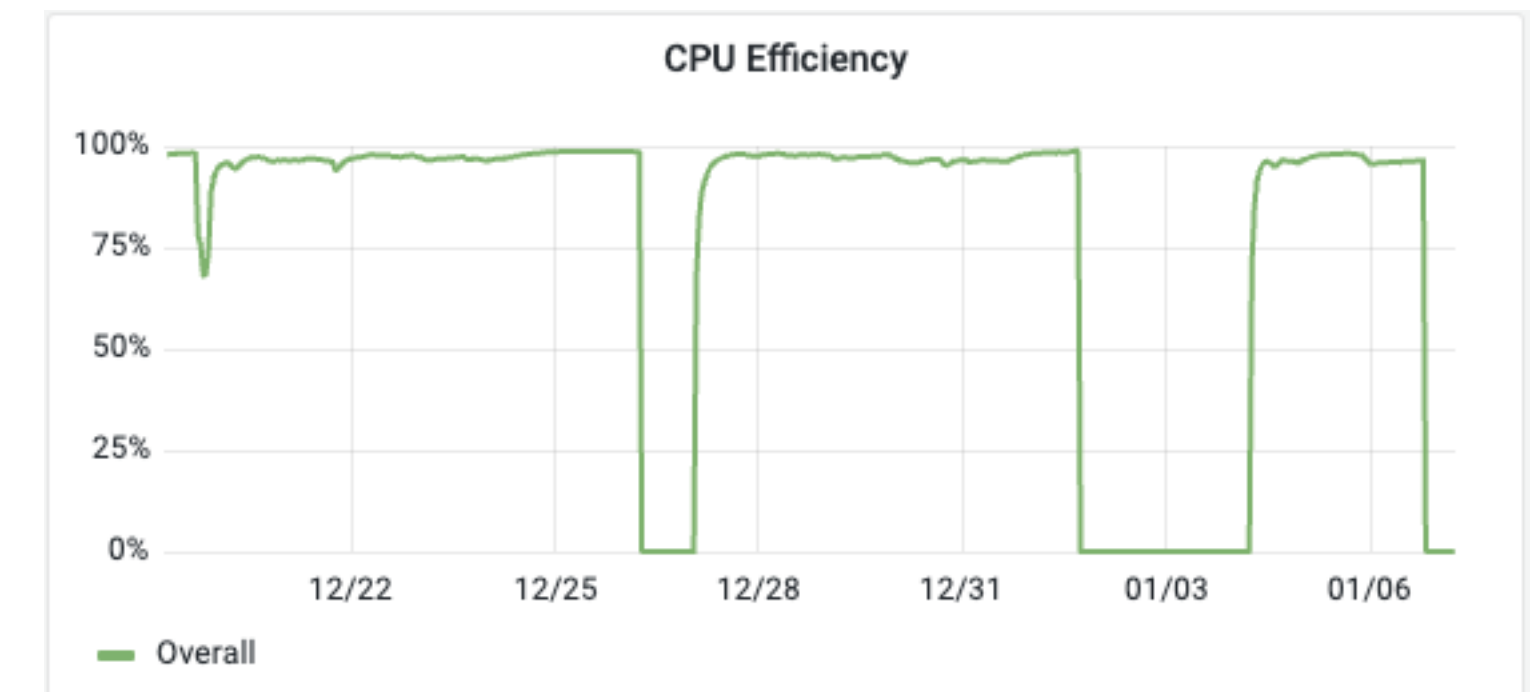
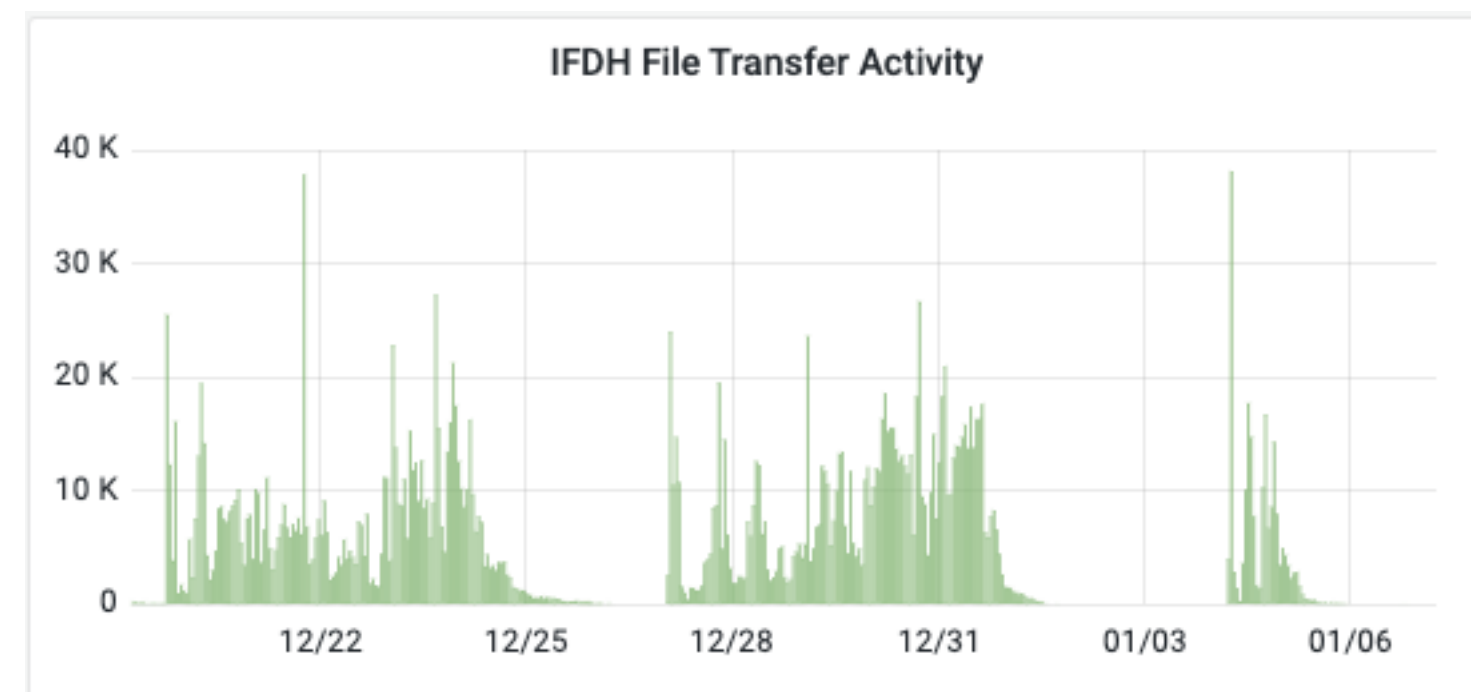
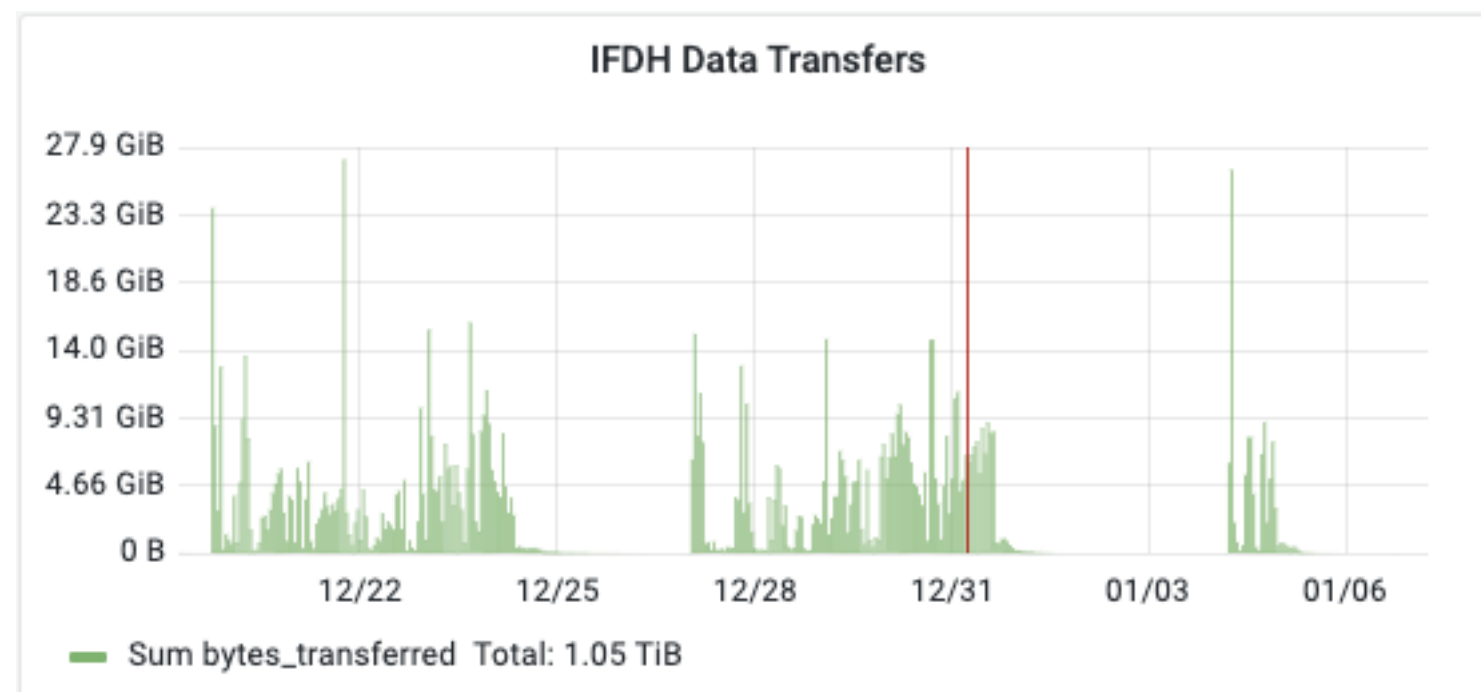
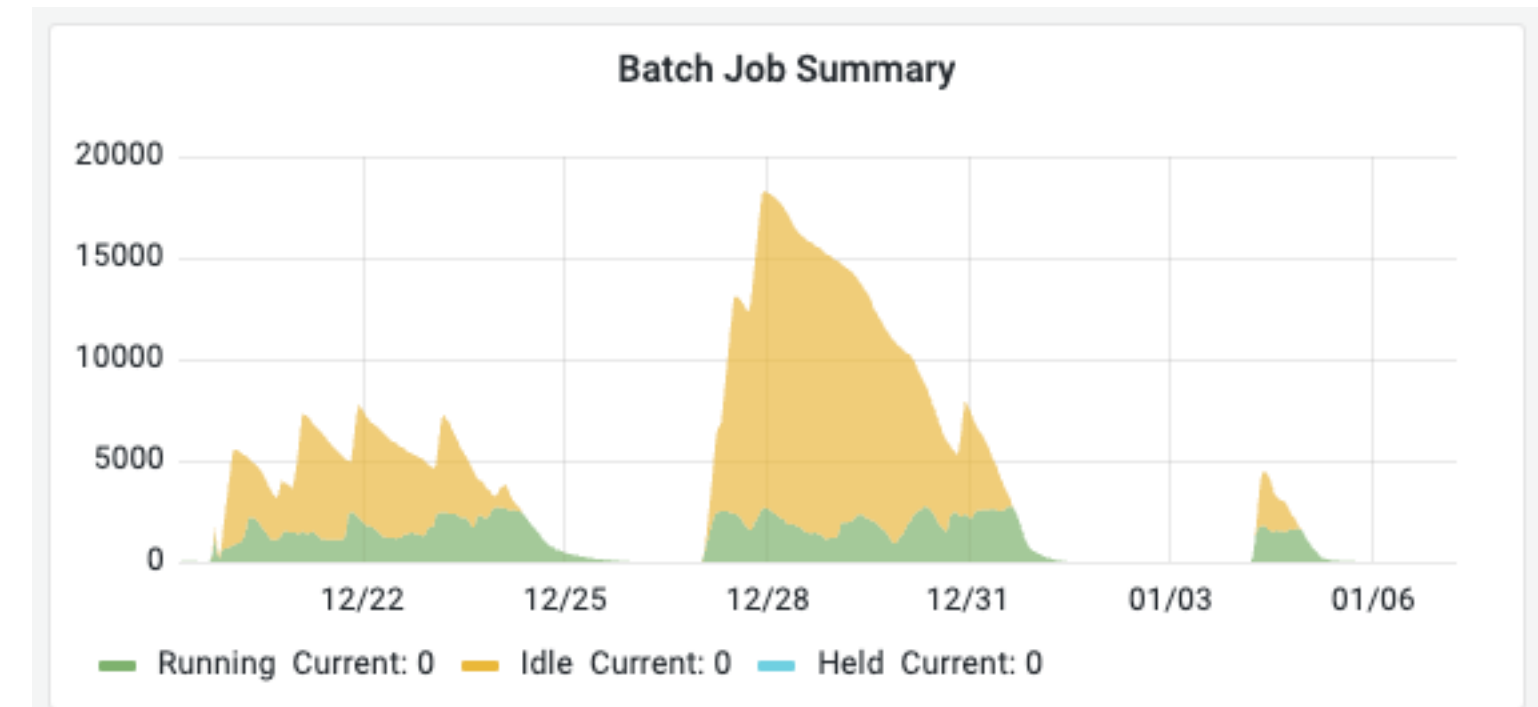
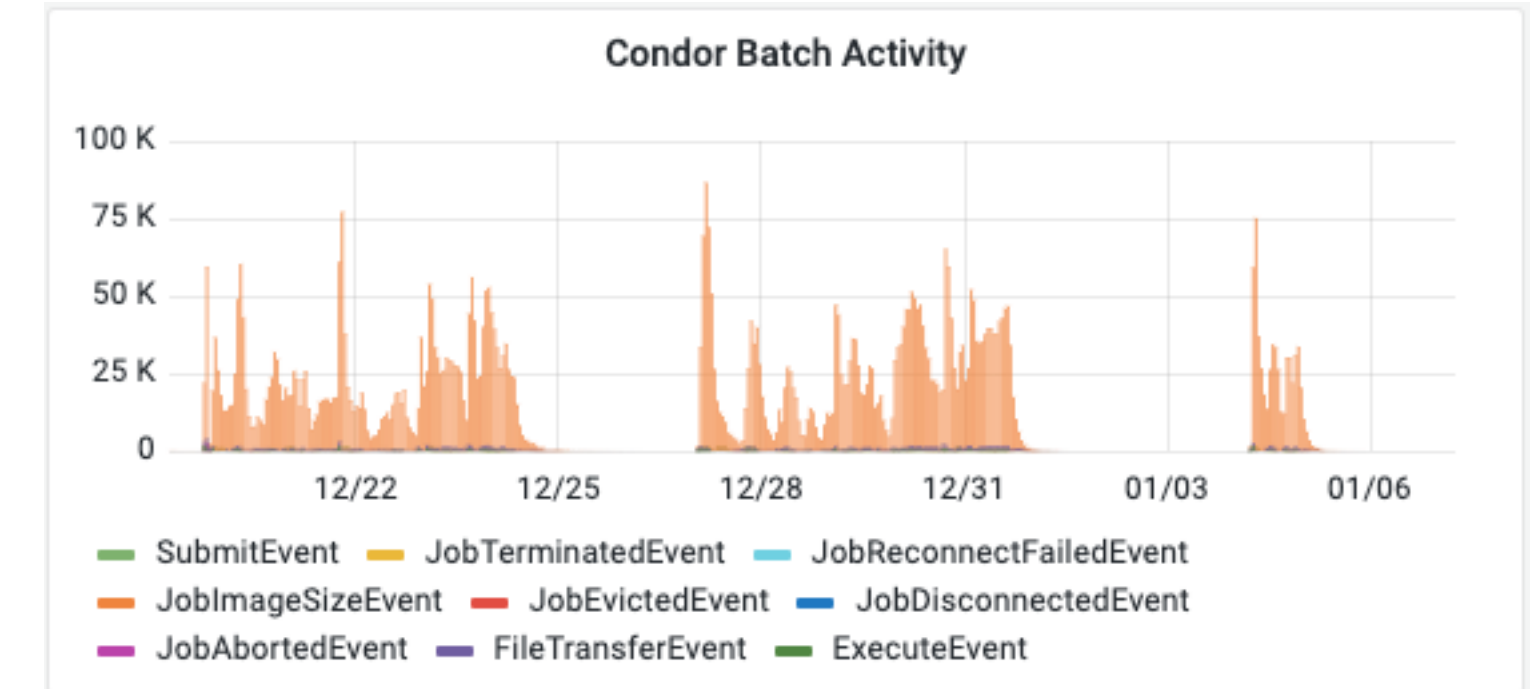
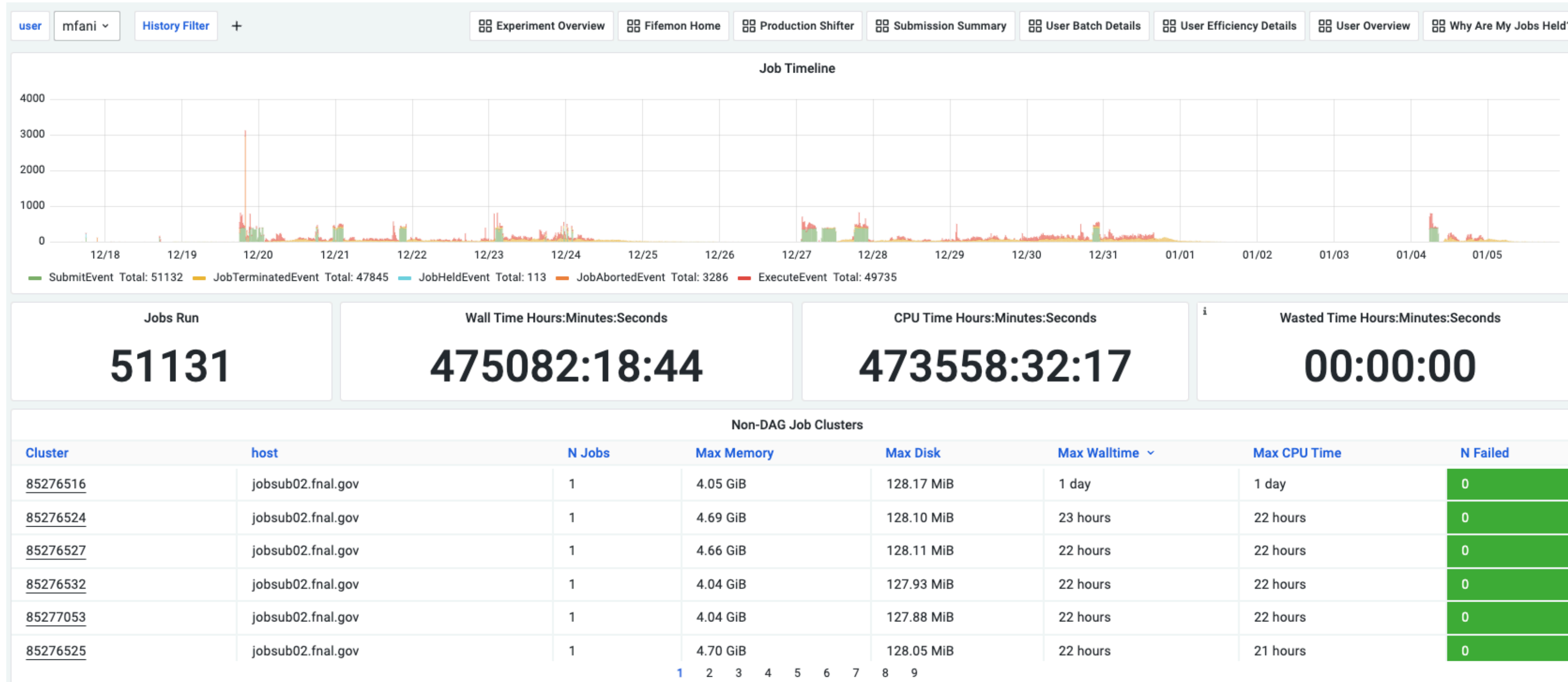


# **Theia 25kt Ratpac production**

- $4 \times 10^6$  events:  $\nu_e, \bar{\nu}_e, \nu_\mu, \bar{\nu}_\mu$ 
  - Total number of events: 3996000
- $4 \times 10000$  submitted jobs, 100 interacting  $\nu$  each
- Input files (G. Yang):
  - Flavored neutrino interaction through genie v2\_12\_10c
  - Physics list: DefaultPlusValenciaMEC
  - Neutrino flux spectra from the GEANT4 model QGSP\_BERT with DUNEed label OptimizedEngineeredNov2017
- Geometry: Theia 25 kt (box)
  - 46728 PMTs, model r7081
  - Target material: wbls\_5pct
  - Fiducial volume
  - Outside world: rock
- Online analysis was conducted to validate results in parallel

Max Memory: 3.94 - 4.72 GiB  
 Max Disk: 127.37 - 130.66 MiB



Average CPU Efficiency

99.2%

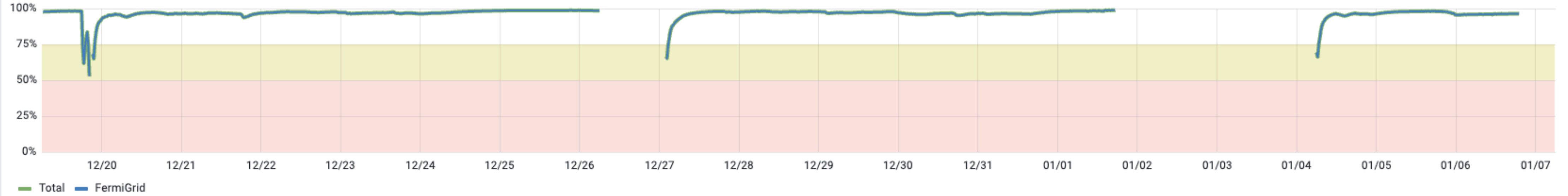
Average Memory Efficiency

16.9%

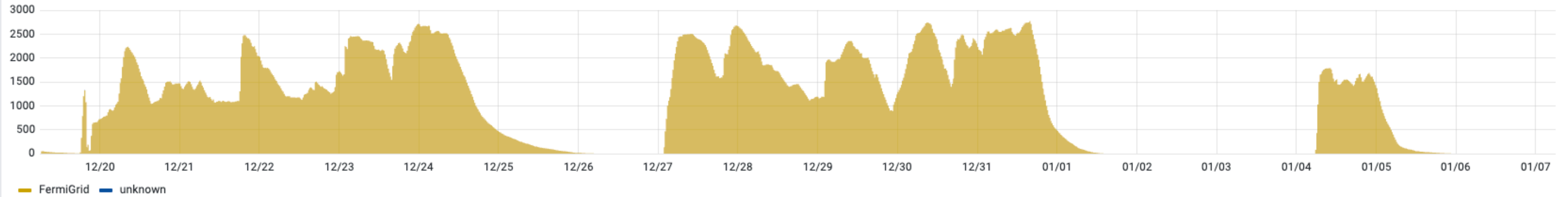
Total Time Wasted by Failed Jobs

0 hour

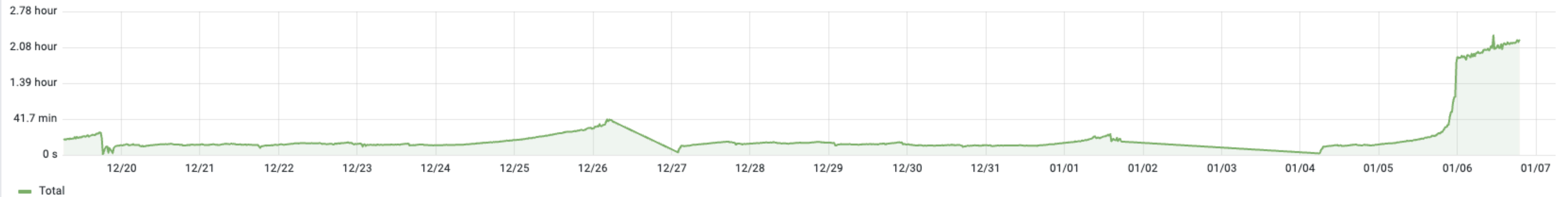
Site & Overall Efficiency



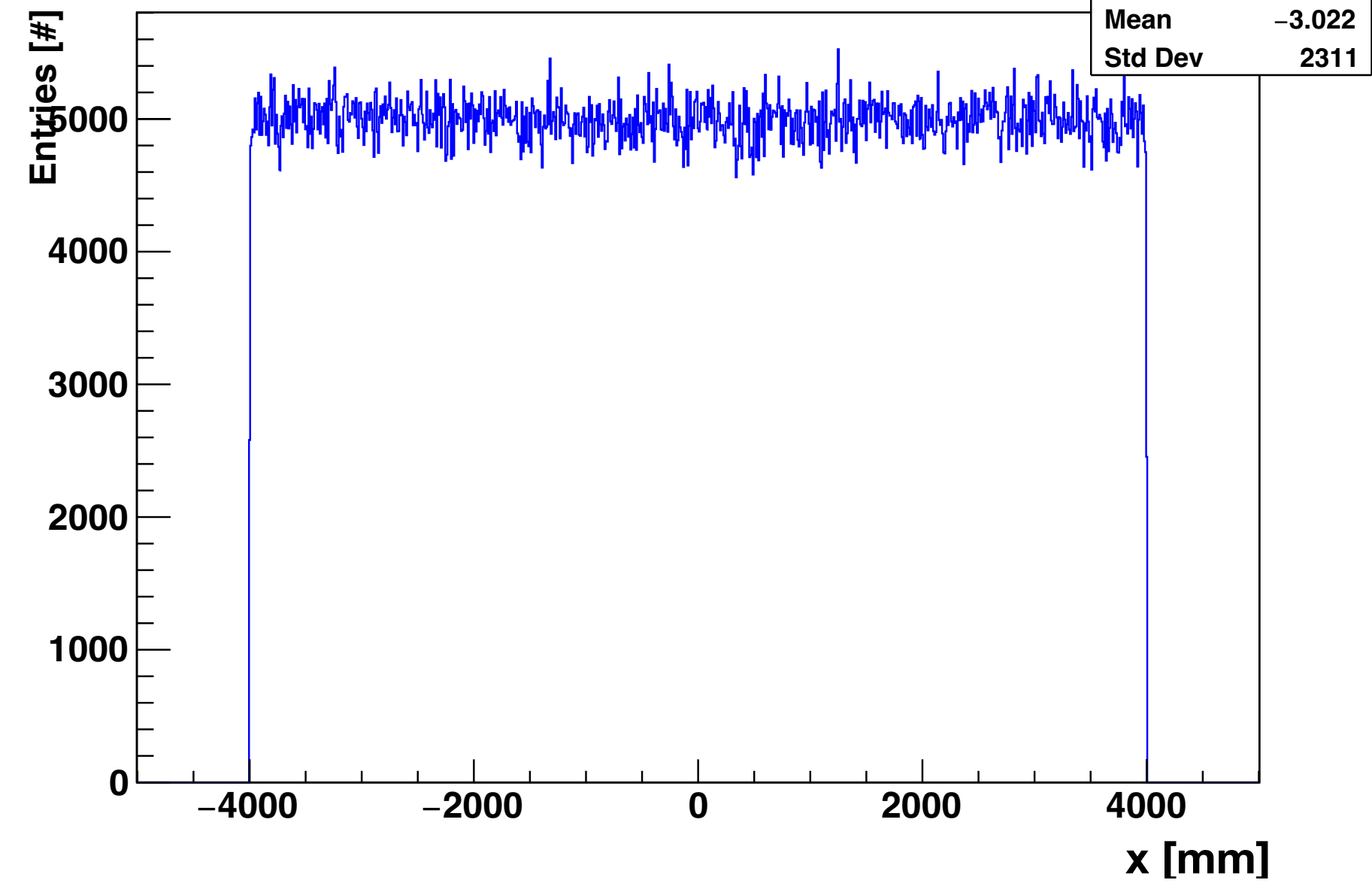
Jobs Running



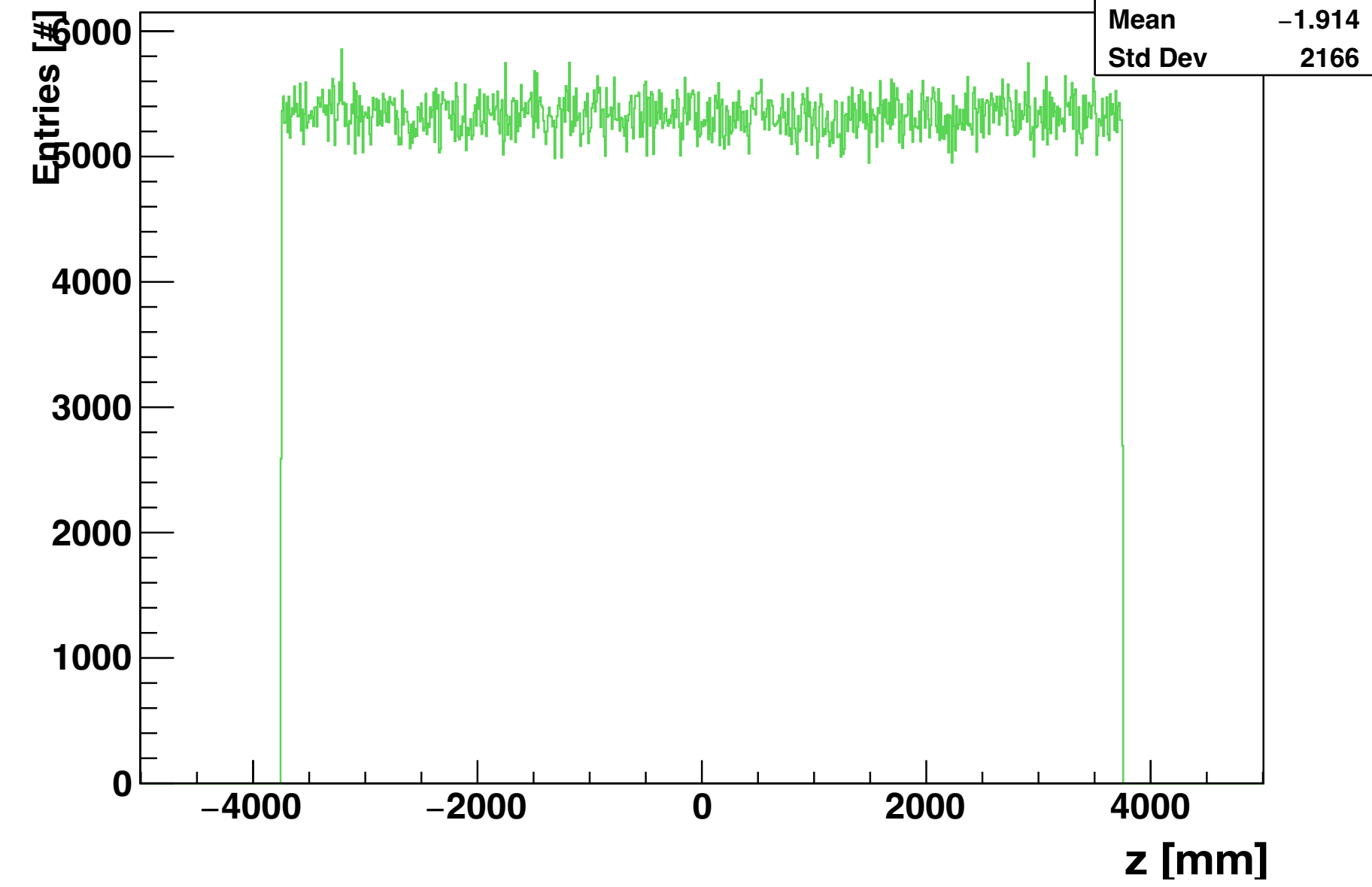
Average Wasted Time (Walltime - Cputime) per Running Job



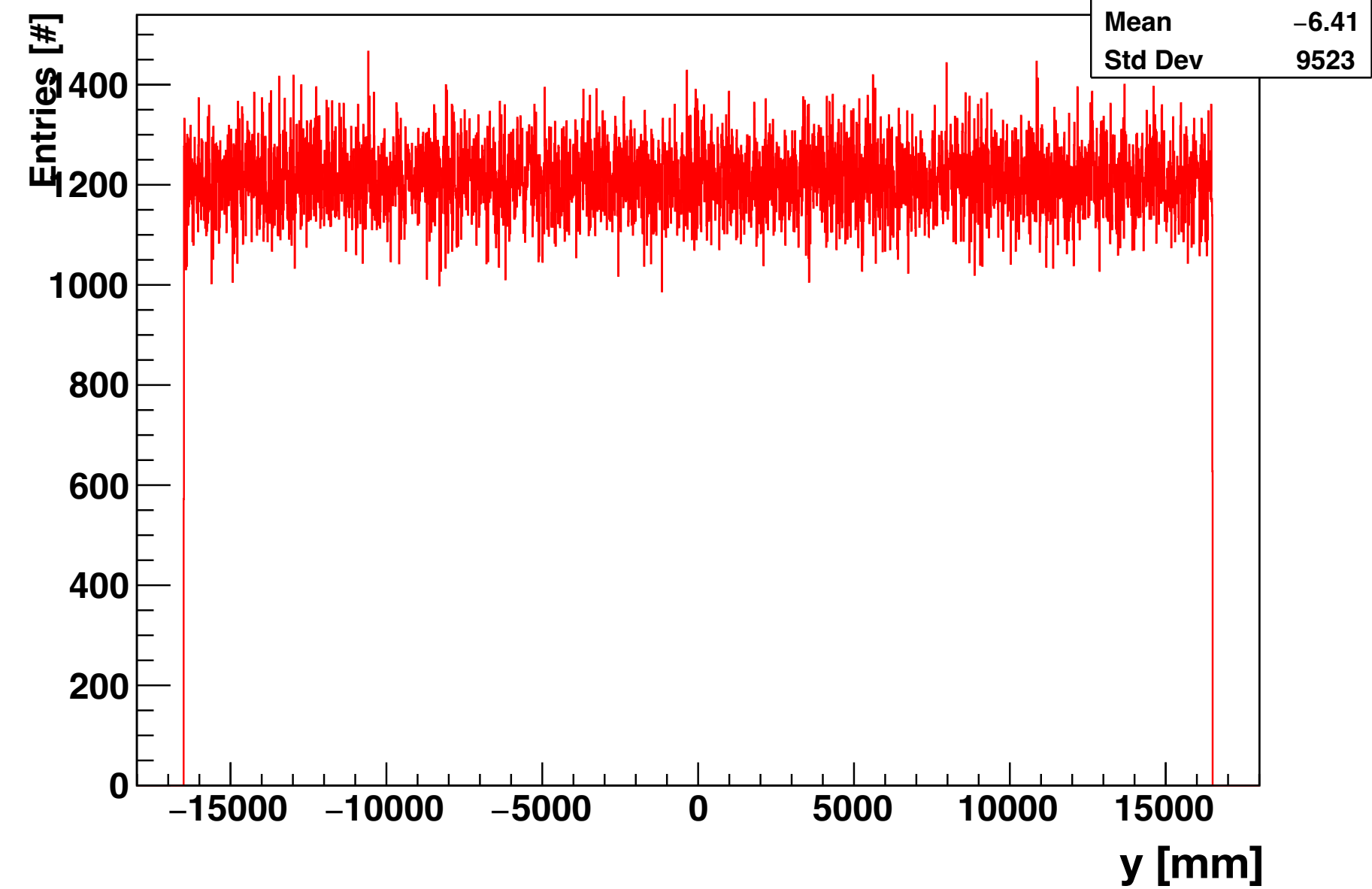
Generation point X (mcx)



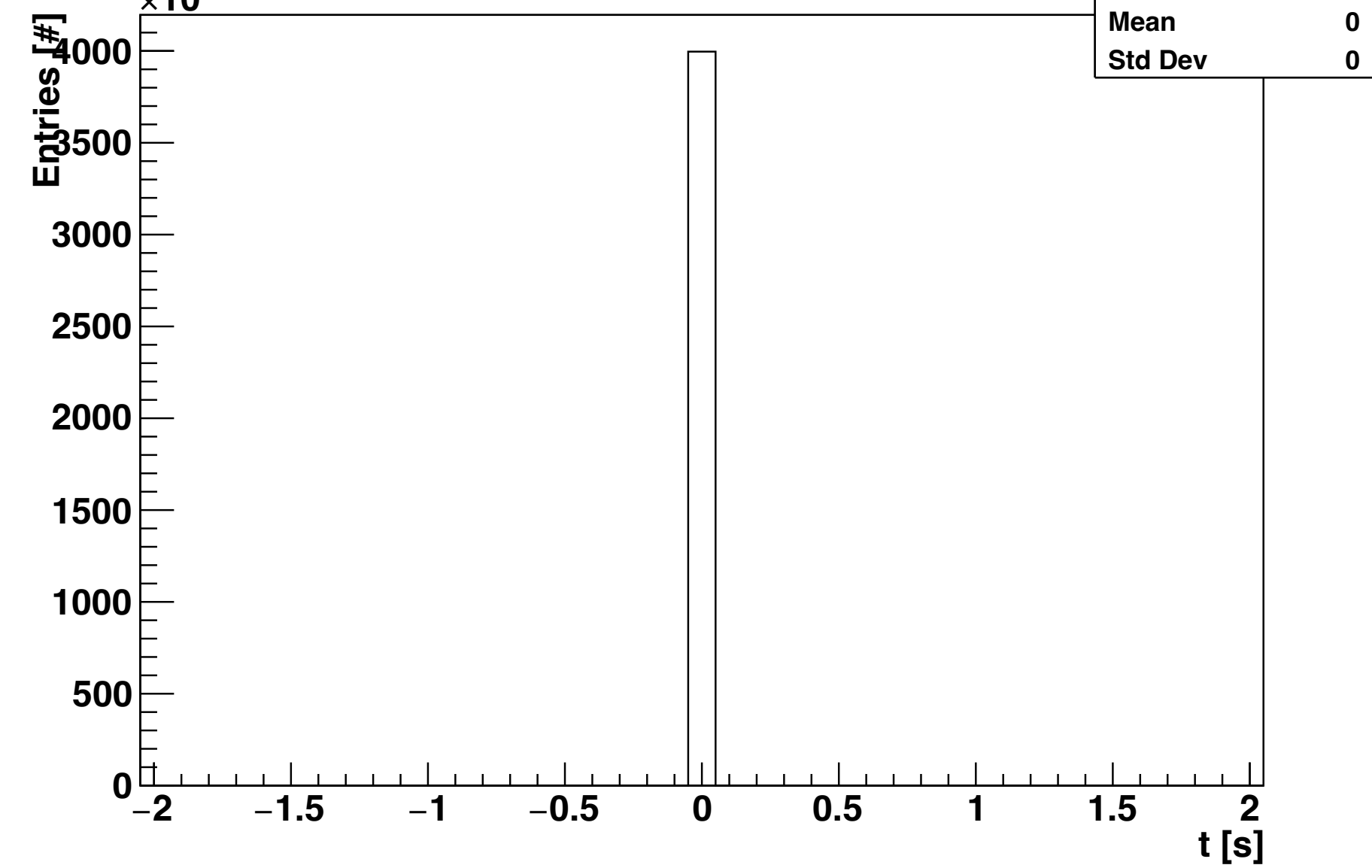
Generation point Z (mcz)

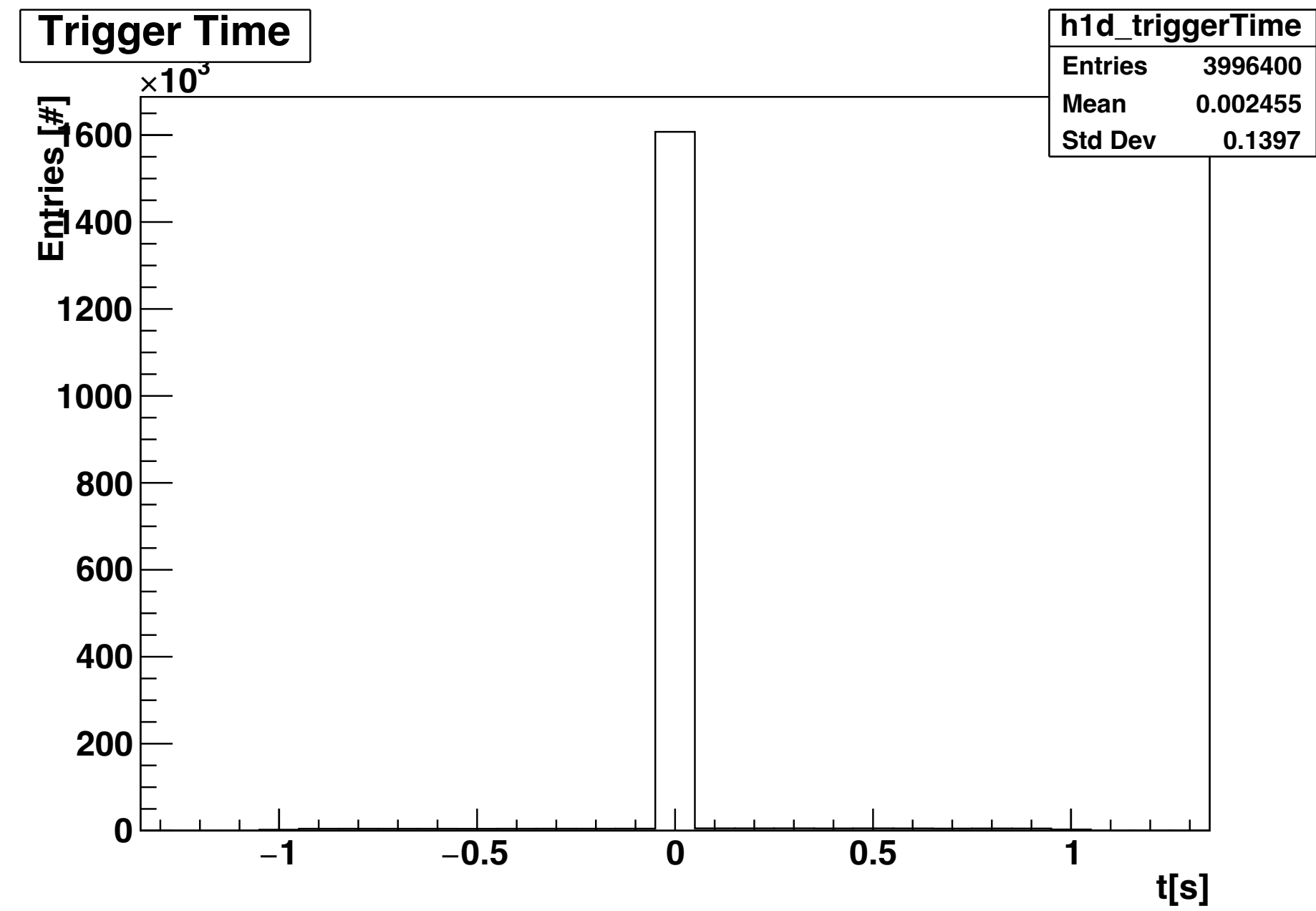
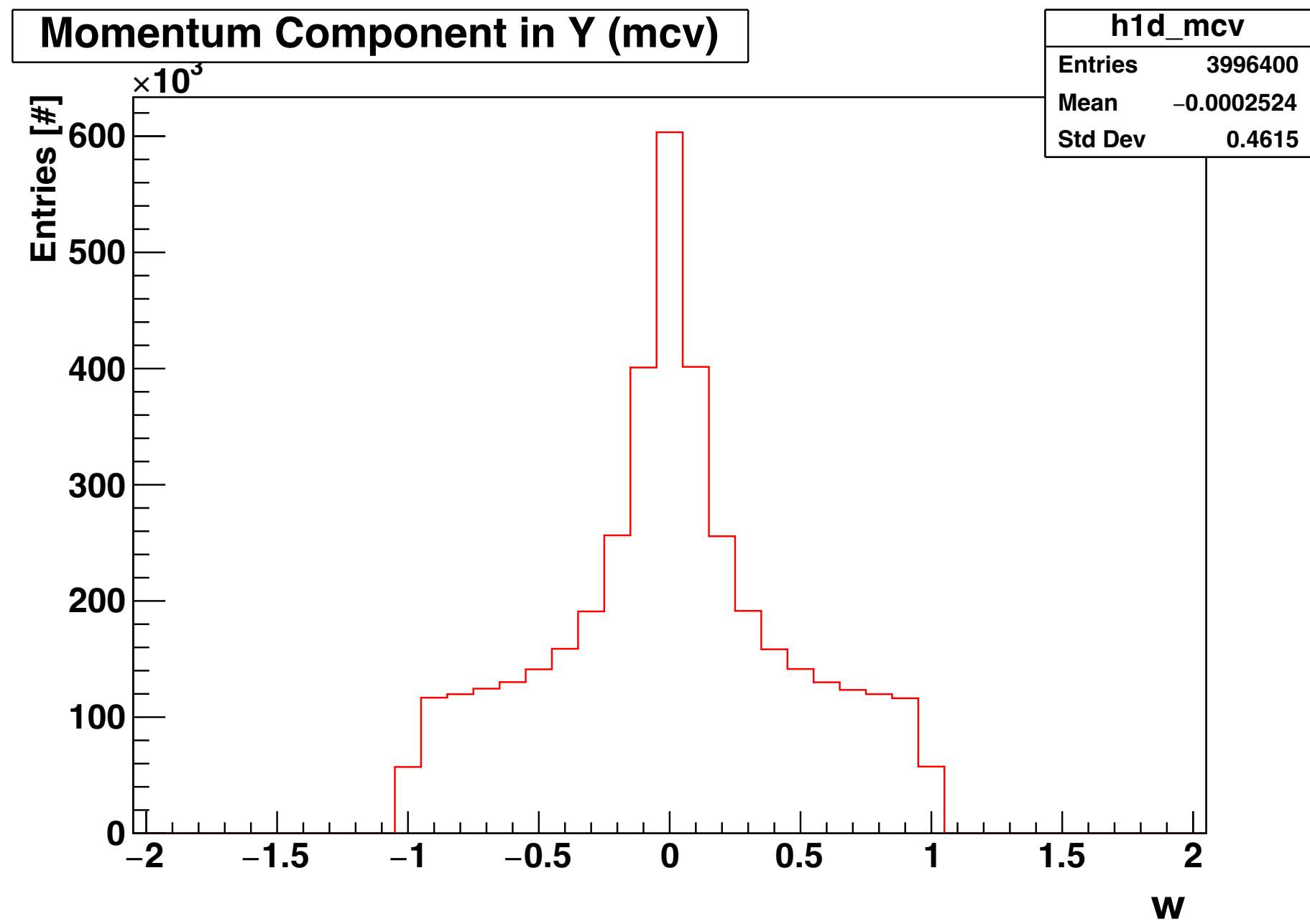
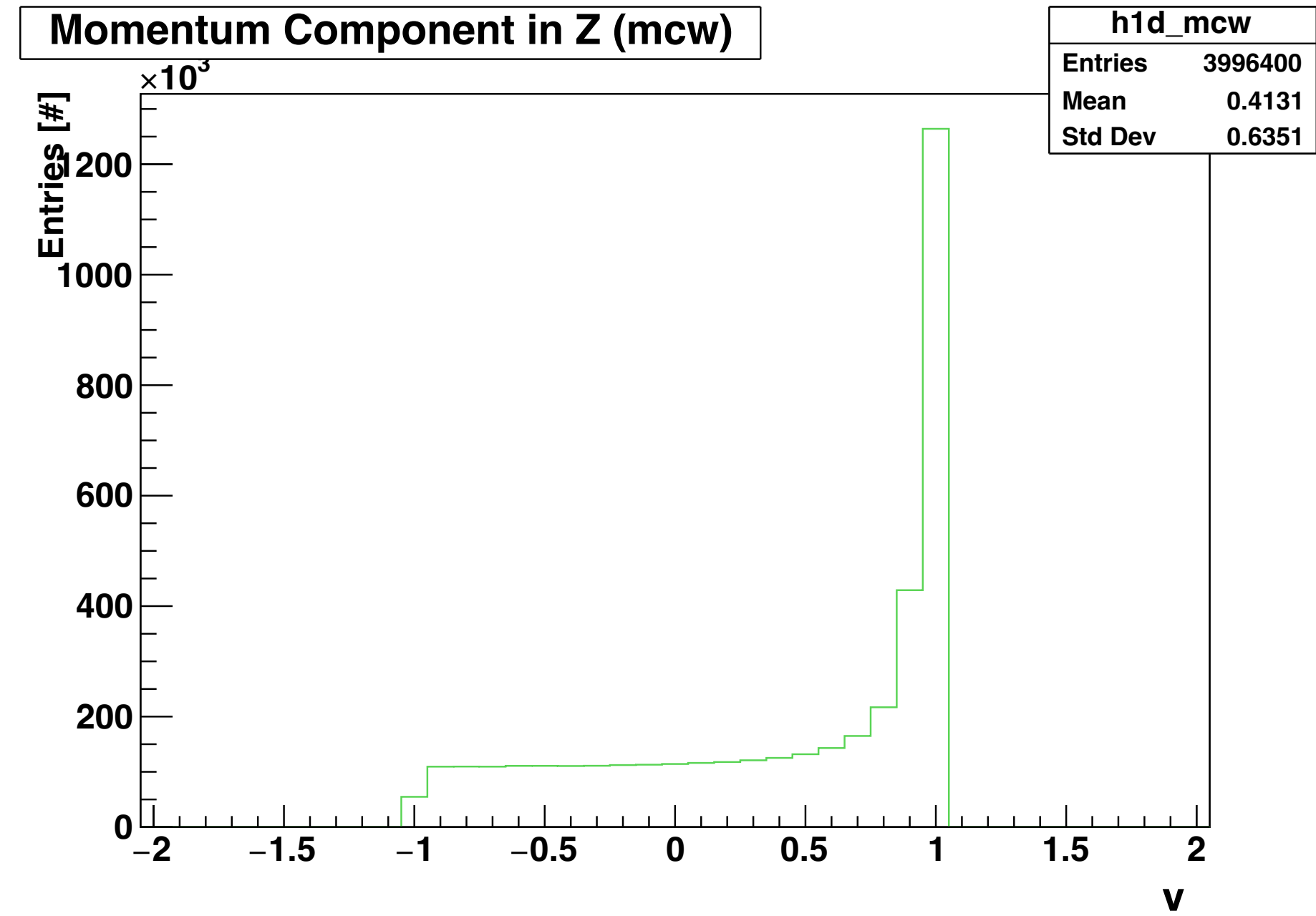
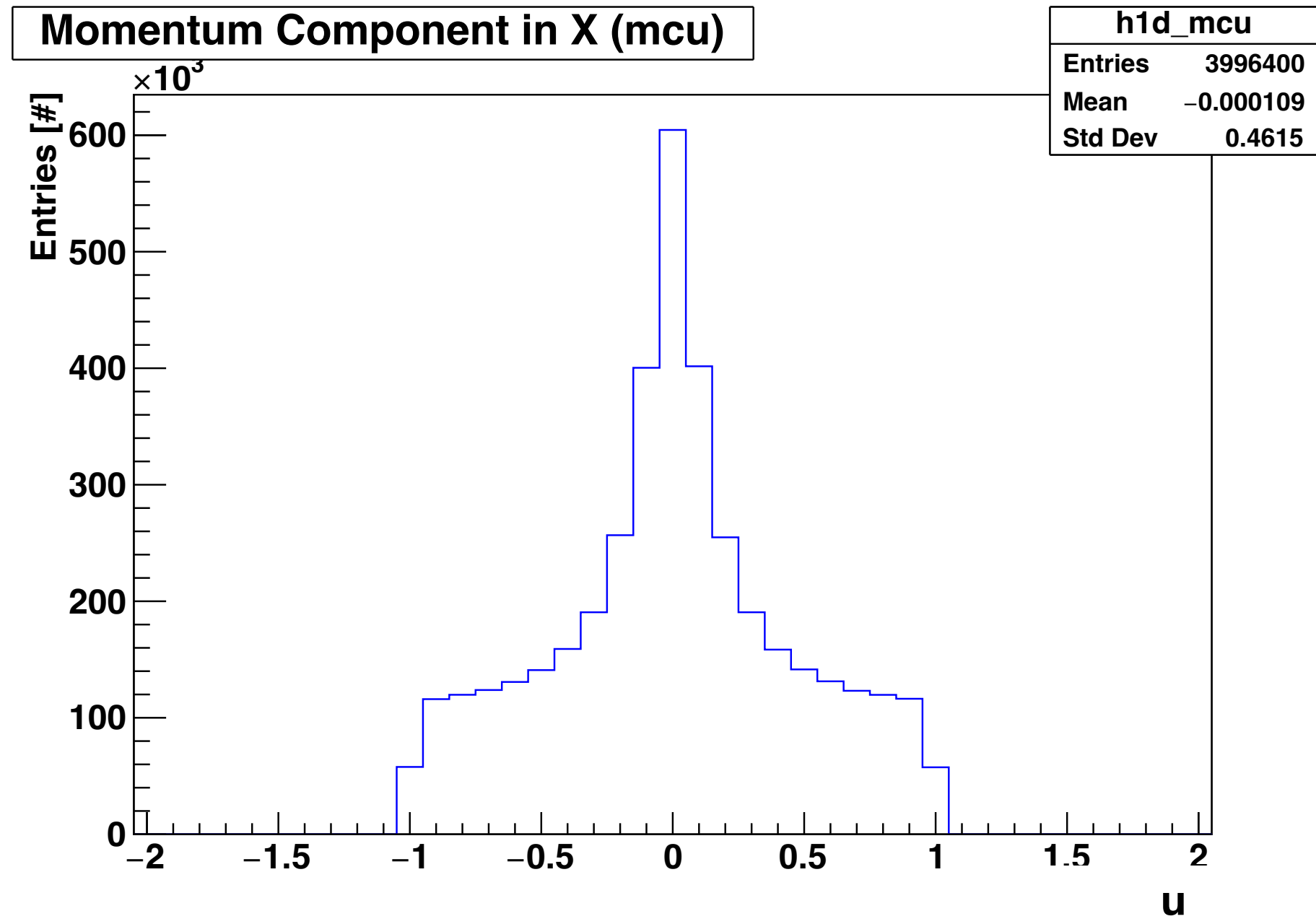


Generation point Y (mcy)

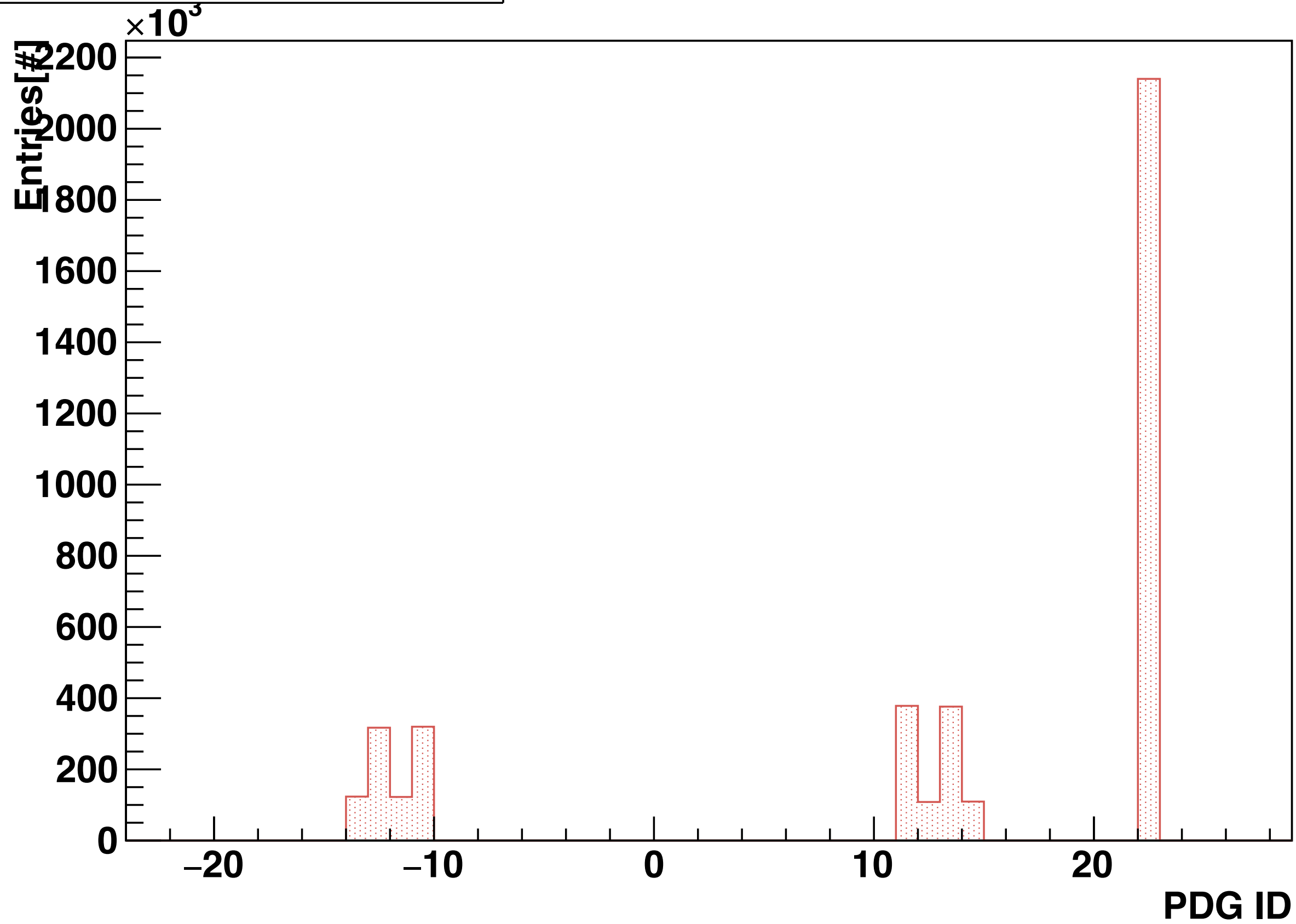


Generation time t (mct)



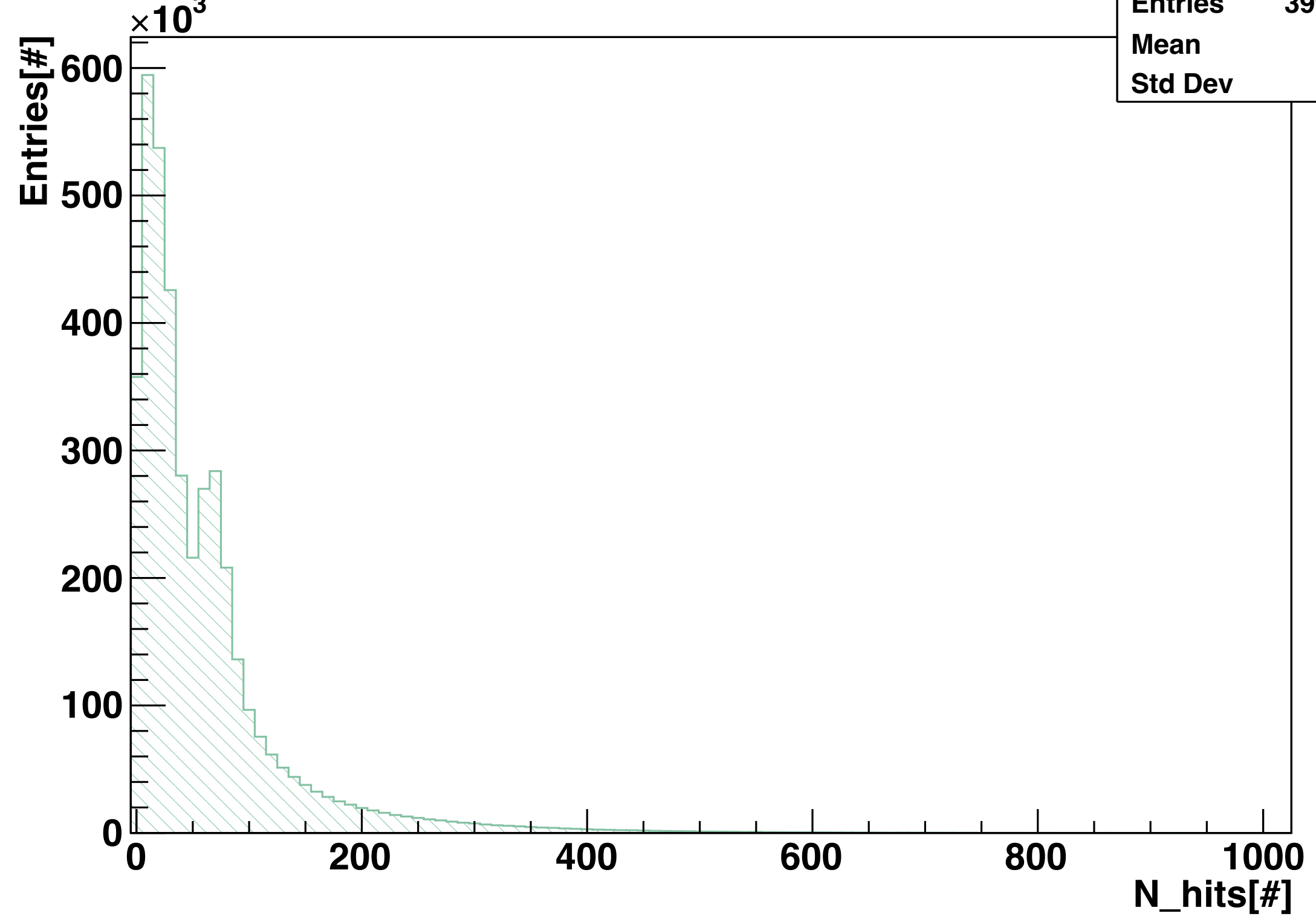


### PDG Particle ID (pdg)



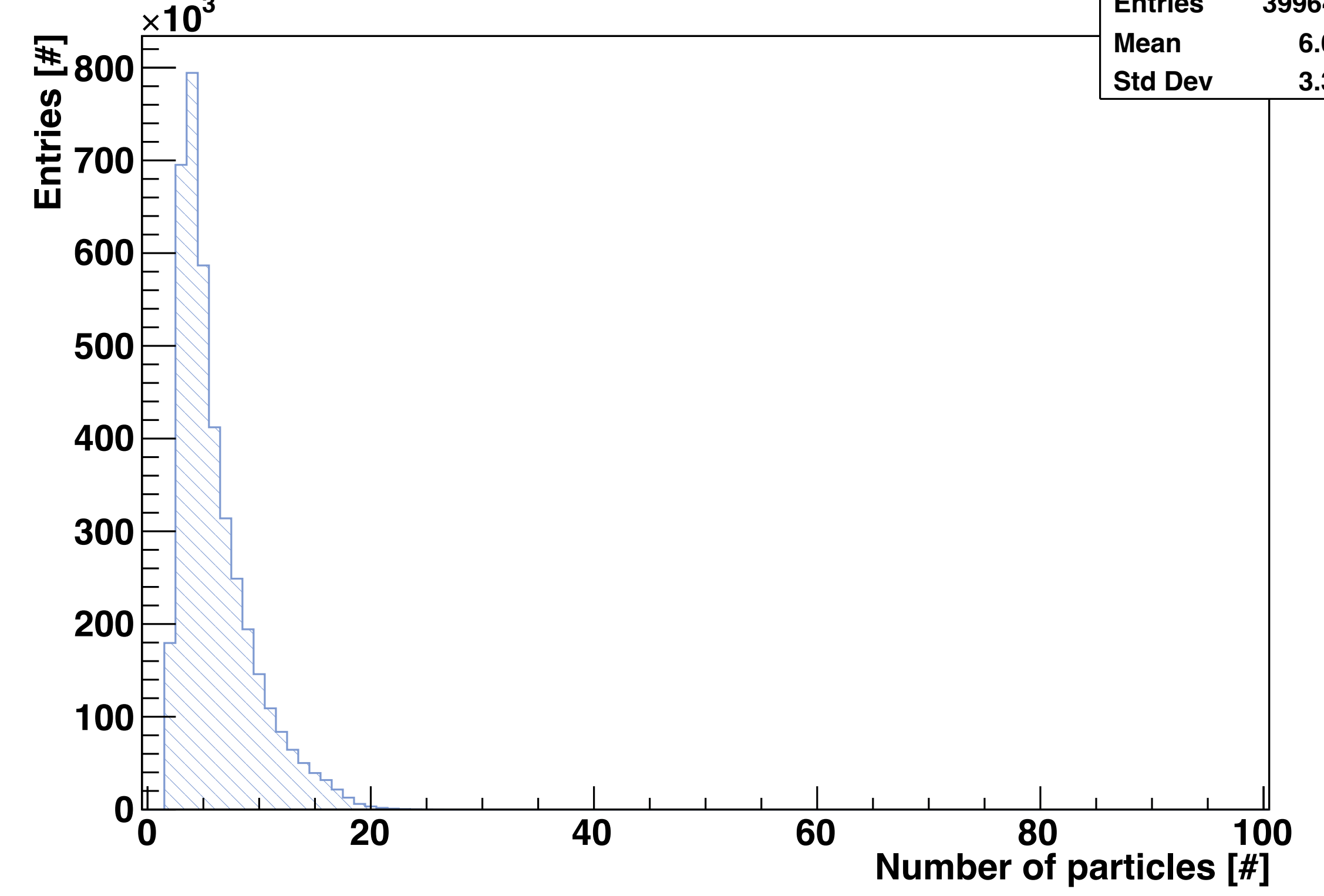
QUARKS		$H^+$	37	$(cd)_0$	4101	$\tilde{c}_R$	2000004	$\pi_1(1400)^+$	9000213
$d$	1	$H^{++}$	38*	$(cd)_1$	4103	$\tilde{b}_2$	2000005 <sup>a</sup>	$\rho(1450)^0$	100113
$u$	2	$a^0/H_4^0$	40*	$(cu)_0$	4201	$\tilde{t}_2$	2000006 <sup>a</sup>	$\rho(1450)^+$	100213
$s$	3			$(cu)_1$	4203	$\tilde{e}_R$	2000011	$\pi_1(1600)^0$	9010113
$c$	4	SPECIAL PARTICLES		$(cs)_0$	4301	$\tilde{\mu}_R$	2000013	$\pi_1(1600)^+$	9010213
$b$	5	$G$ (graviton)	39	$(cc)_1$	4303	$\tilde{\tau}_2$	2000015 <sup>a</sup>	$a_1(1640)^0$	9020113
$t$	6	$R^0$	41	$(bd)_0$	4403	$\tilde{g}$	1000021	$a_1(1640)^+$	9020213
$b'$	7	$LQ^c$	42	$(bd)_1$	5101	$\tilde{\chi}_1^0$	1000022 <sup>b</sup>	$\rho(1700)^0$	30113
$t'$	8	DM ( $S=0$ )	51	$(bu)_0$	5103	$\tilde{\chi}_2^0$	1000023 <sup>b</sup>	$\rho(1700)^+$	30213
LEPTONS		DM ( $S=1/2$ )	52	$(bu)_1$	5201	$\tilde{\chi}_1^+$	1000024 <sup>b</sup>	$\rho(1900)^0$	9030113
$e^-$	11	DM ( $S=1$ )	53	$(bs)_0$	5203	$\tilde{\chi}_3^0$	1000025 <sup>b</sup>	$\rho(1900)^+$	9030213
$\nu_e$	12	reggeon	110	$(bs)_1$	5301	$\tilde{\chi}_4^0$	1000035 <sup>b</sup>	$\rho(2150)^0$	9040113
$\mu^-$	13	pomeron	990	$(bc)_0$	5303	$\tilde{\chi}_2^+$	1000037 <sup>b</sup>	$\rho(2150)^+$	9040213
$\nu_\mu$	14	odderon	9990	$(bb)_1$	5401	$\tilde{G}$	1000039	$a_2(1320)^0$	115
$\tau^-$	15	for MC internal use 81-100, 901-930, 998-999*			5403	LIGHT $I = 1$ MESONS		$\pi_2(1670)^0$	10115
$\nu_\tau$	16				5503			$\pi_2(1670)^+$	10215
$\tau'^-$	17							$a_2(1700)^0$	9000115
$\nu_{\tau'}$	18							$a_2(1700)^+$	9000215
GAUGE AND HIGGS BOSONS								$\pi_2(2100)^0$	9010115
$g$	(9) 21							$\pi_2(2100)^+$	9010215
$\gamma$	22							$\rho_3(1690)^0$	117
$Z^0$	23							$\rho_3(1690)^+$	217
$W^+$	24							$\rho_3(1990)^0$	9000117
$h^0/H_1^0$	25							$\rho_3(1990)^+$	9000217
$Z'/Z_2^0$	32							$\rho_3(2250)^0$	9010117
$Z''/Z_3^0$	33							$\rho_3(2250)^+$	9010217
$W'/W_2^+$	34							$a_4(2040)^0$	119
$H^0/H_2^0$	35							$a_4(2040)^+$	219
$A^0/H_3^0$	36							LIGHT $I = 0$ MESONS ( $u\bar{u}, d\bar{d}, s\bar{s}$ admixtures)	

**Number of hits**



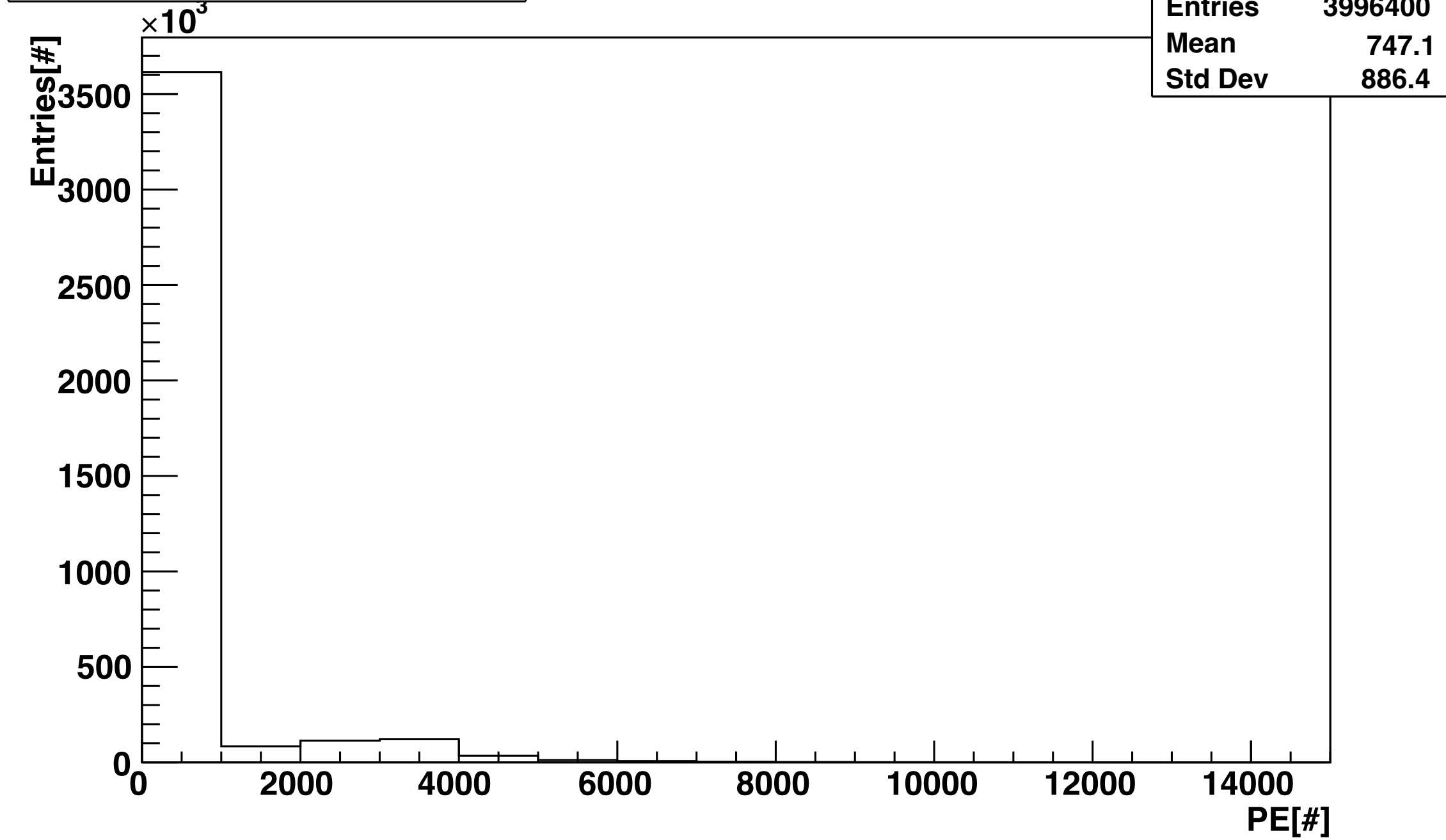
h1d_nhits	
Entries	3996400
Mean	60.83
Std Dev	74.08

**Particles in the final state**

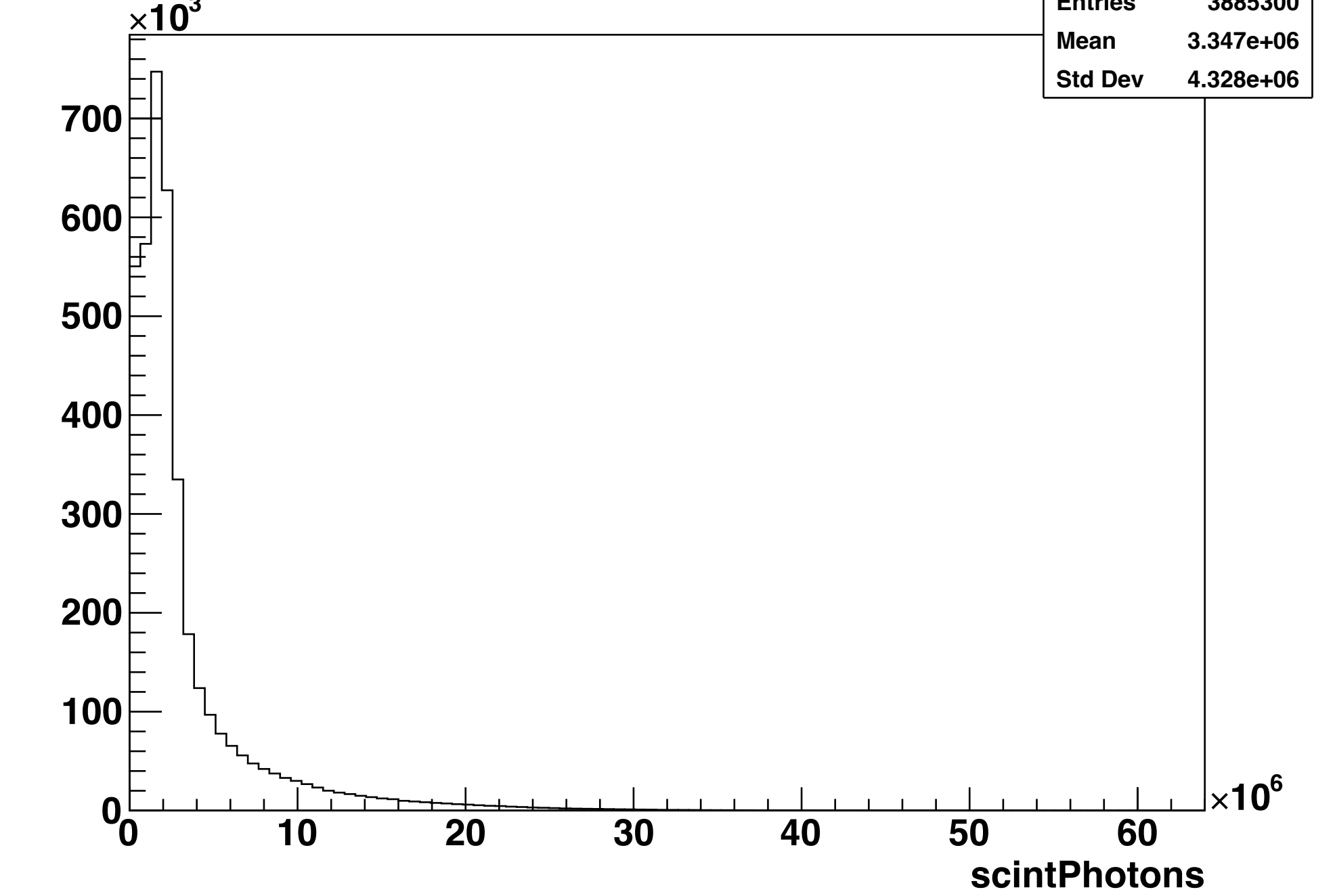


h1d_mcparticlecount	
Entries	3996400
Mean	6.035
Std Dev	3.308

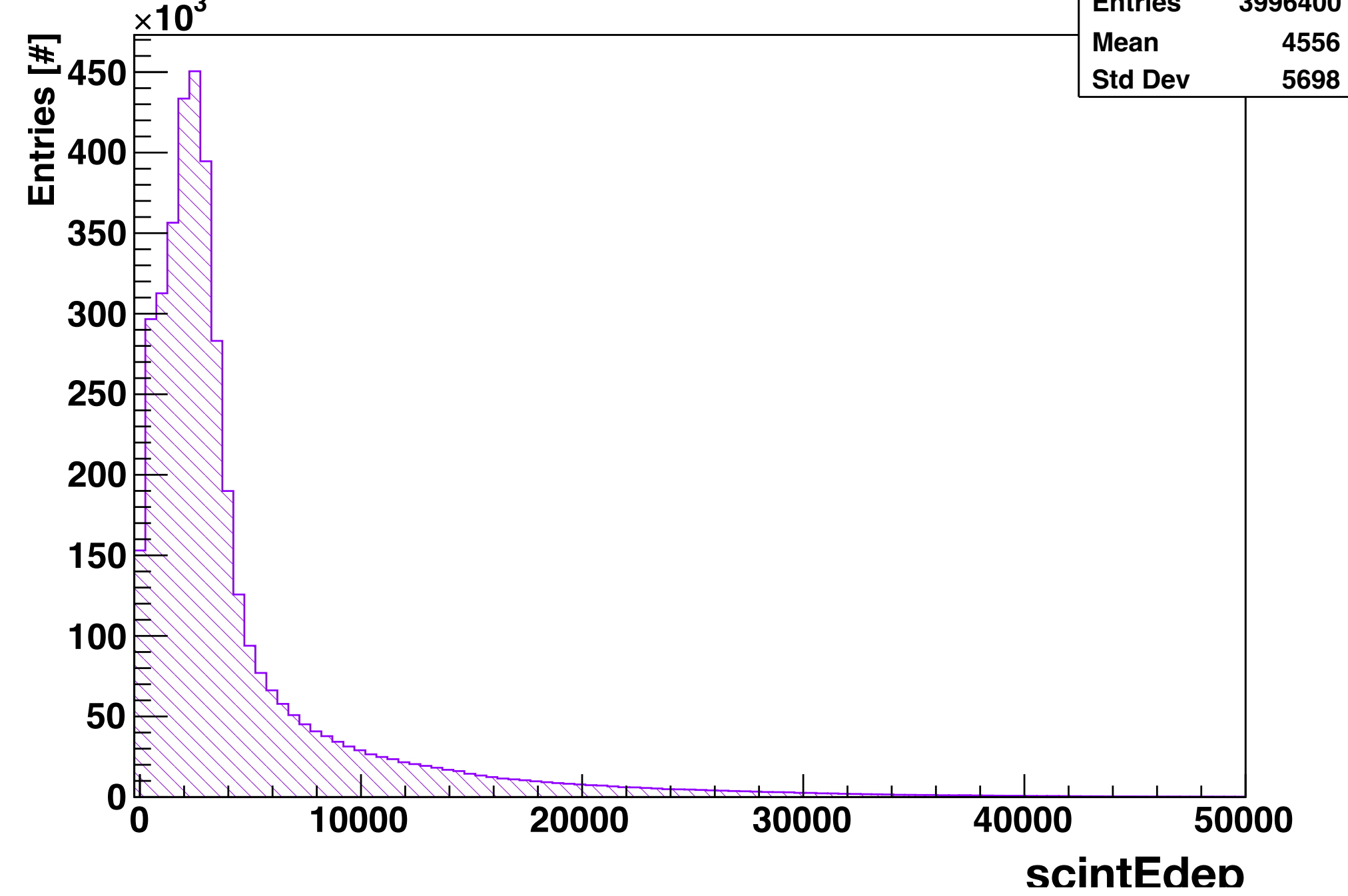


**Detected photoelectrons**

h1d_mcpecount	
Entries	3996400
Mean	747.1
Std Dev	886.4

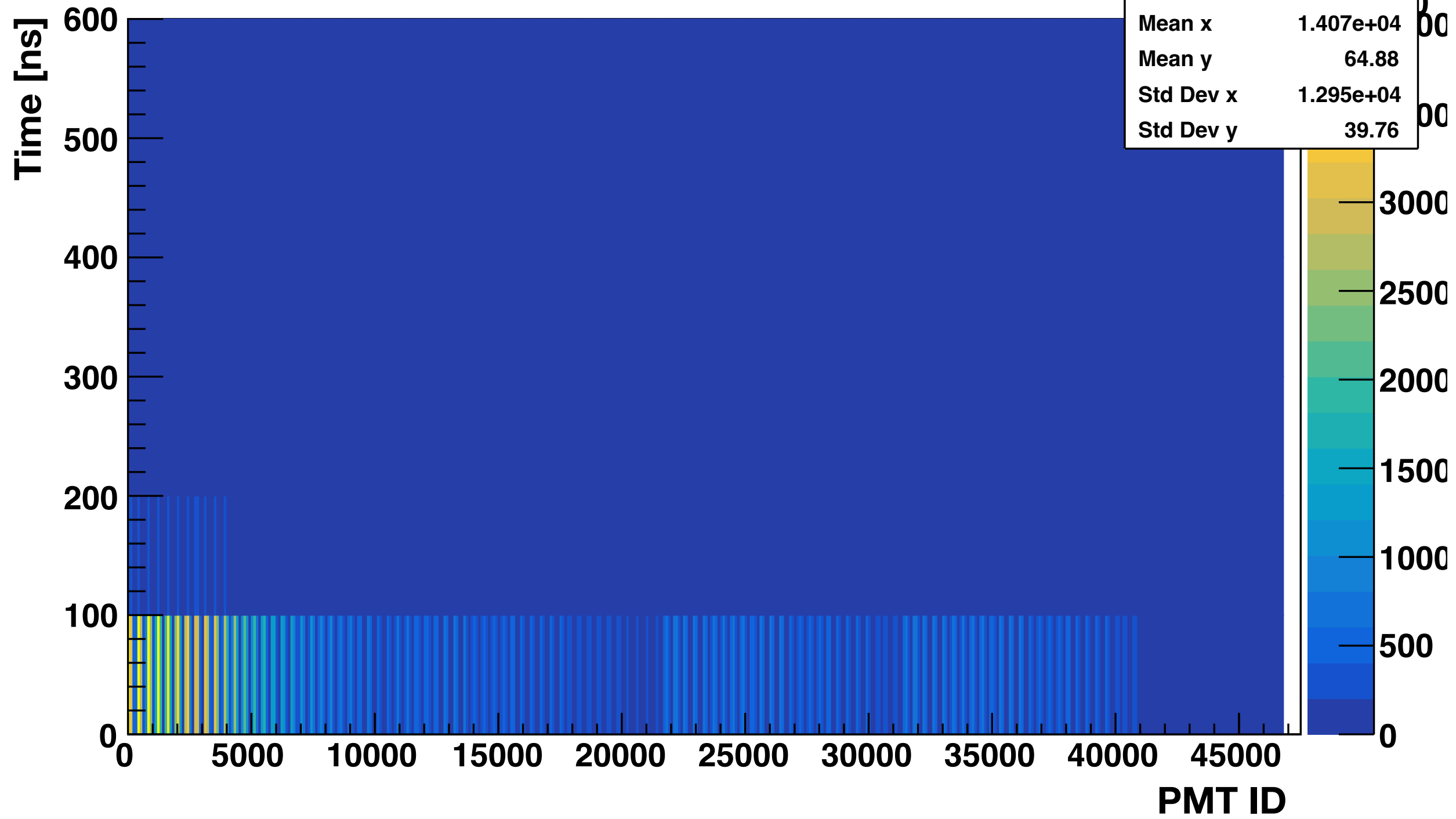
**scintPhotons**

htemp	
Entries	3885300
Mean	3.347e+06
Std Dev	4.328e+06

**Deposited Scintillation Energy**

h1d_scintEdep	
Entries	3996400
Mean	4556
Std Dev	5698

**Photon Arrival Times per PMT**



**Kinetic Energy vs Deposited Charge**

