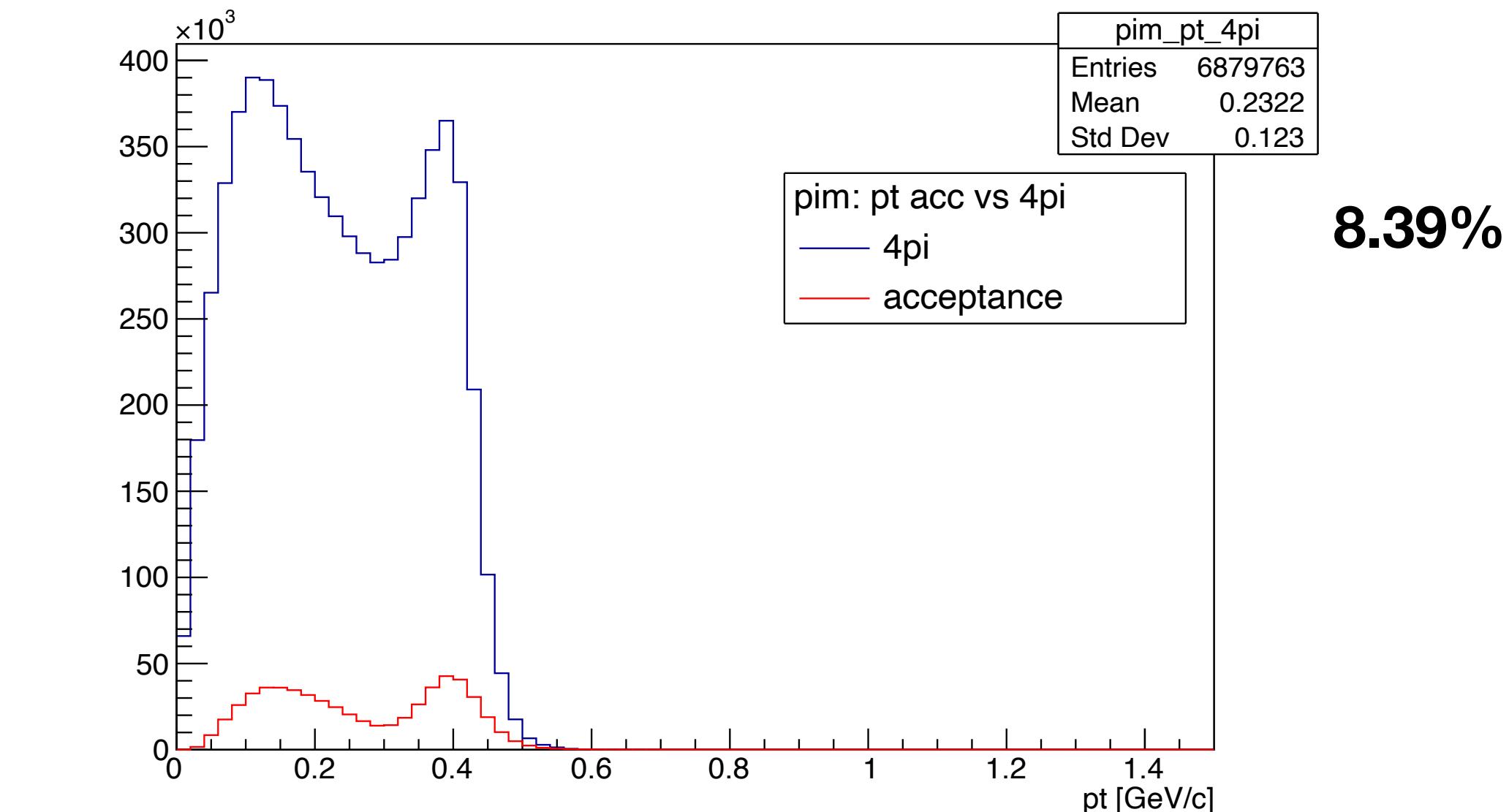
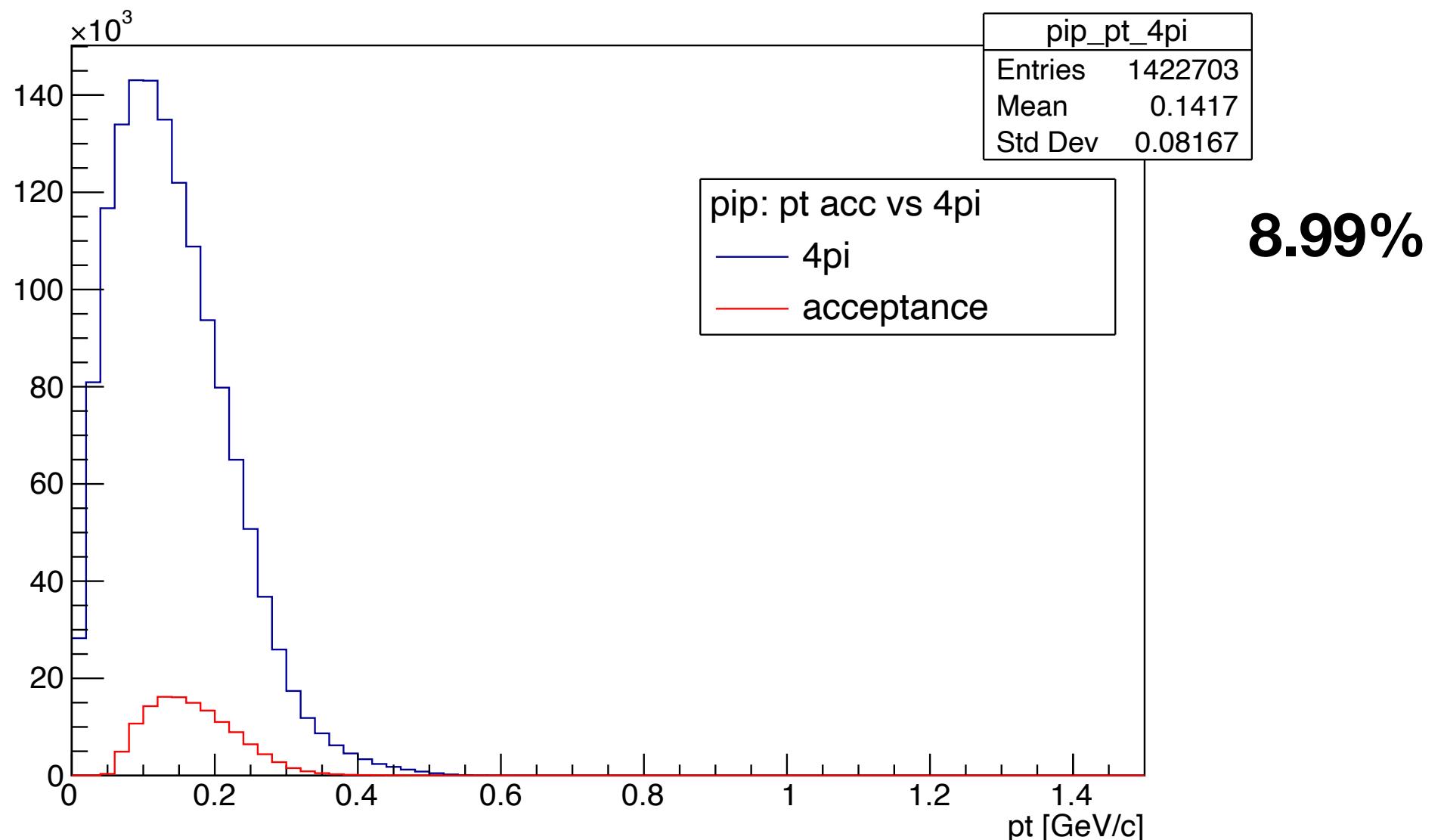
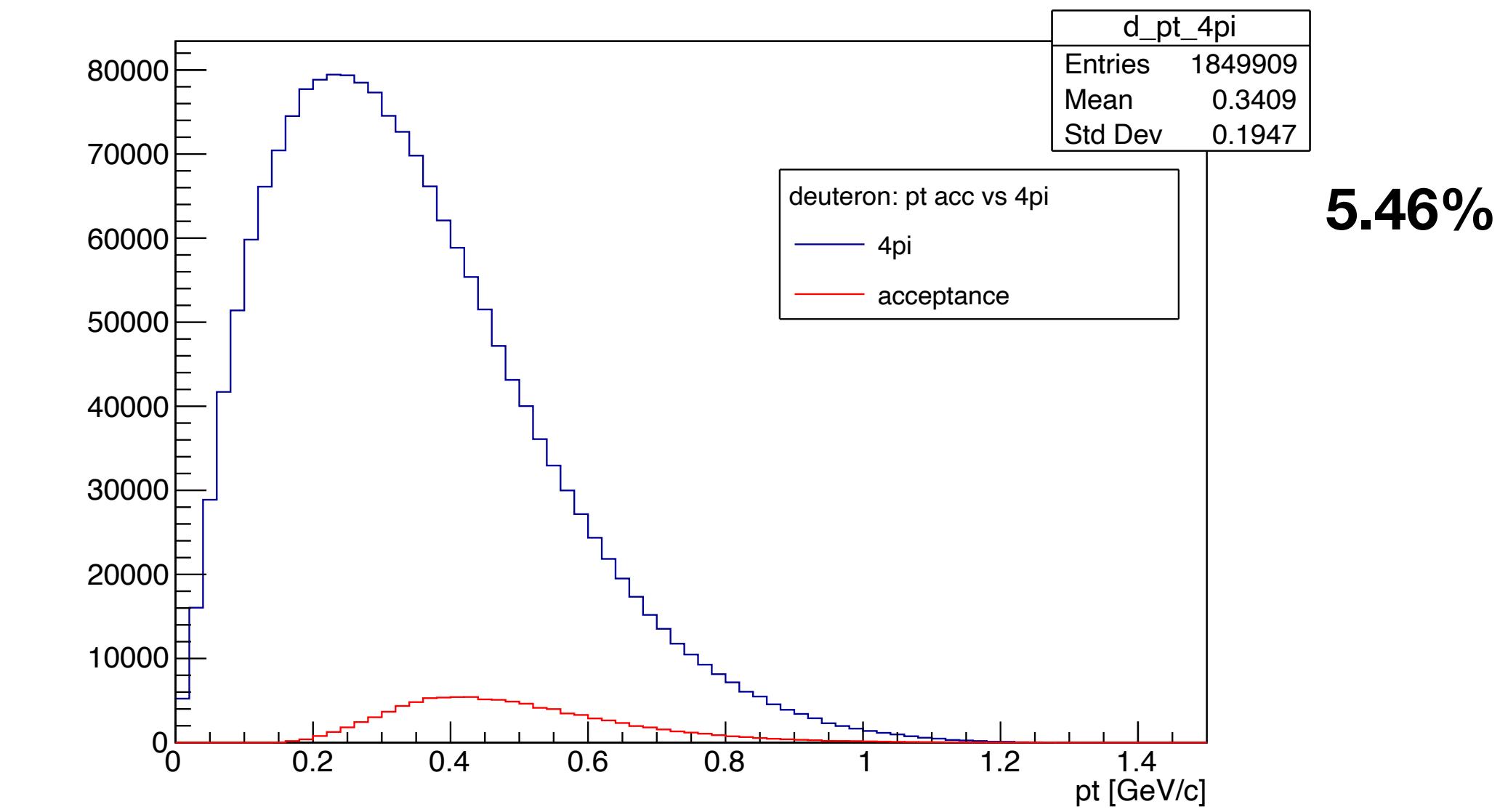
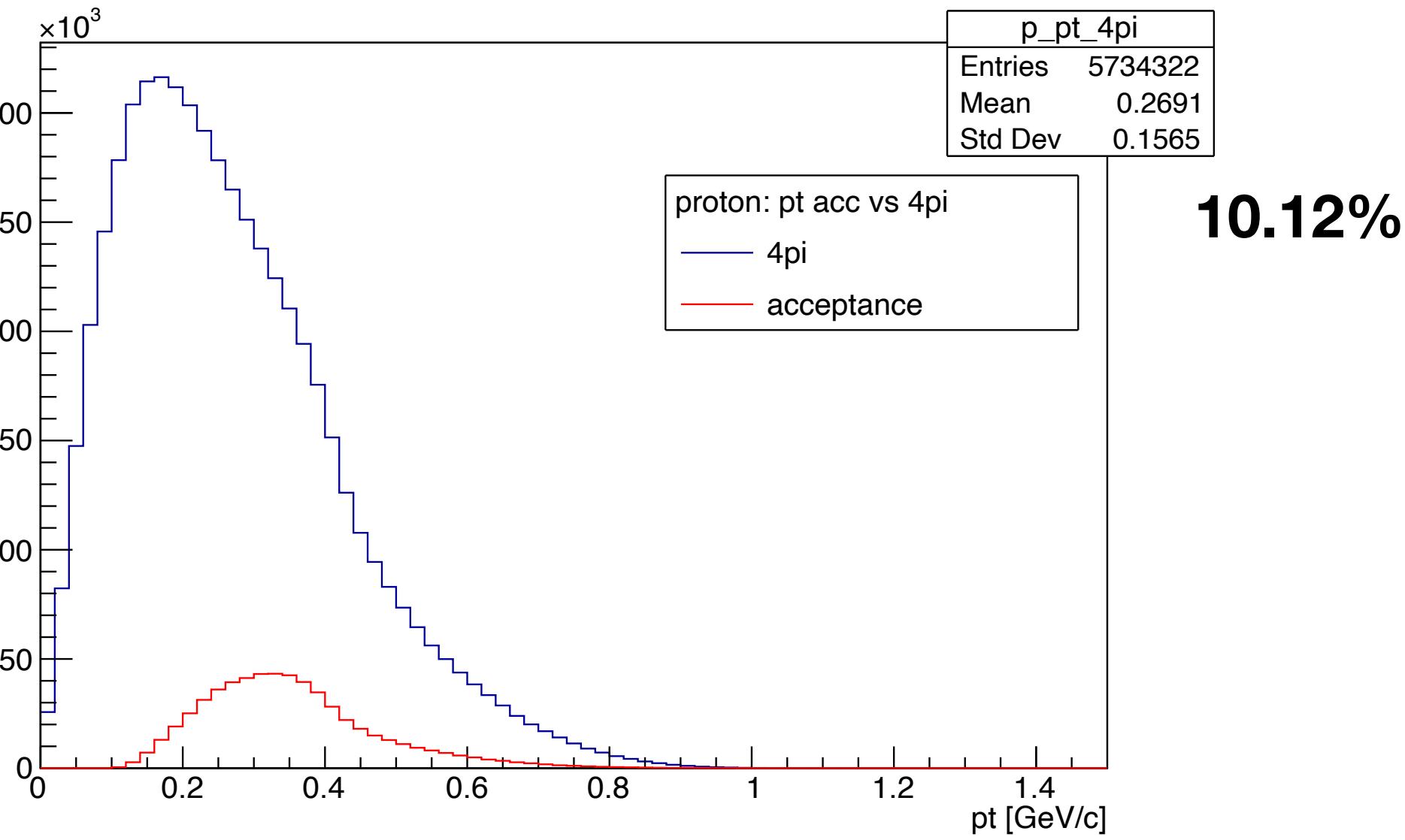
momentum



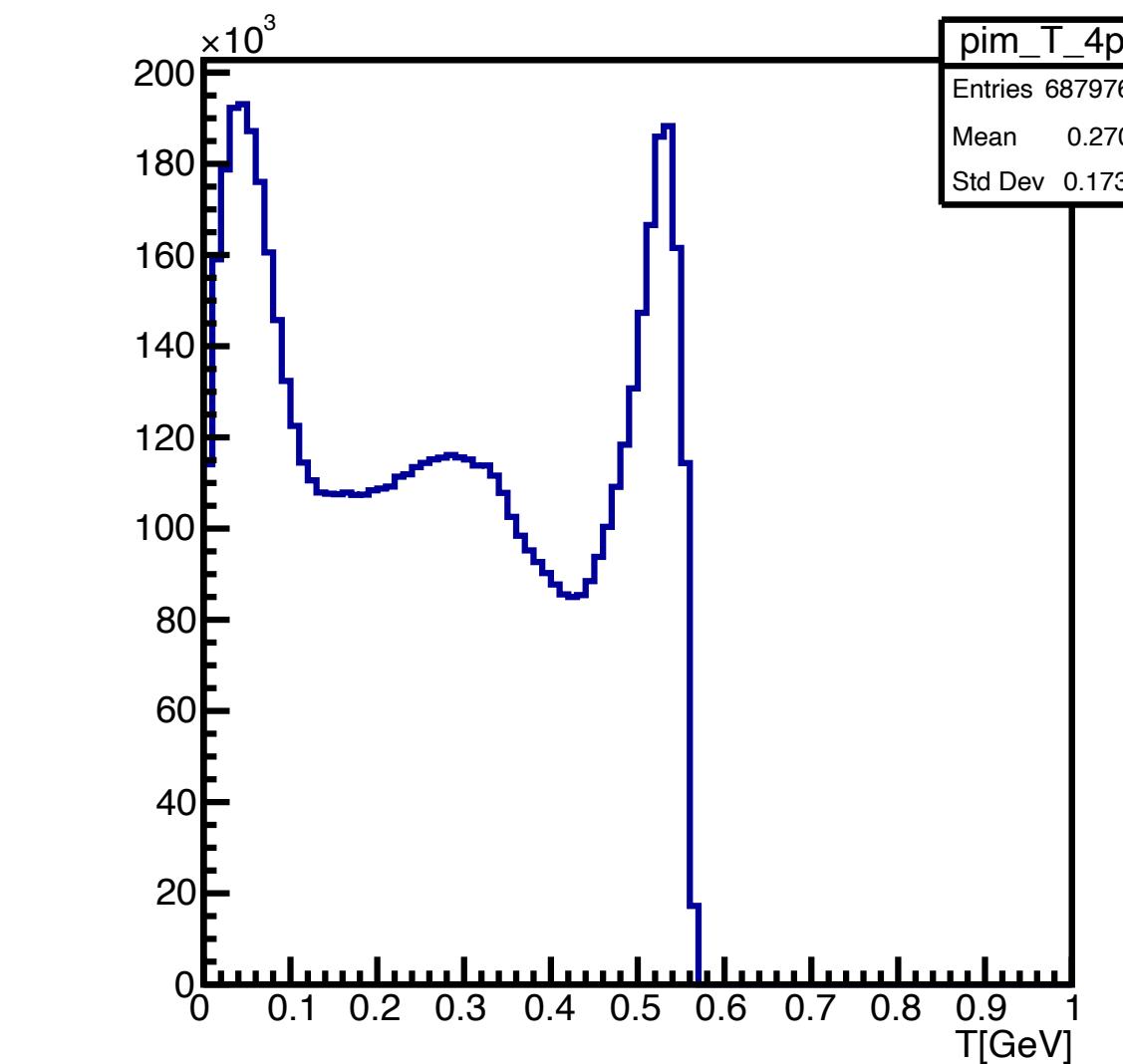
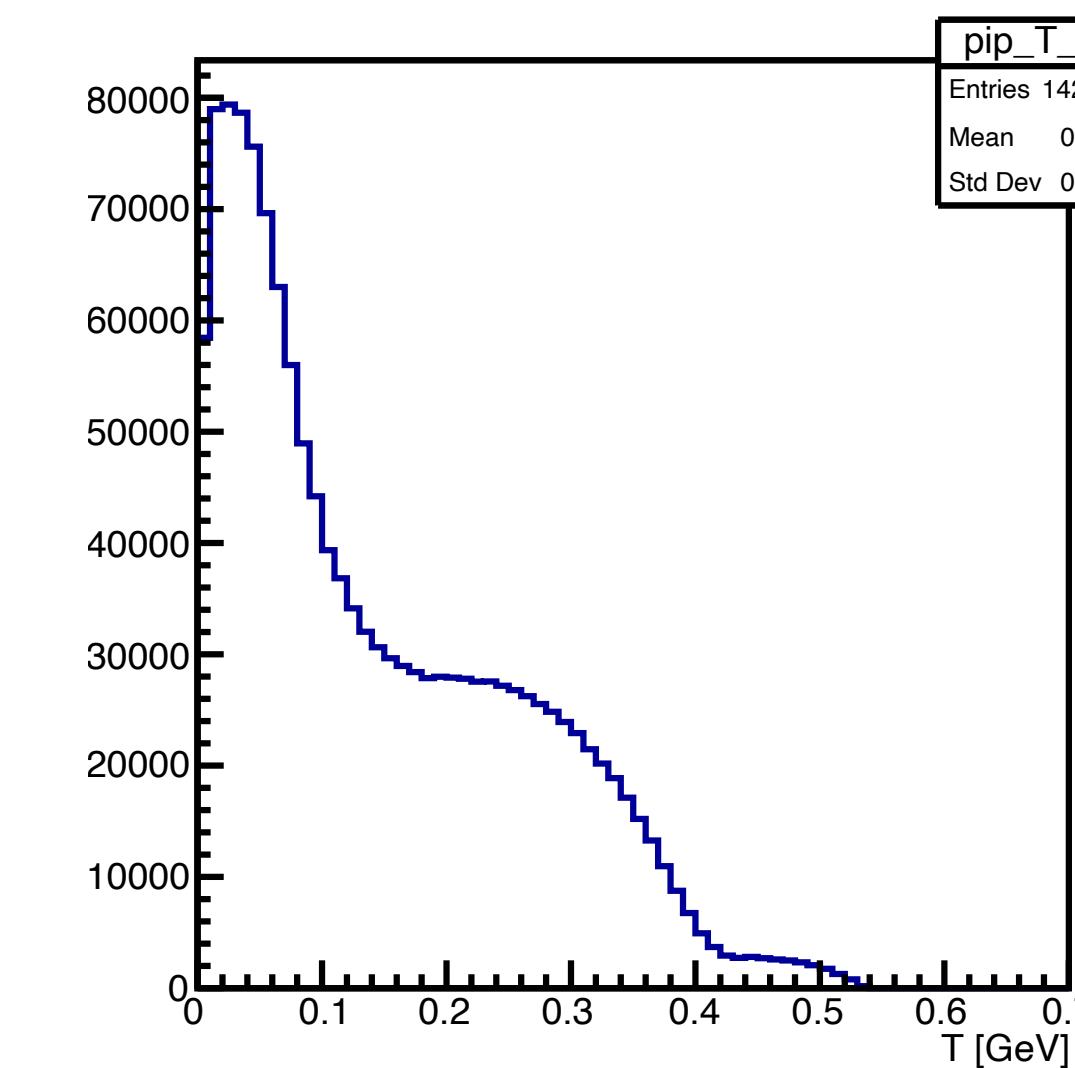
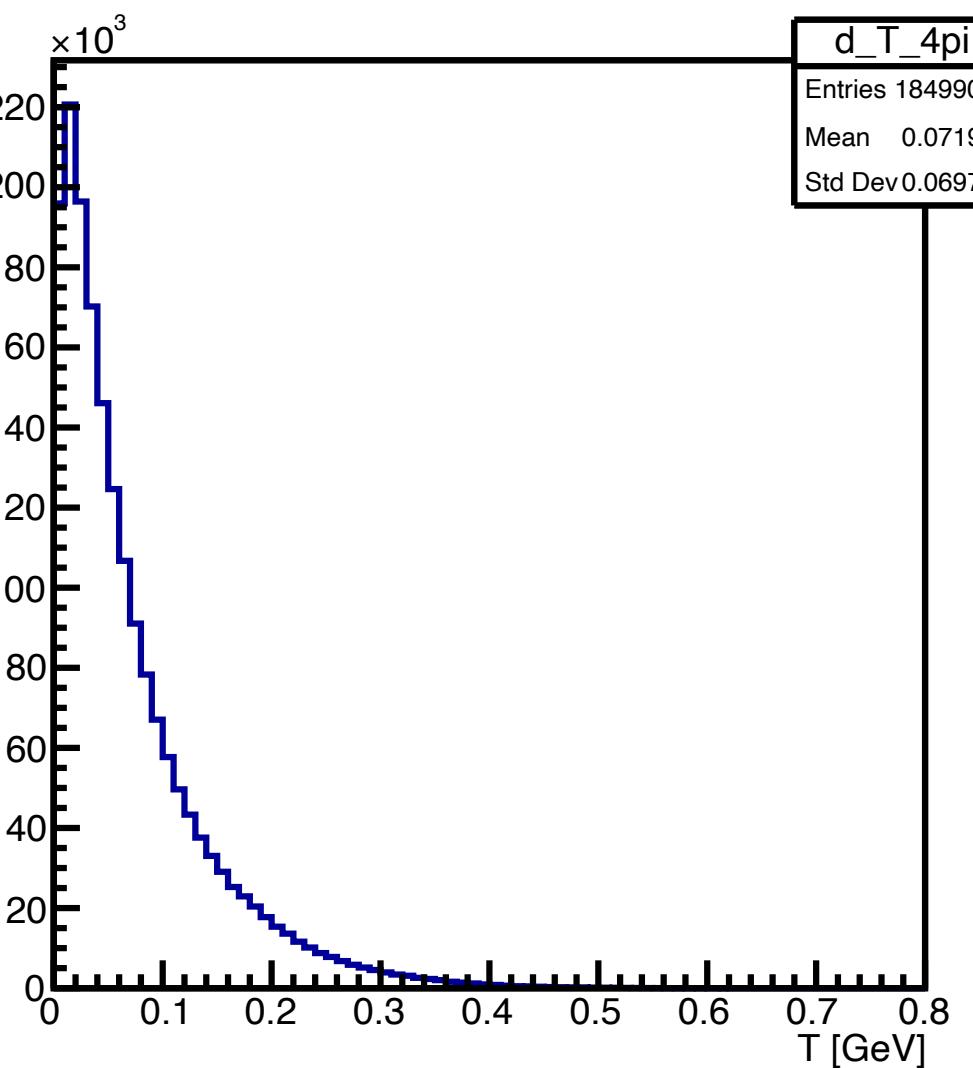
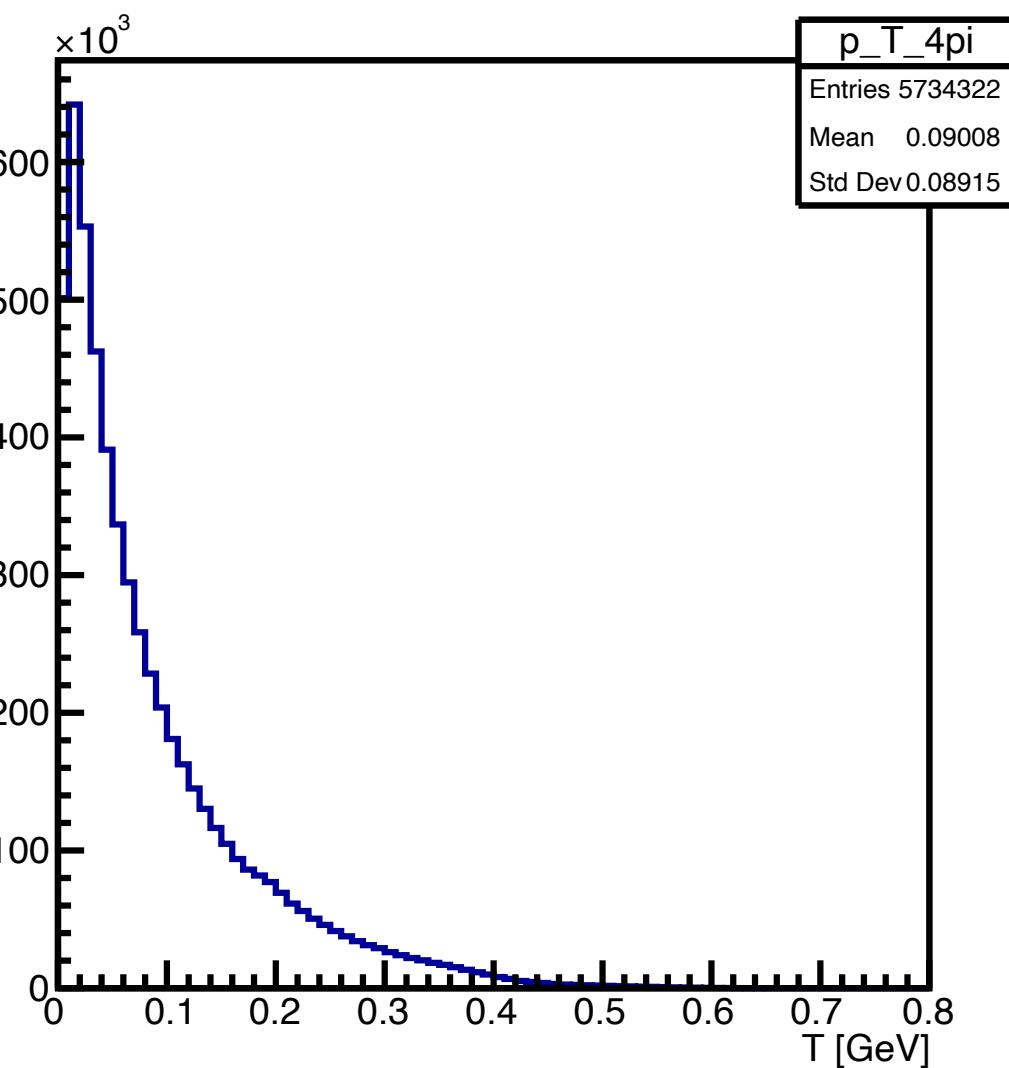
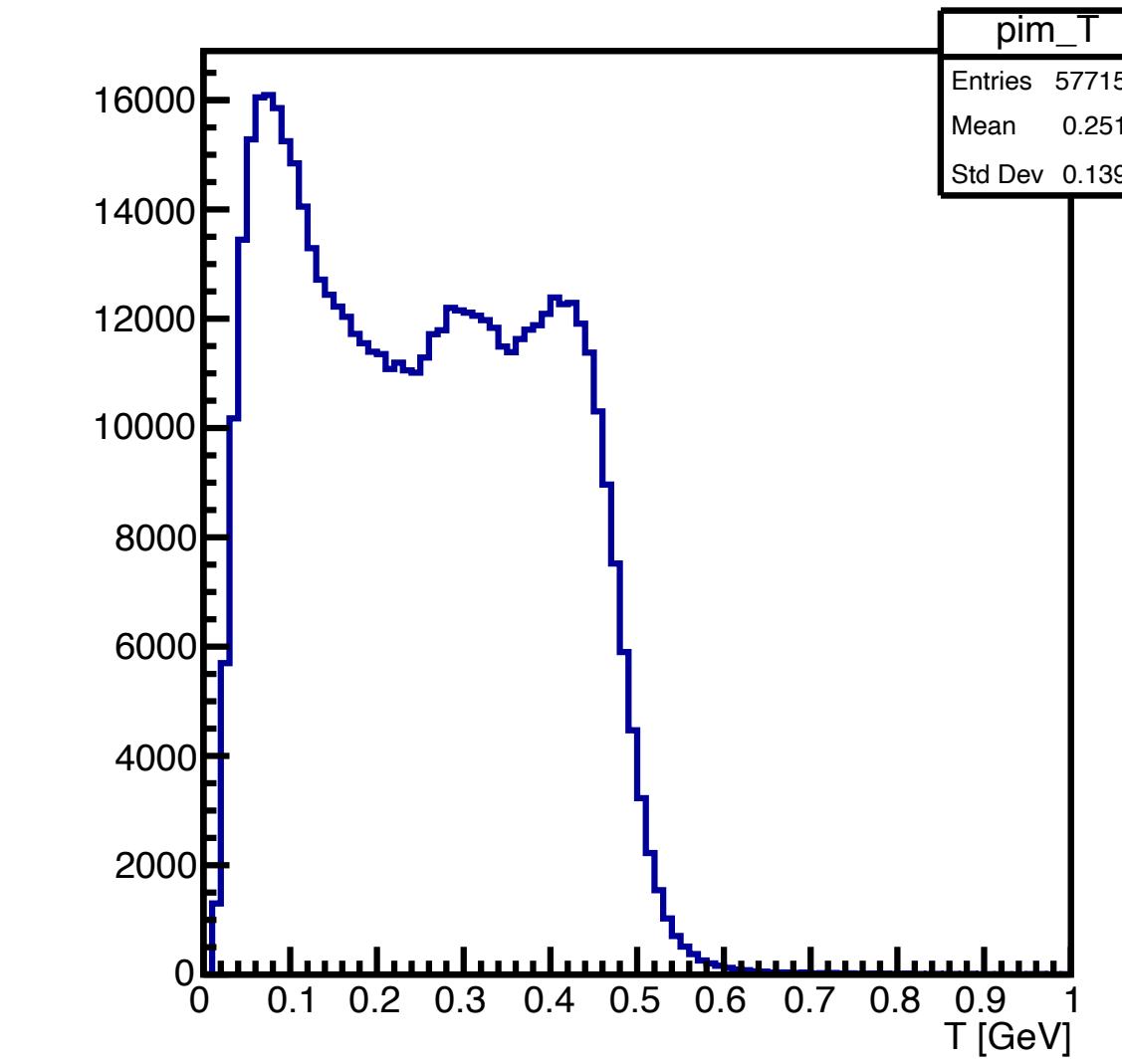
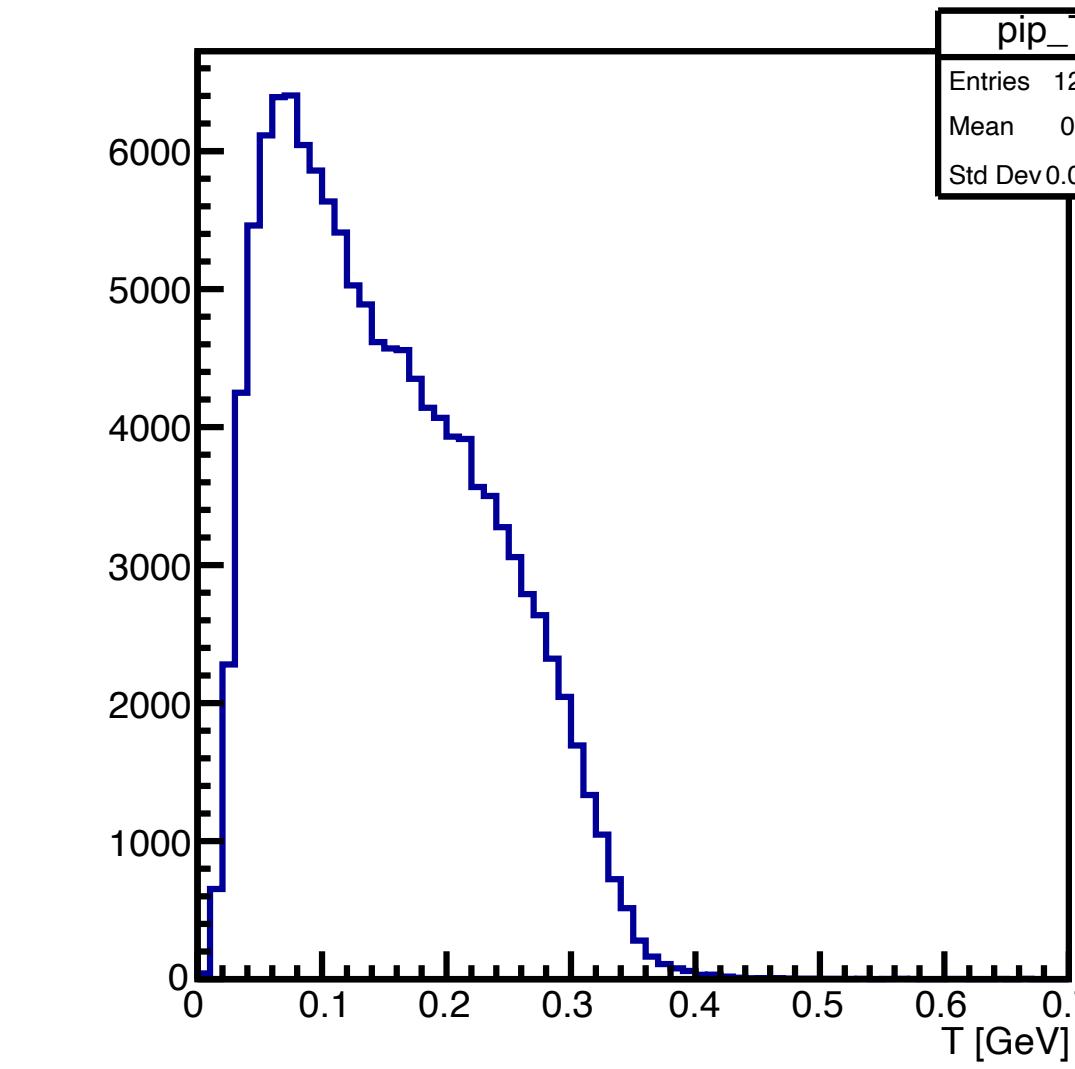
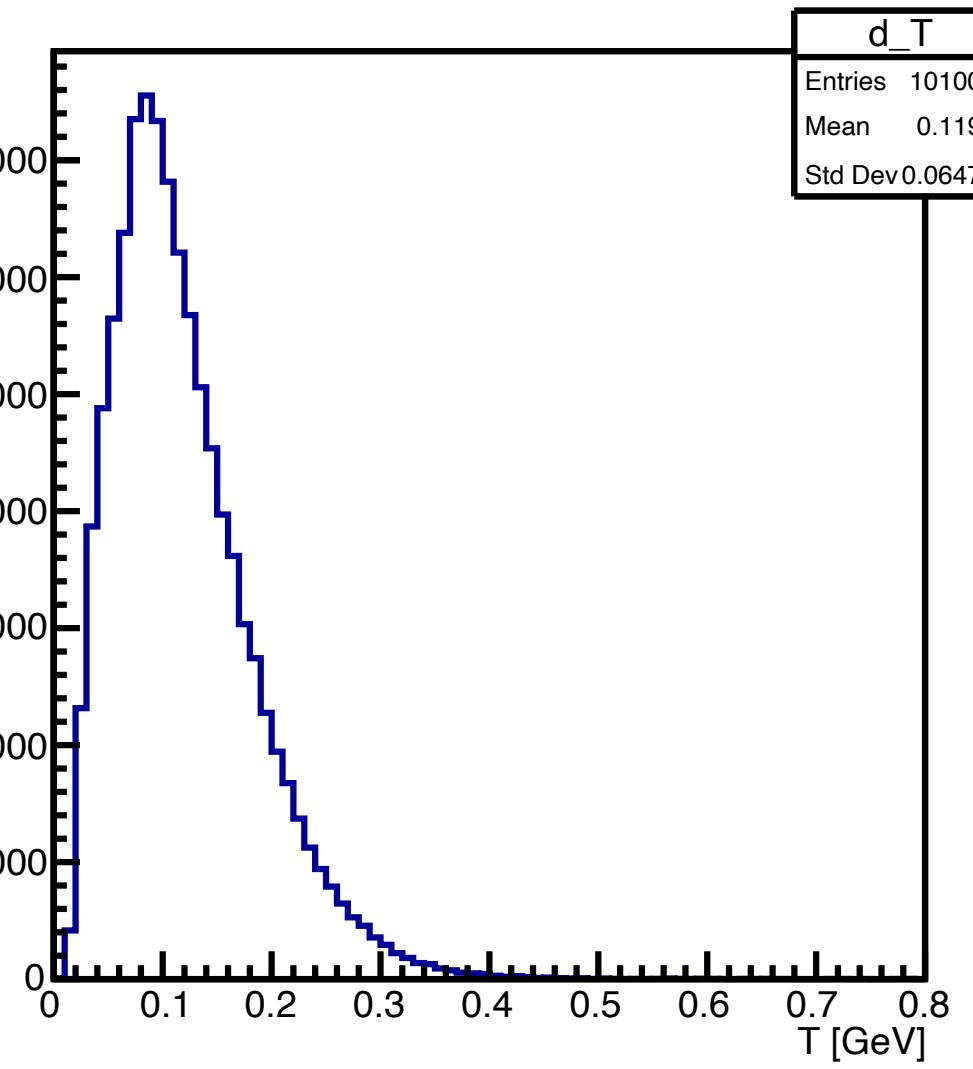
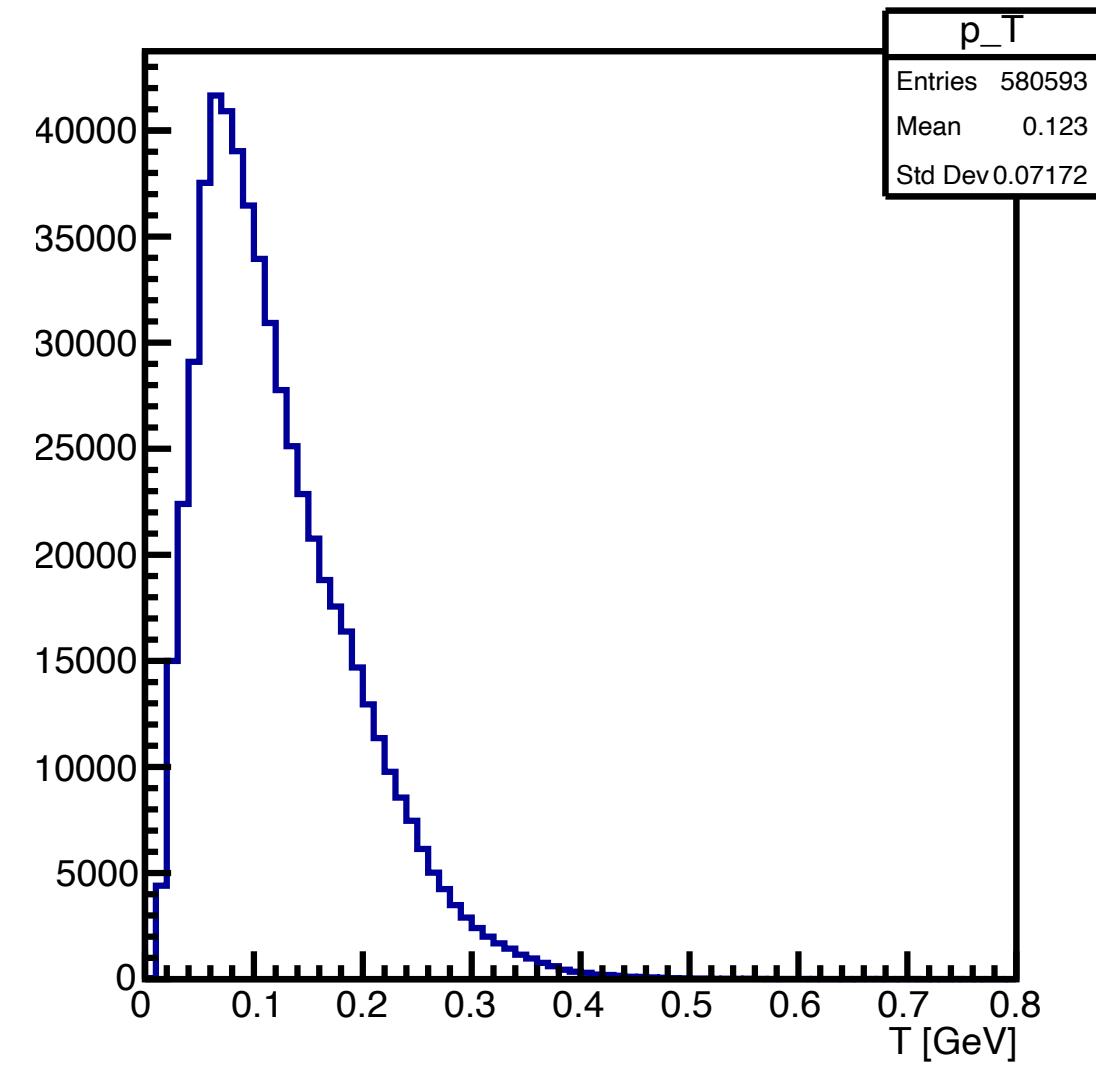
transverse momentum



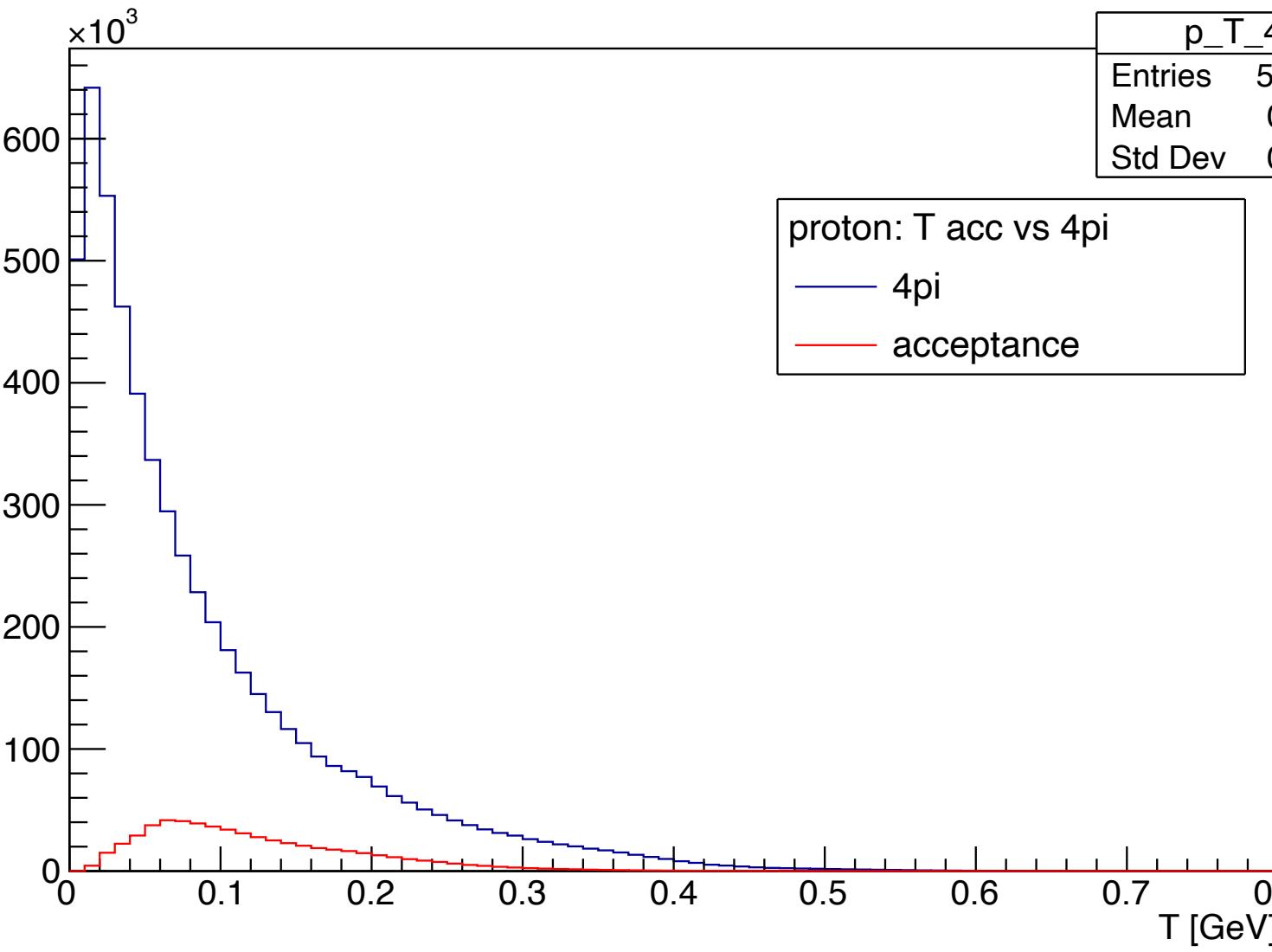
transverse momentum



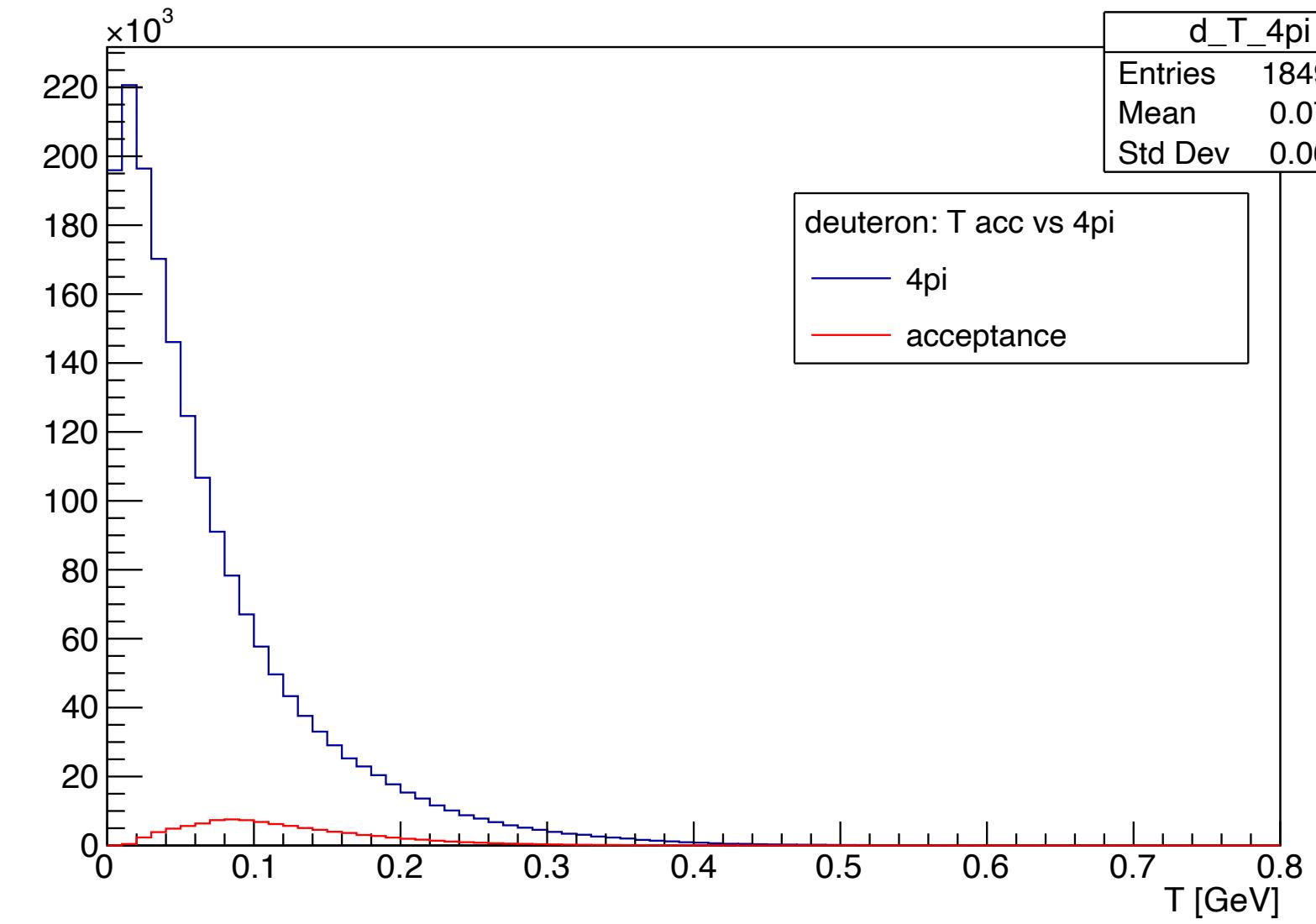
kinetic energy



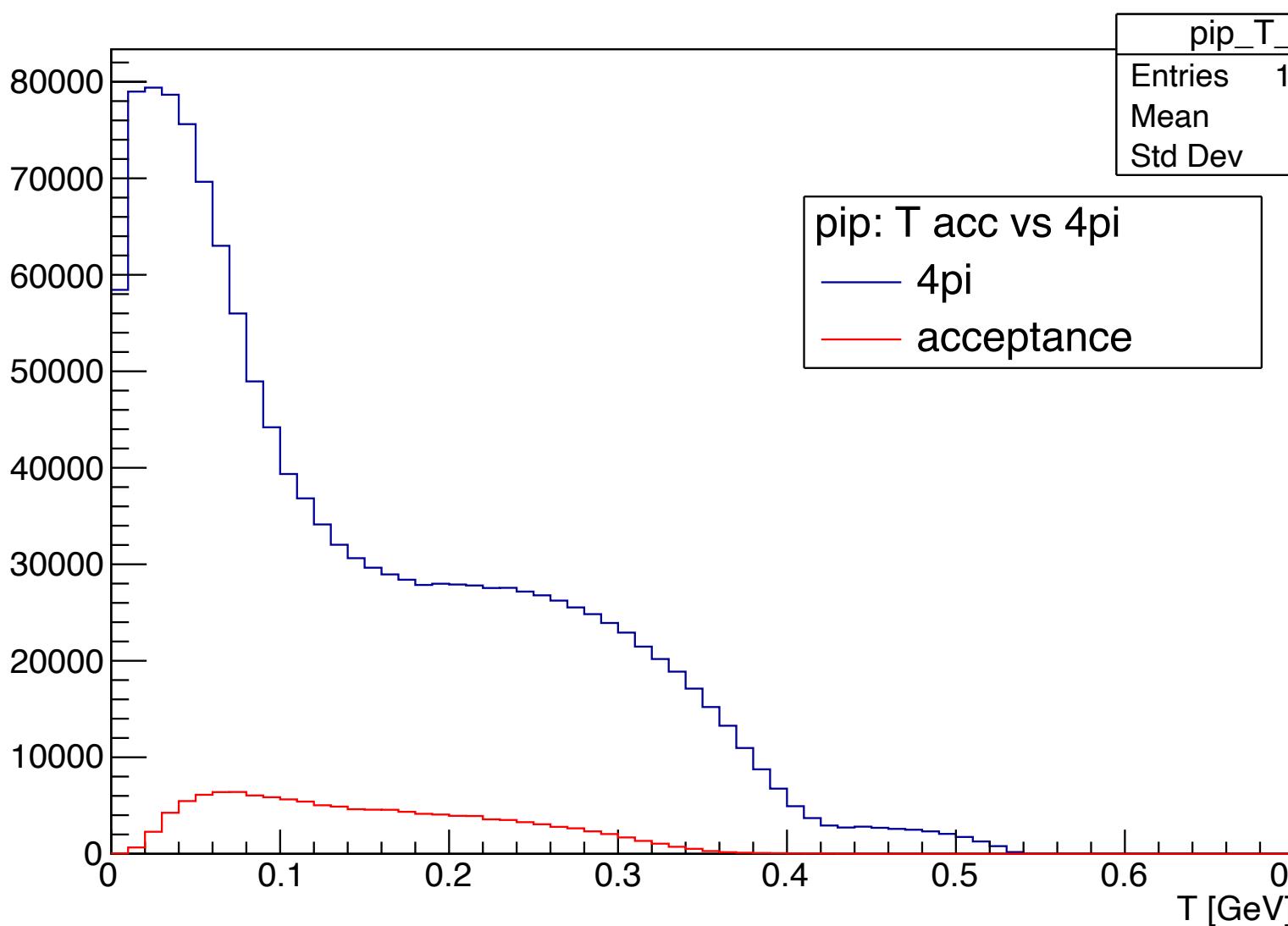
kinetic energy



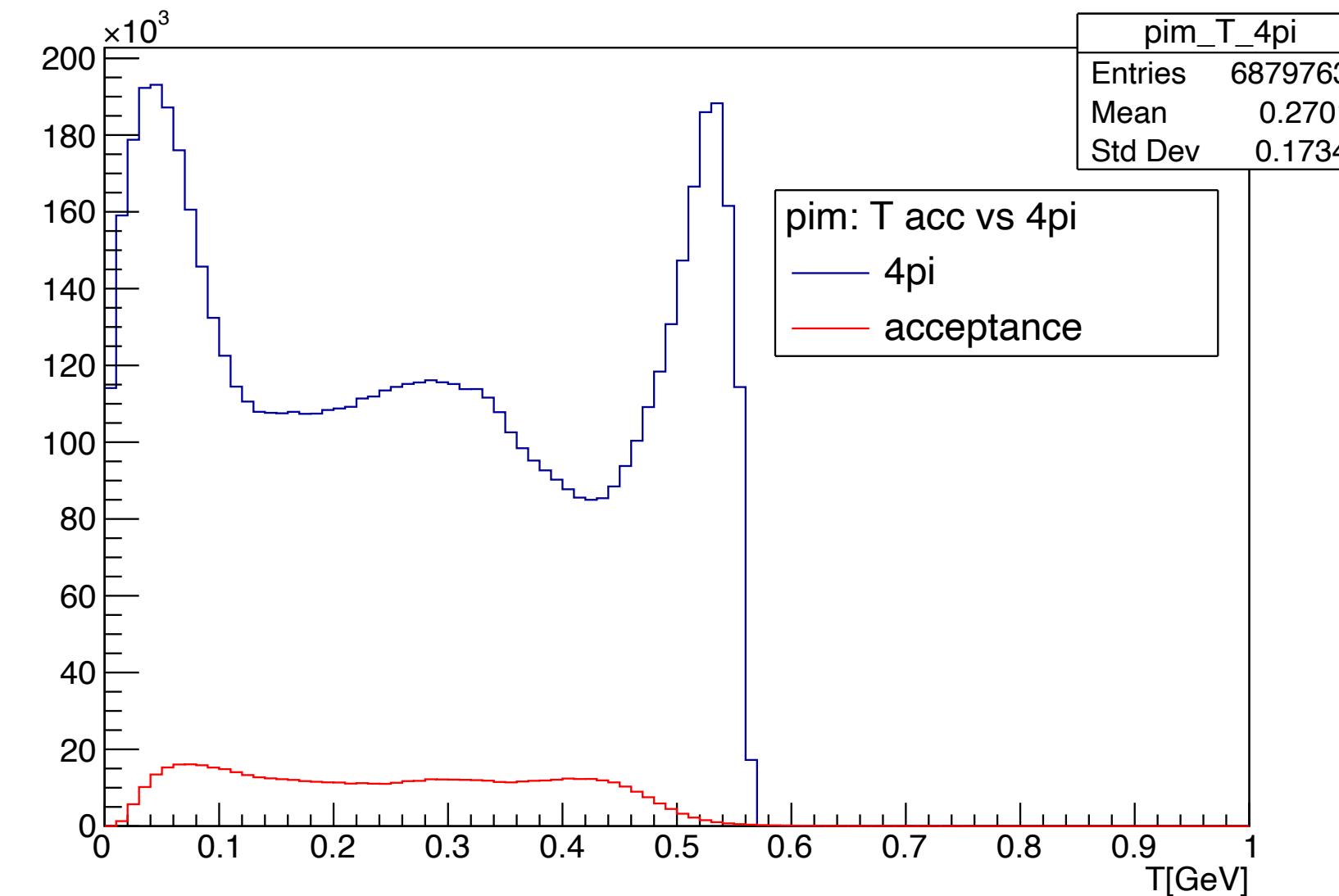
10.12%



5.46%



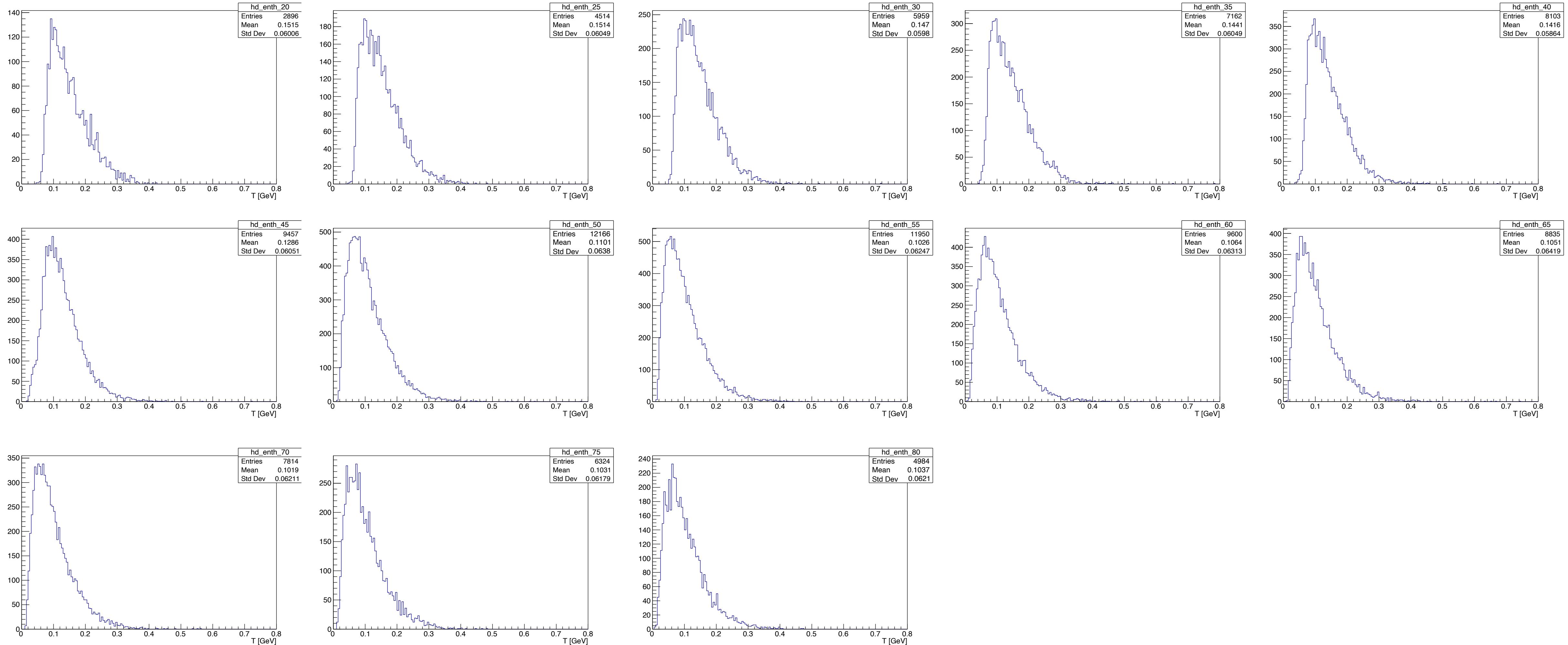
8.99%



8.39%

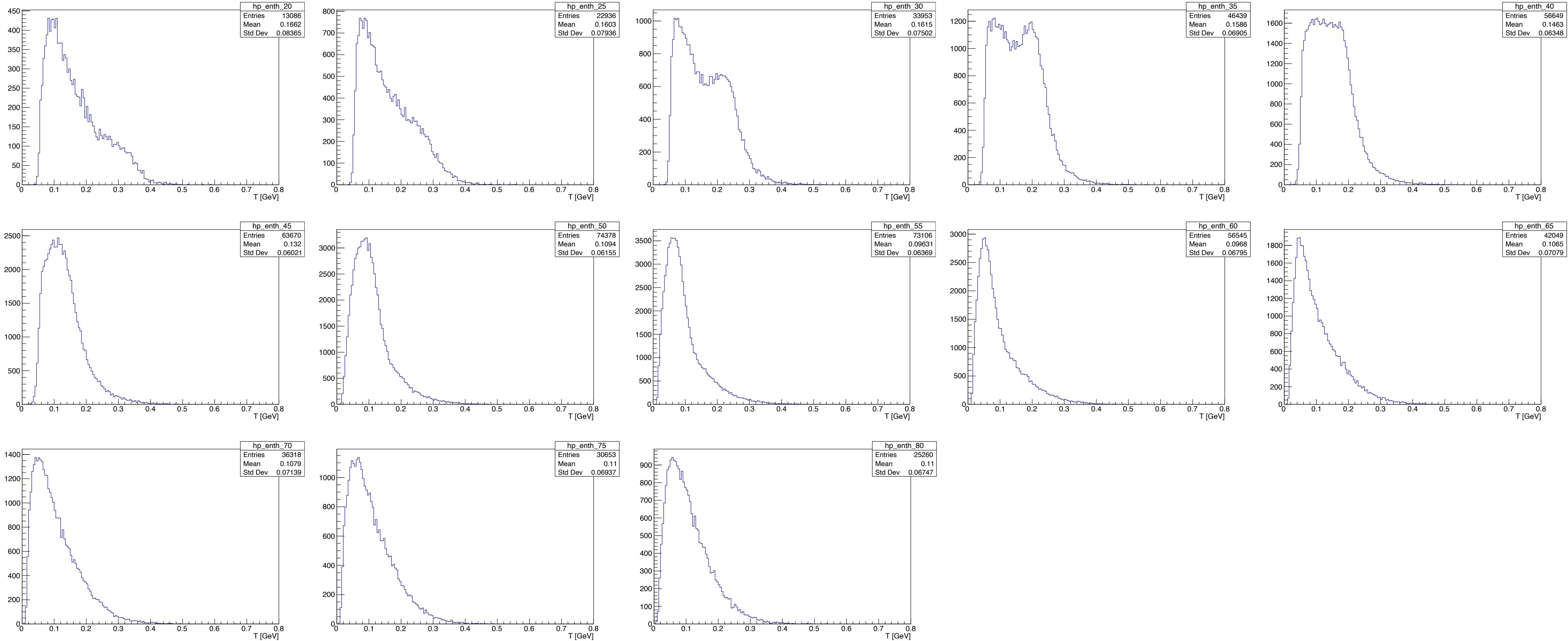
T-θ distributions: d

θ from 20° to 80°
 $\Delta\theta = 5^\circ$



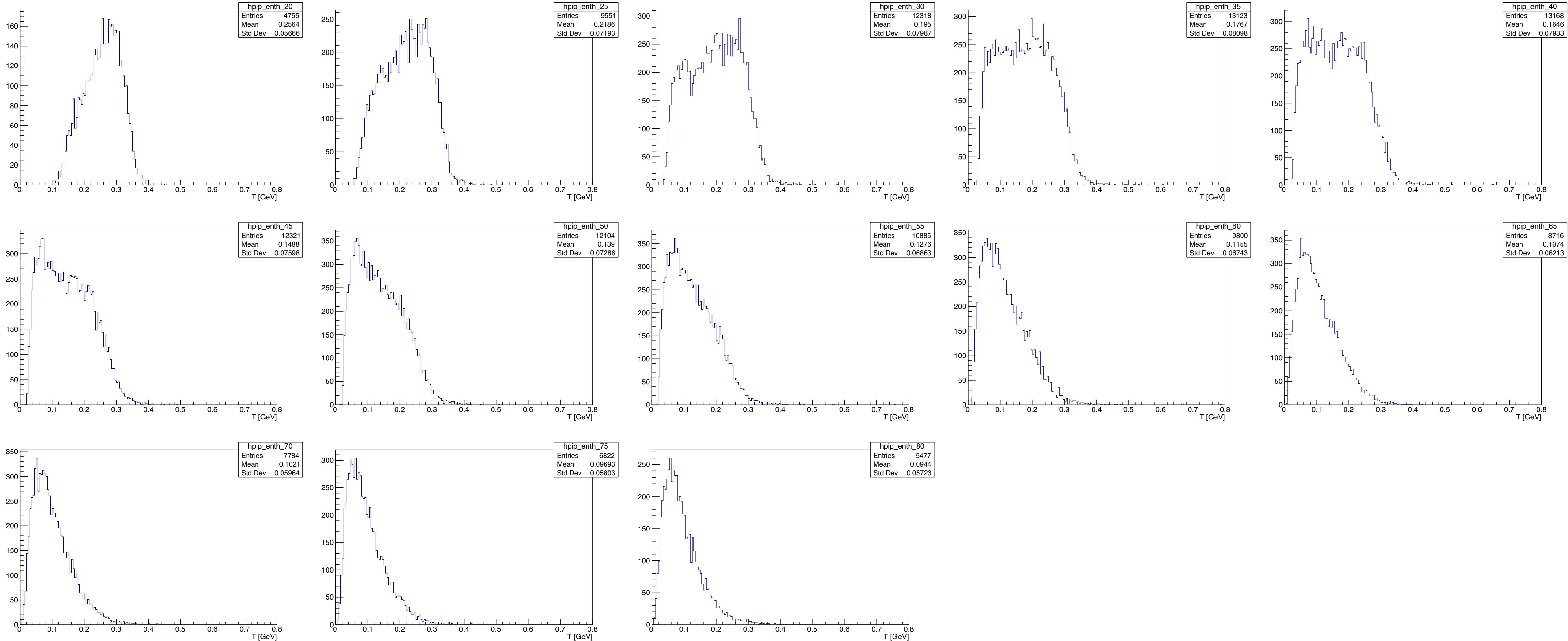
T-θ distributions: p

θ from 20° to 80°
 $\Delta\theta = 5^\circ$



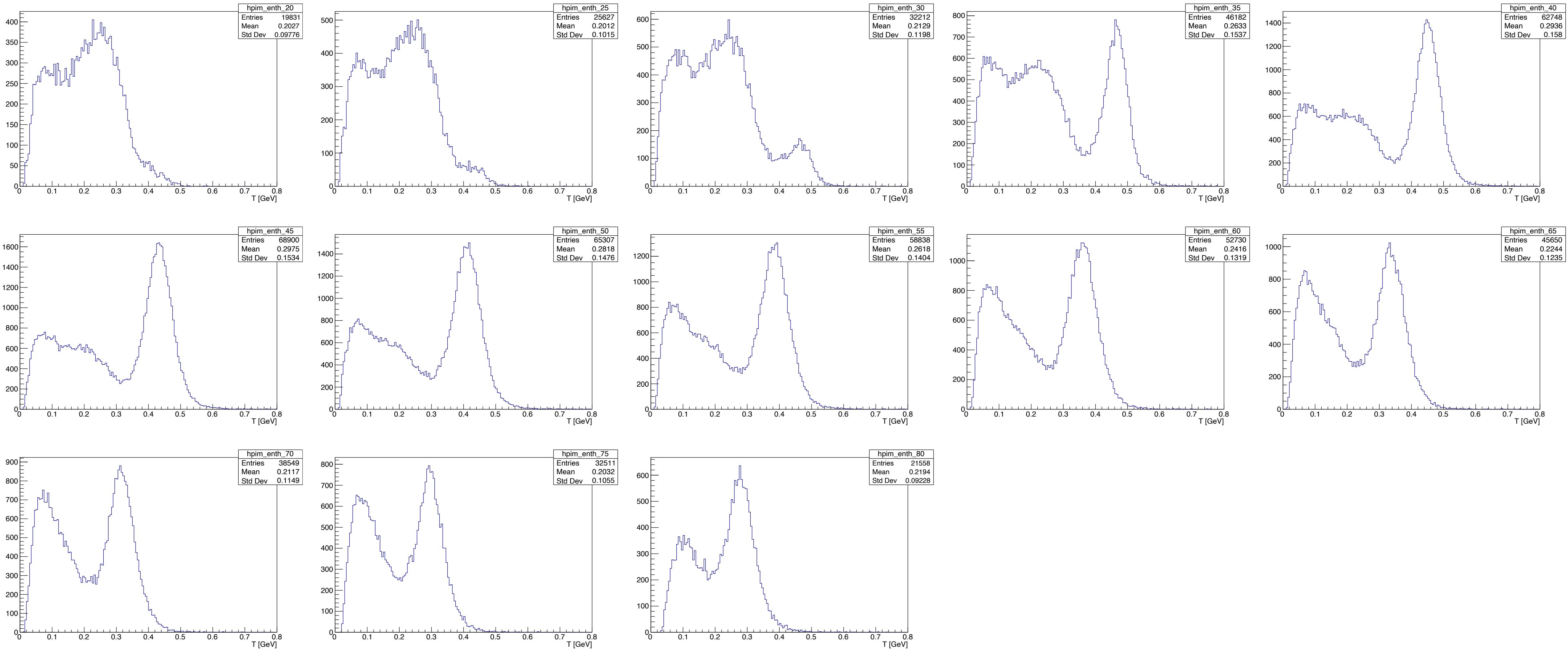
T - θ distributions: π^+

θ from 20° to 80°
 $\Delta\theta = 5^\circ$

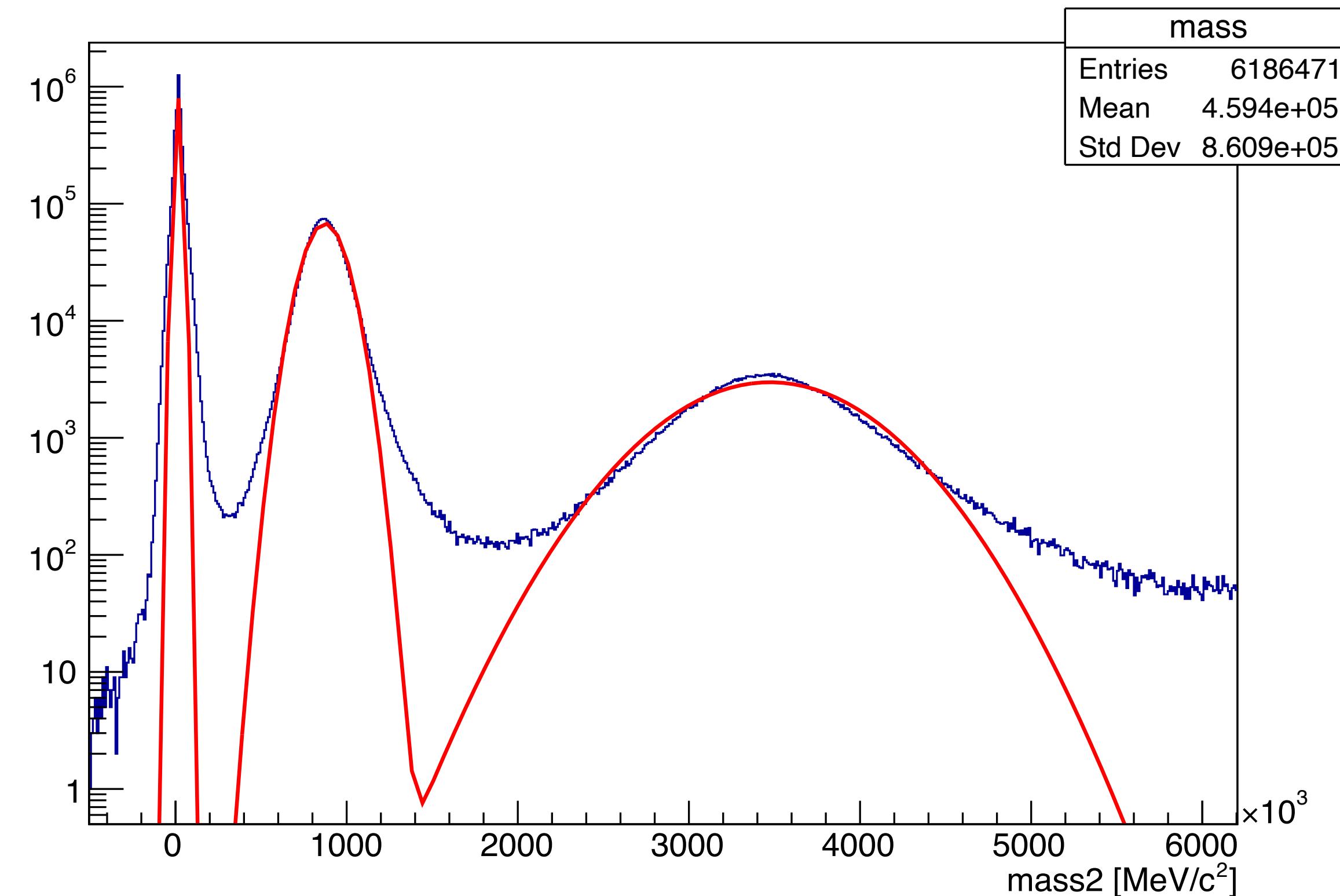
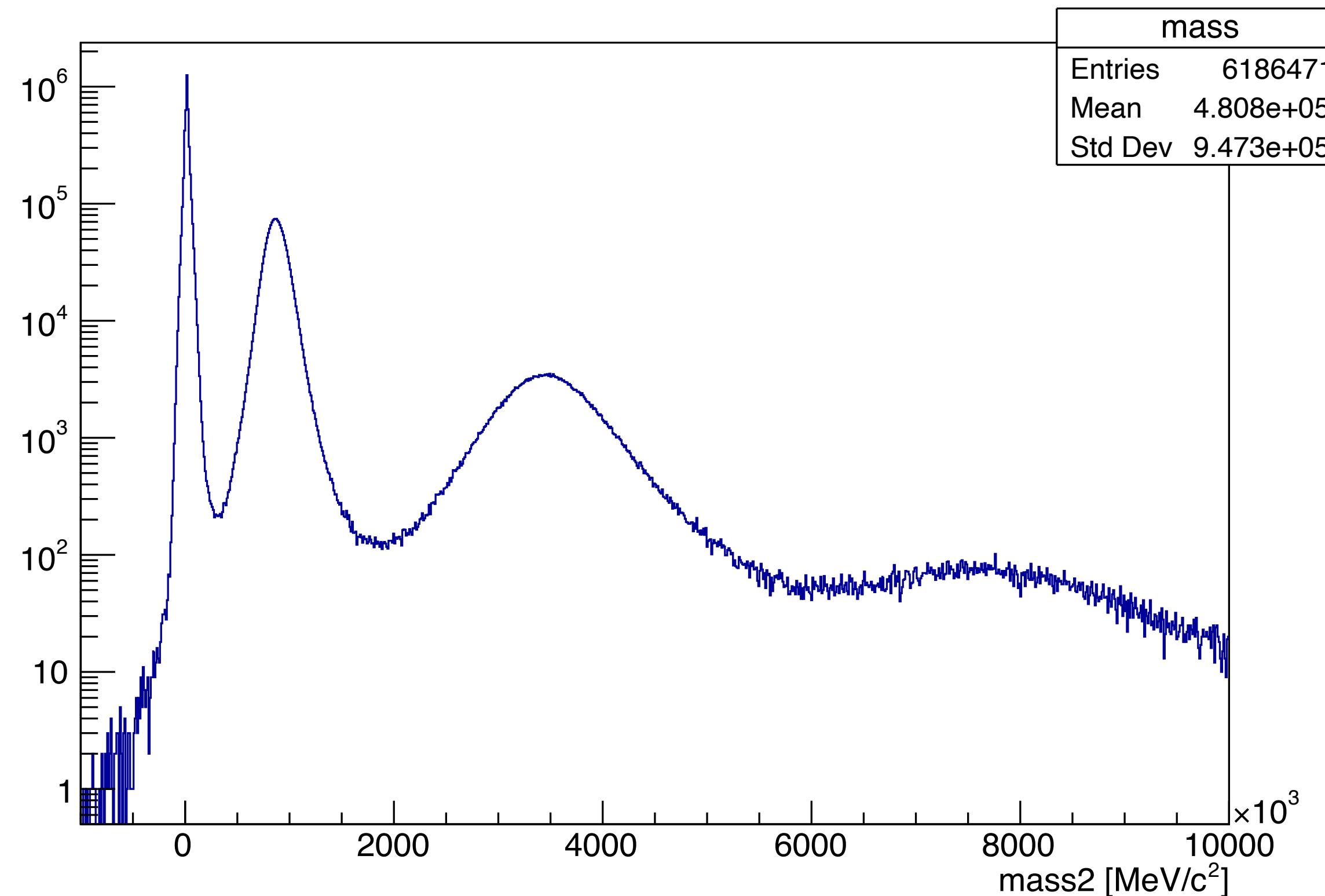


T - θ distributions: π^-

θ from 20° to 80°
 $\Delta\theta = 5^\circ$



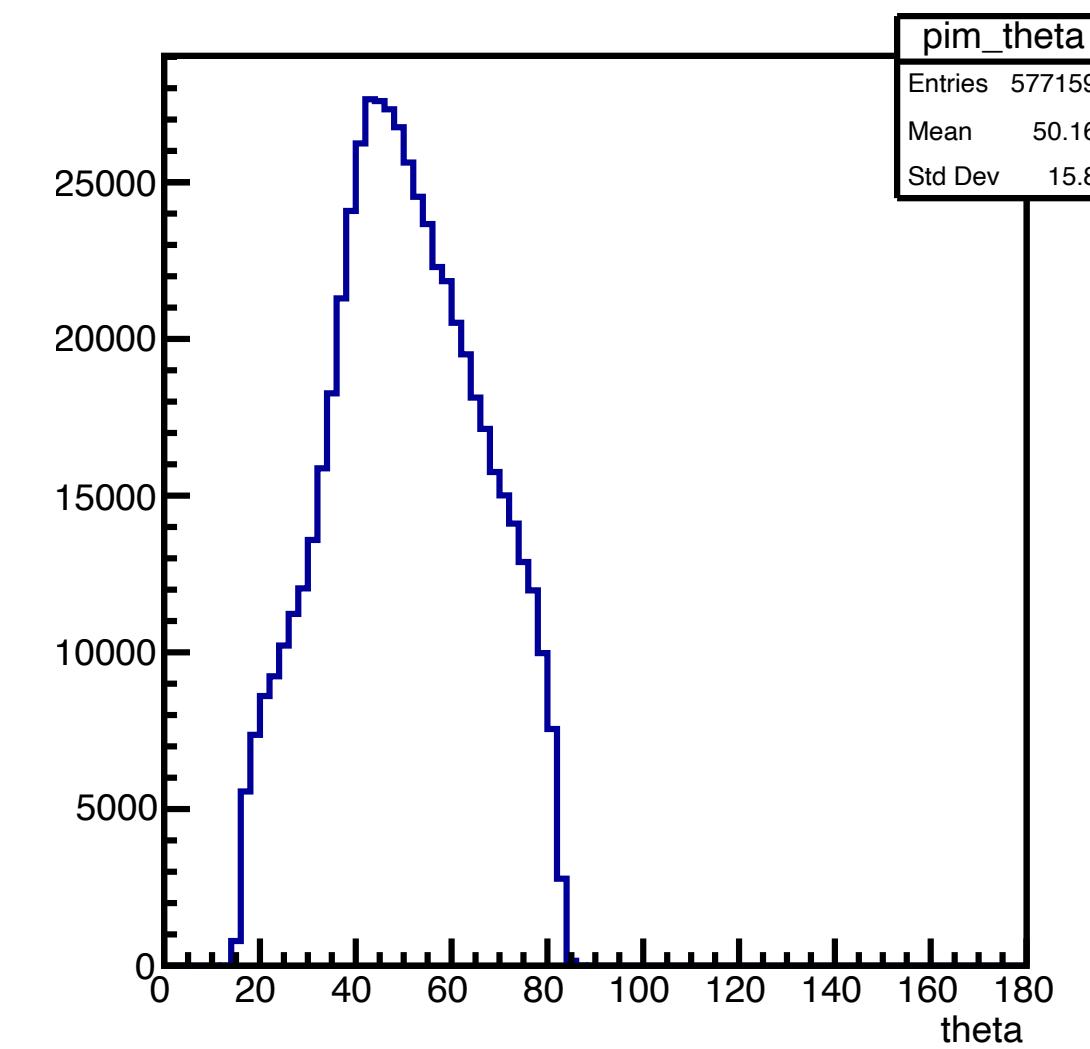
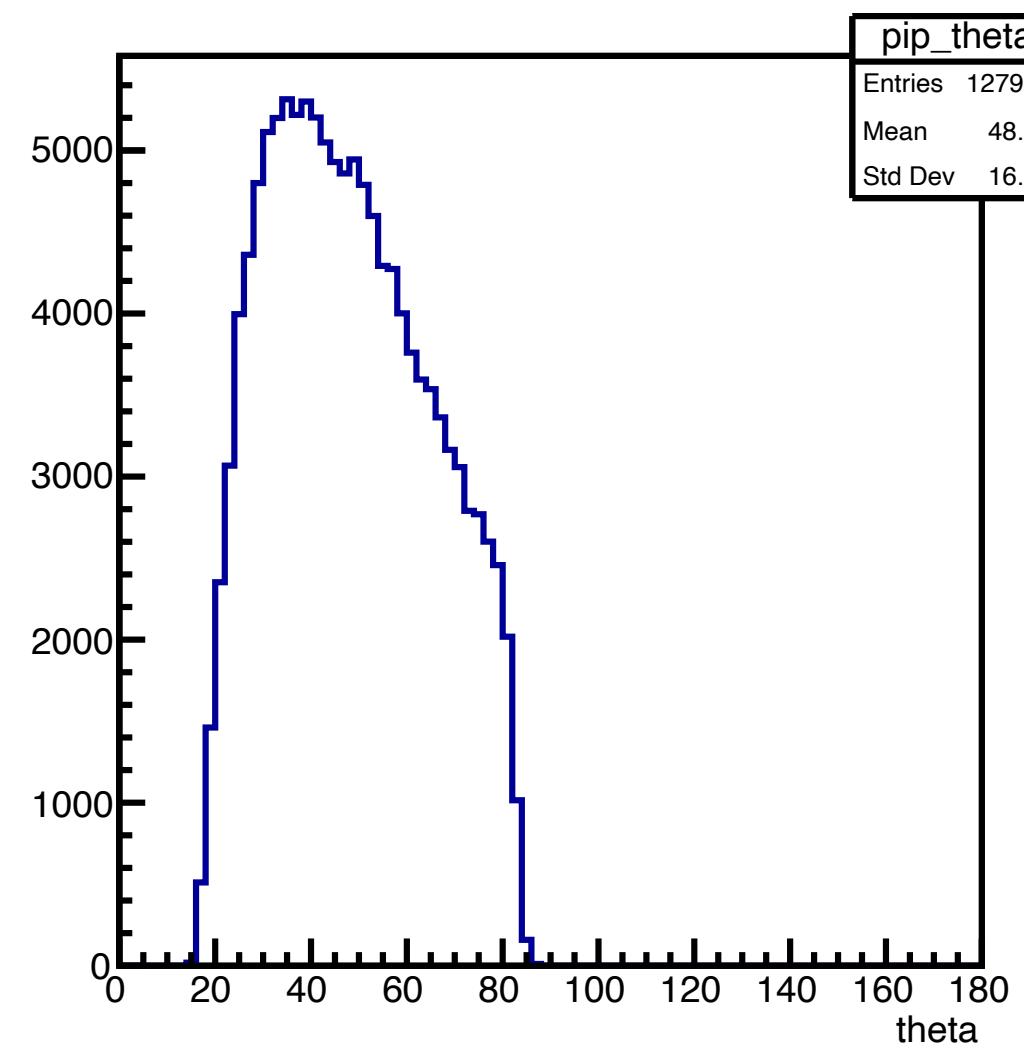
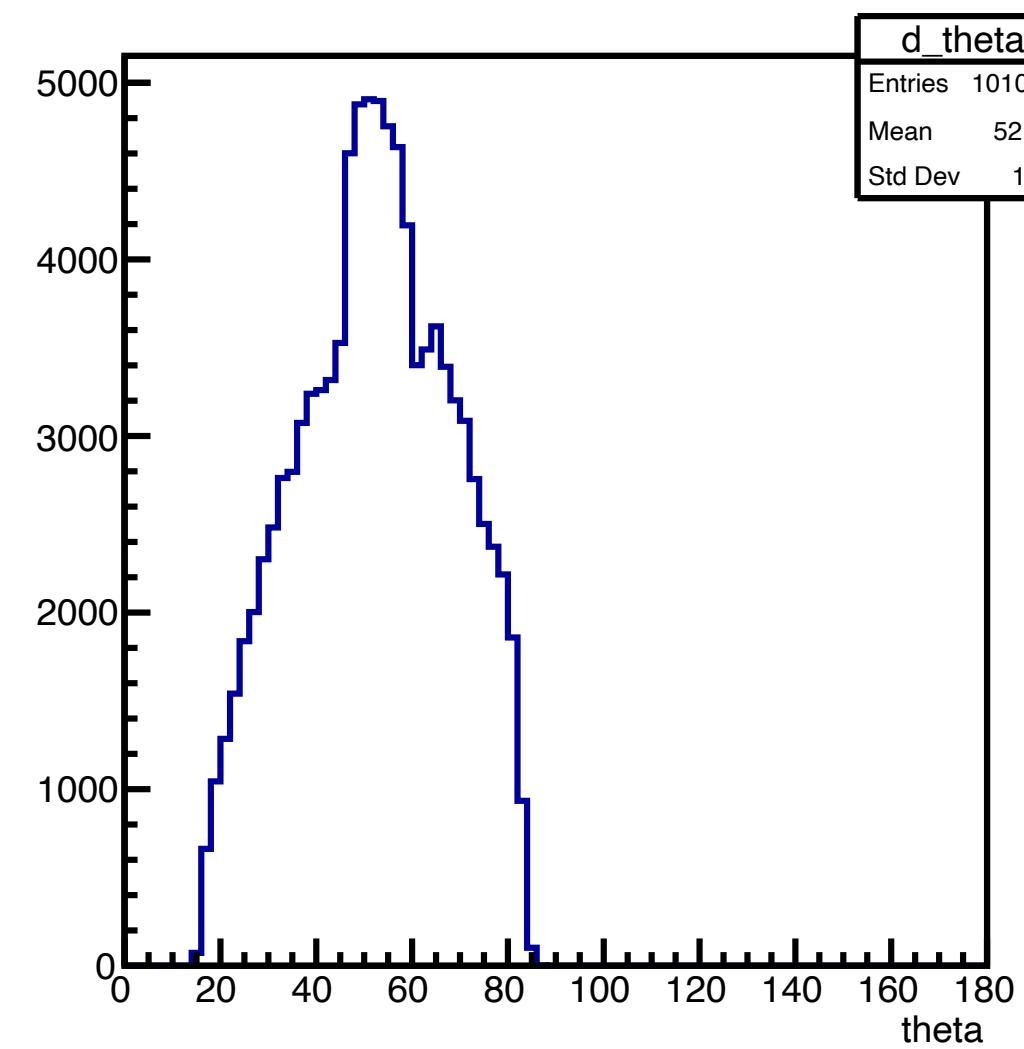
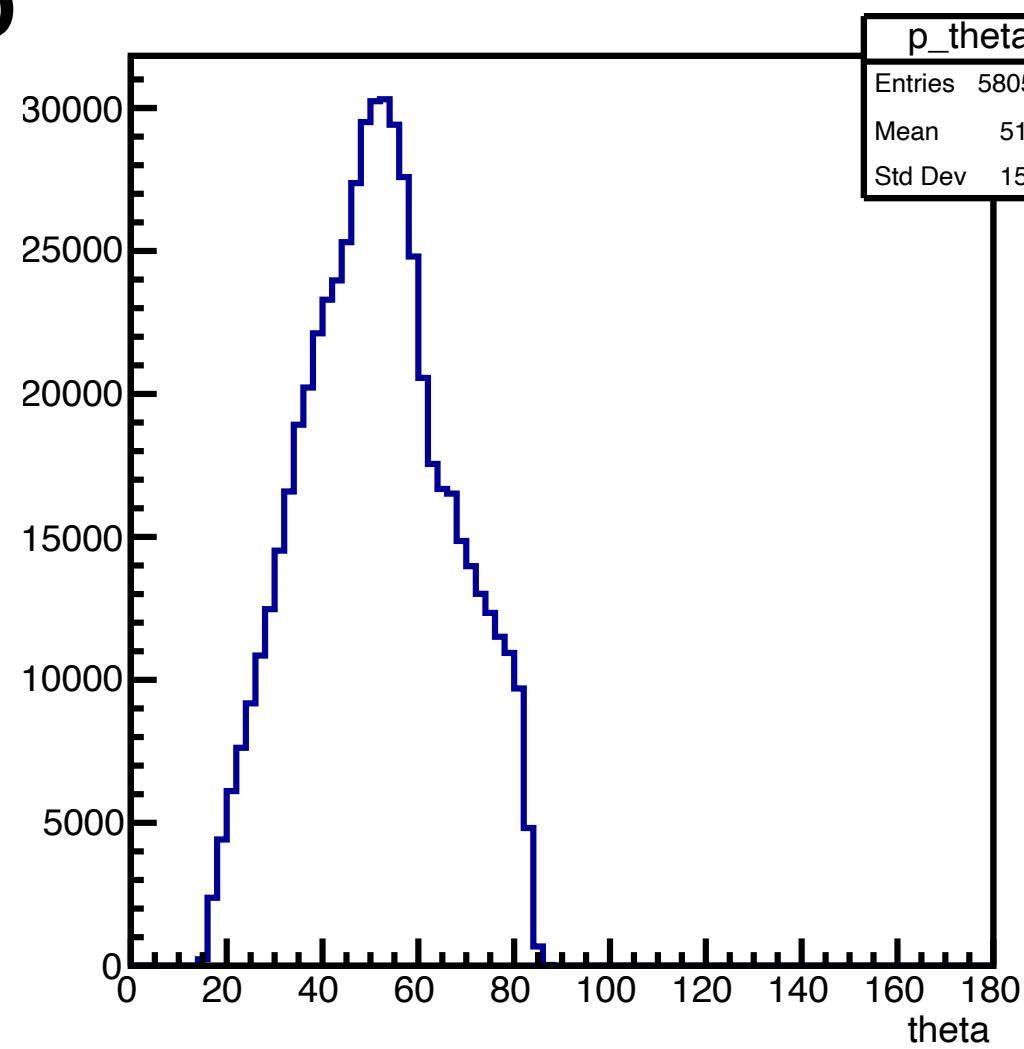
mass cuts



	π^+/π^-	p	d
mean	16 790	872 541	3 473 960
std dev	19 972	107 807	494 141
cut	π^+ : (-20 000 34 000) π^- : (-20 000, 60 000)	(200 000, 1 900 000)	(1 900 000, 6 100 000)

mass cuts vs GeantPID comparison

PID

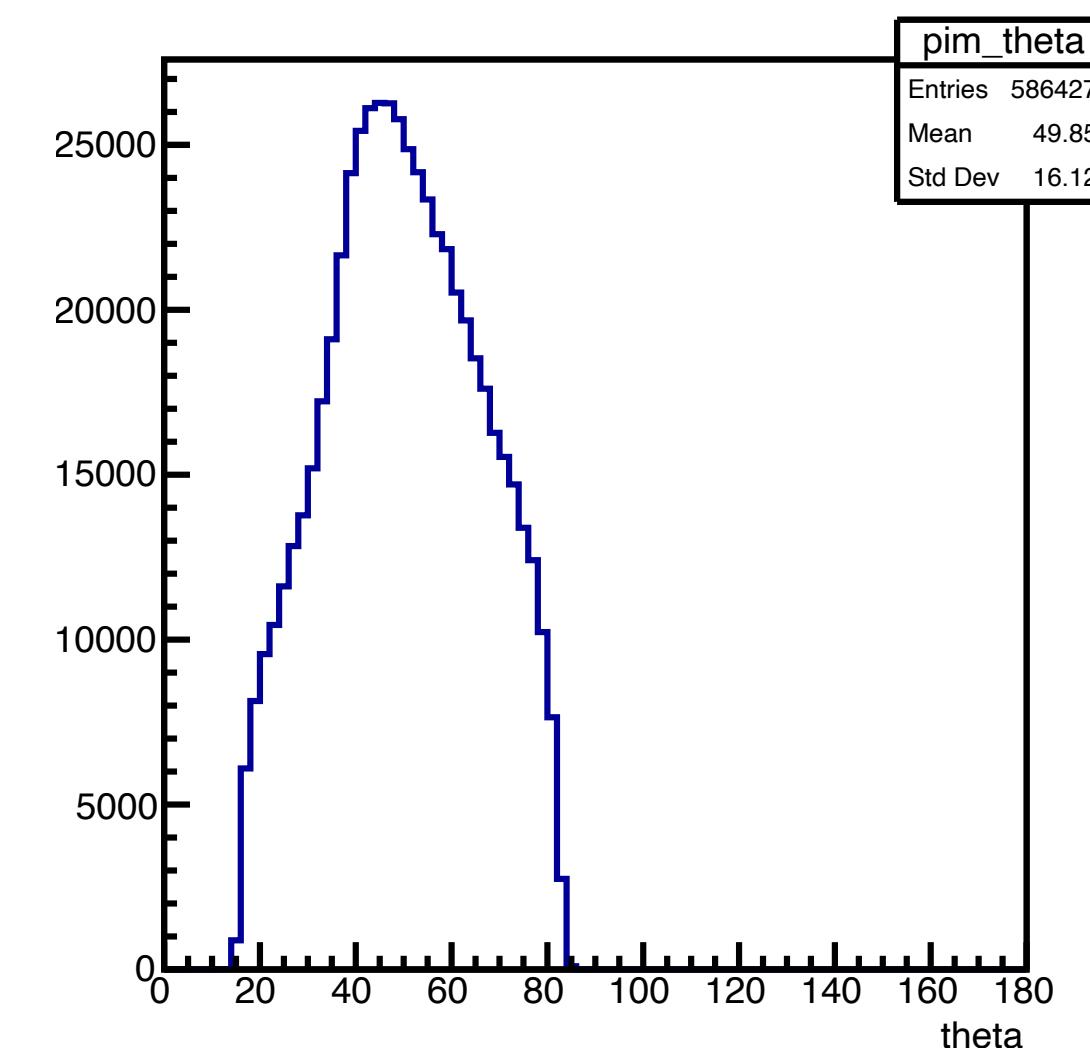
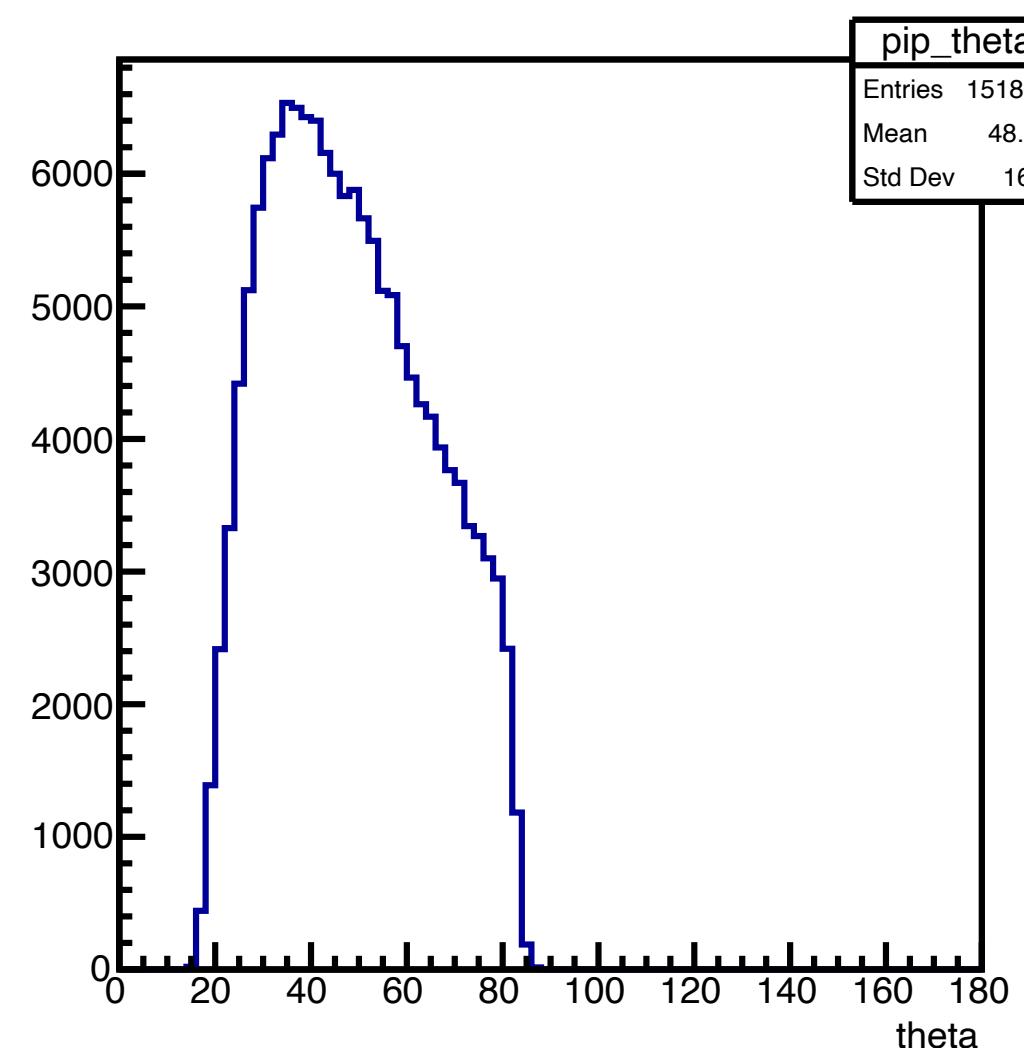
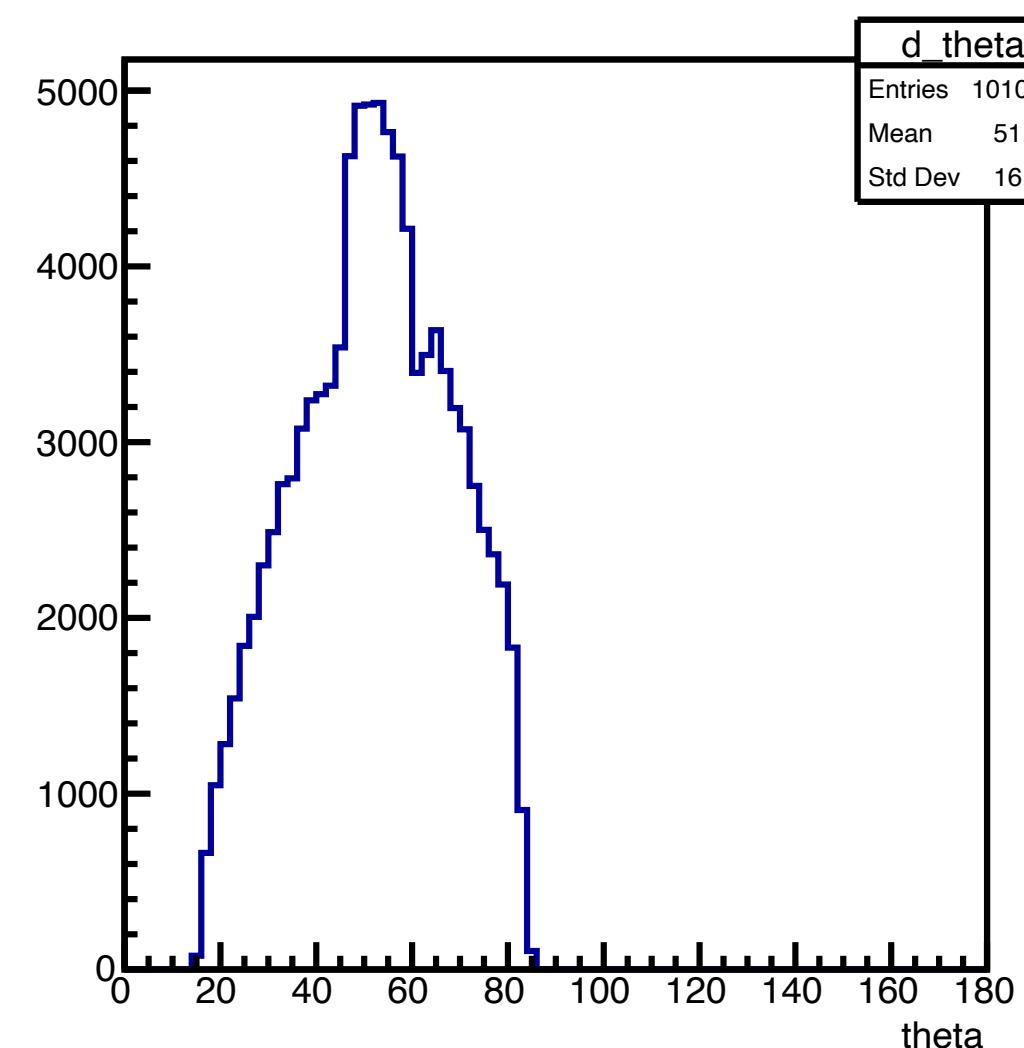
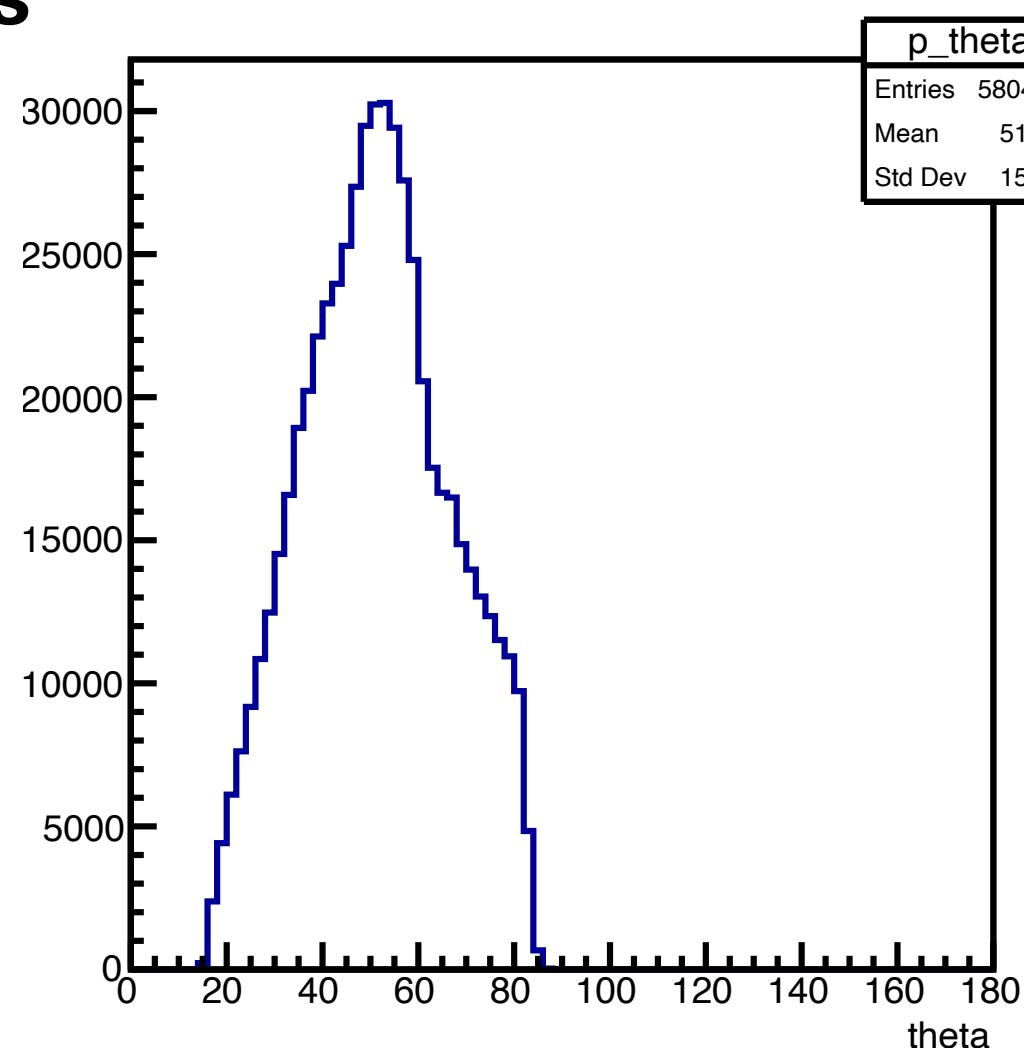


< 1%

19% extra

2% extra

cuts

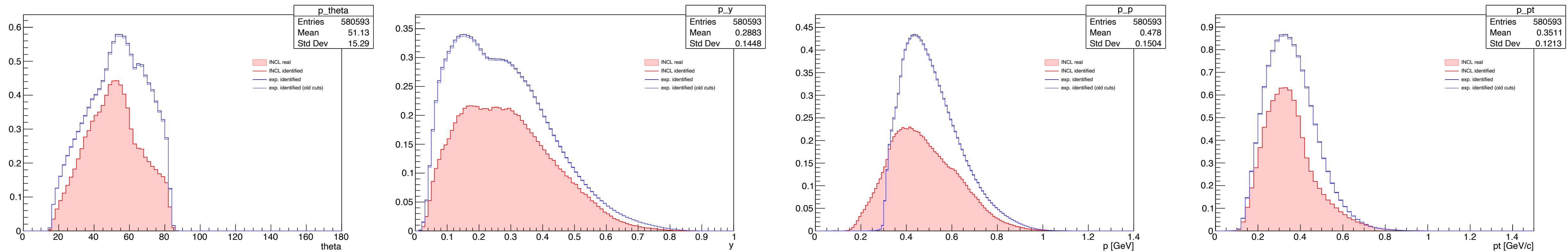


experimental data vs INCL

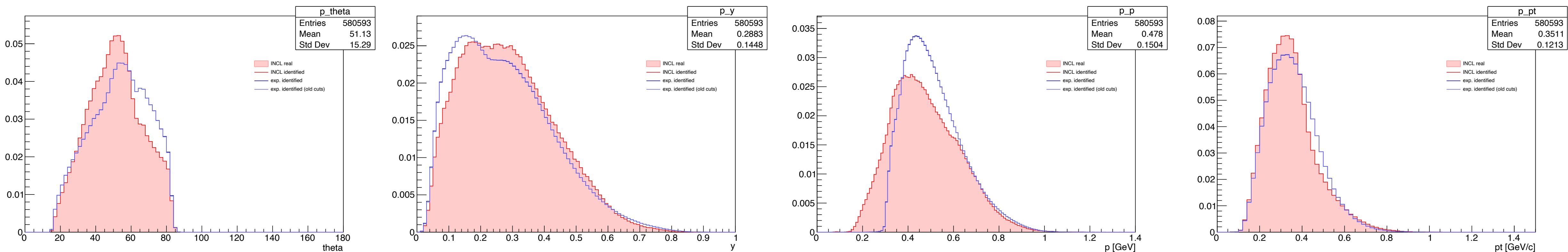
- experimental data compared to INCL simulation in acceptance
- both are normalized in two ways:
 - A
 - INCL: `->Scale(1.462*10-5) total cross-section [mb] / # of simulated events`
 $(1462.32\text{mb} / 100\ 000\ 000)$
 - data: `->Scale(10.165*10-7) derived from elastic π -p scattering`
 - B
 - `->Scale(1/Integral())`

experimental data vs INCL: p

A

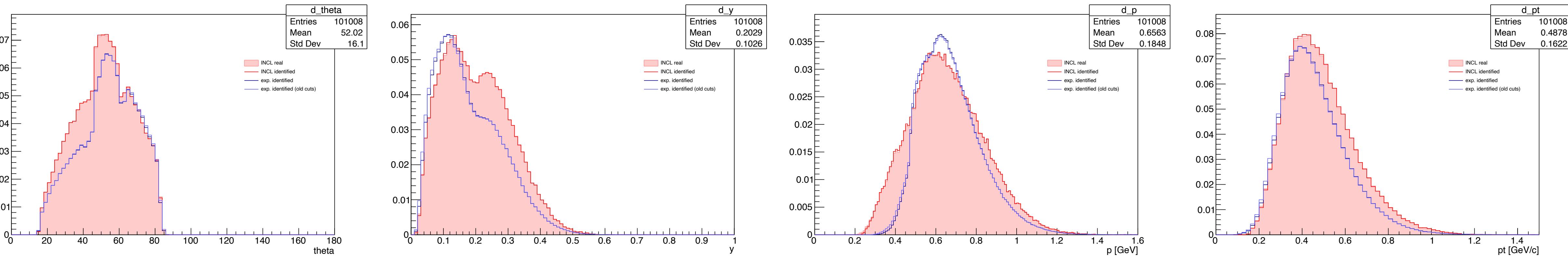


B

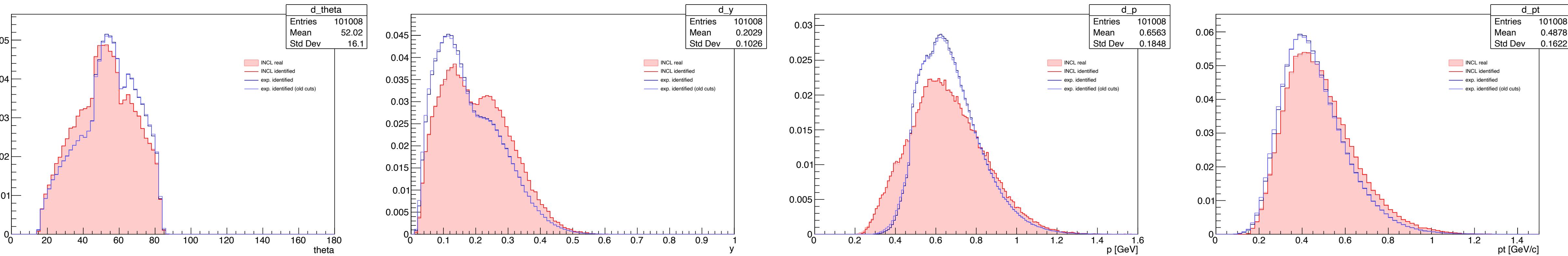


experimental data vs INCL: d

A

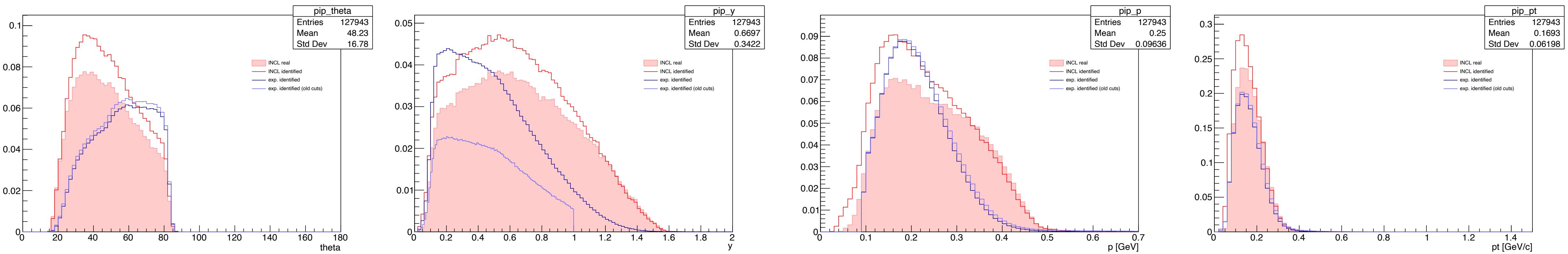


B

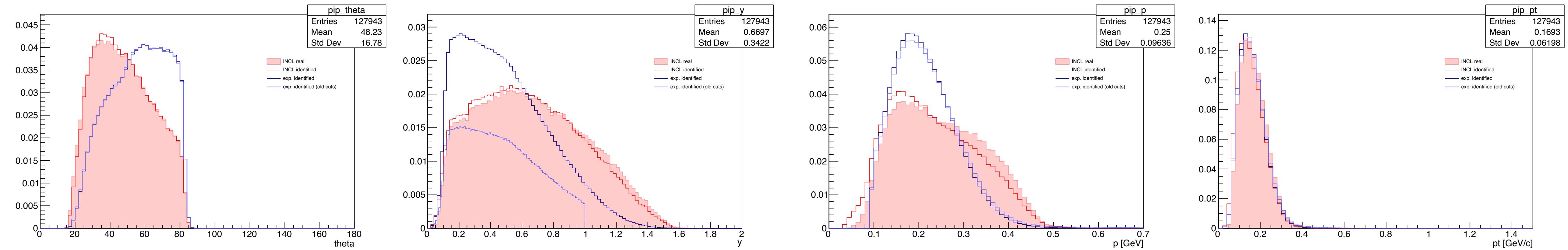


experimental data vs INCL: π^+

A

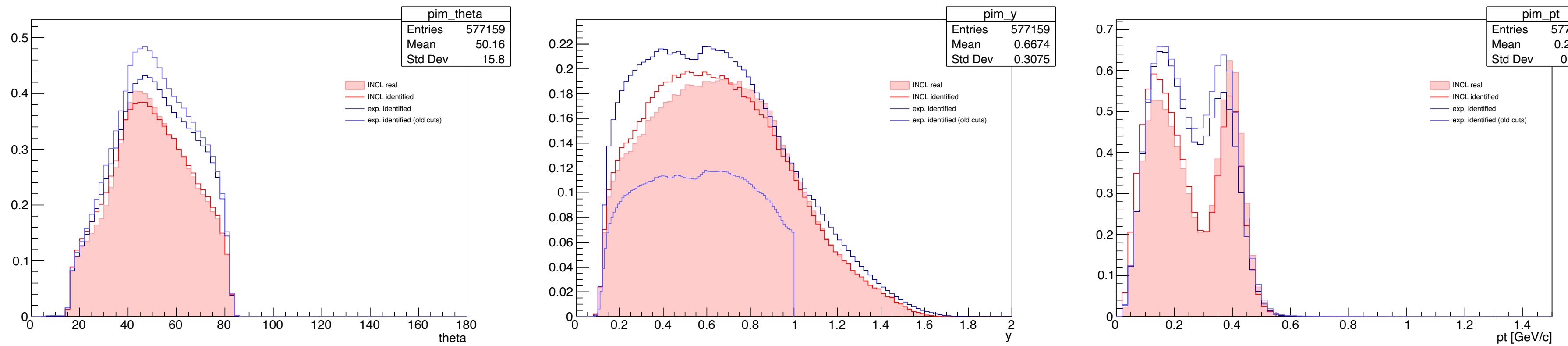


B

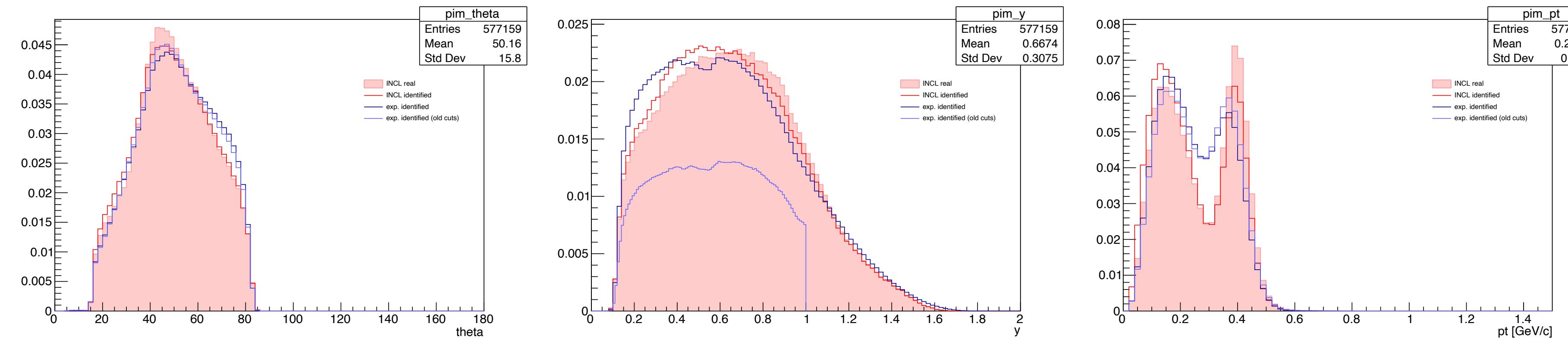


experimental data vs INCL: π^-

A



B



- code: [https://github.com/pauczy/pimC analysis](https://github.com/pauczy/pimC_analysis)
- complete report: <https://www.overleaf.com/read/gytzcjxvjchj>