

# Search for time-dependent fluctuations in cosmic rays spectra with the AMS01 detector

- Track quality studies:
  1. Track clusters Signal over Noise
  2. Residual at impact point
  3. Tracker clusters out of track
- TOF Clusters

# PRESELECTION

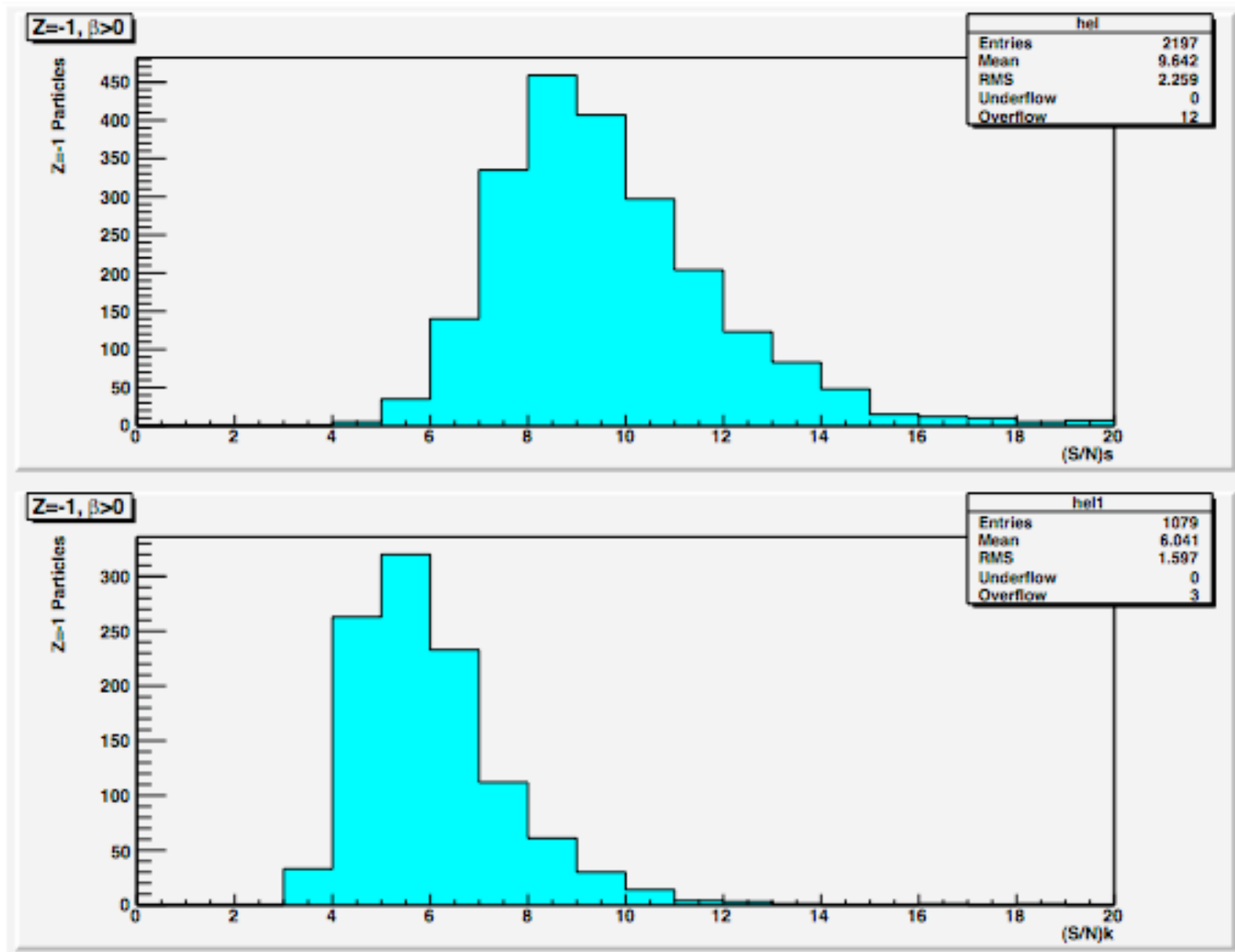
- ✓ No hits in Anticoincidence counter
- ✓ At least one reconstructed track
- ✓ At least one charge measurement
- ✓ At least one  $\beta$  measurement
- ✓ One reconstructed particle
- ✓  $\text{ChargeTOF} == \text{ChargeTRACKER}$
- ✓ Only downward going particles

Electron candidates:  $\text{charge} * \text{sign}(\text{Pmom}) = -1$

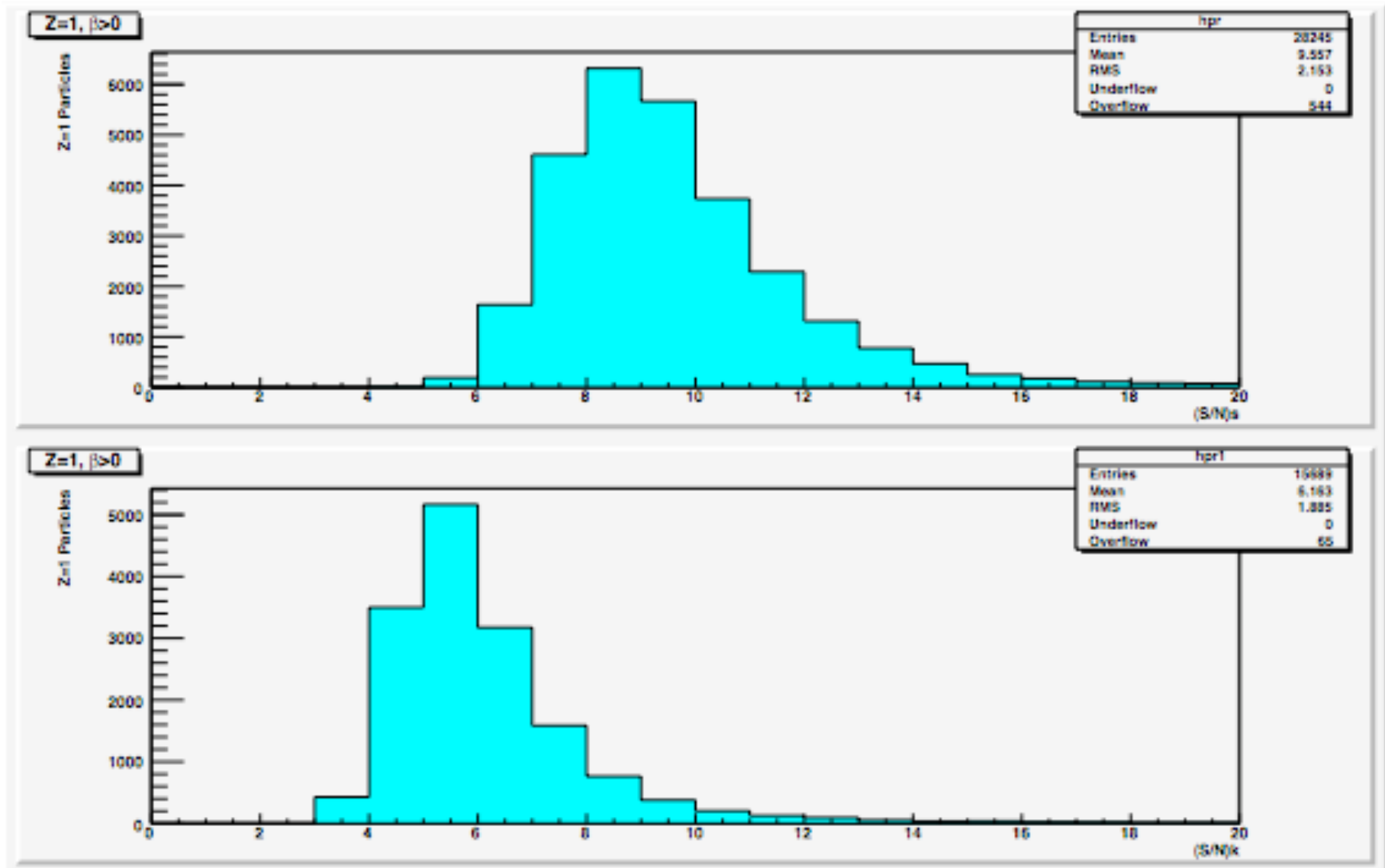
Proton candidates:  $\text{charge} * \text{sign}(\text{Pmom}) = +1$

Helium candidates:  $\text{charge} * \text{sign}(\text{Pmom}) = +2$

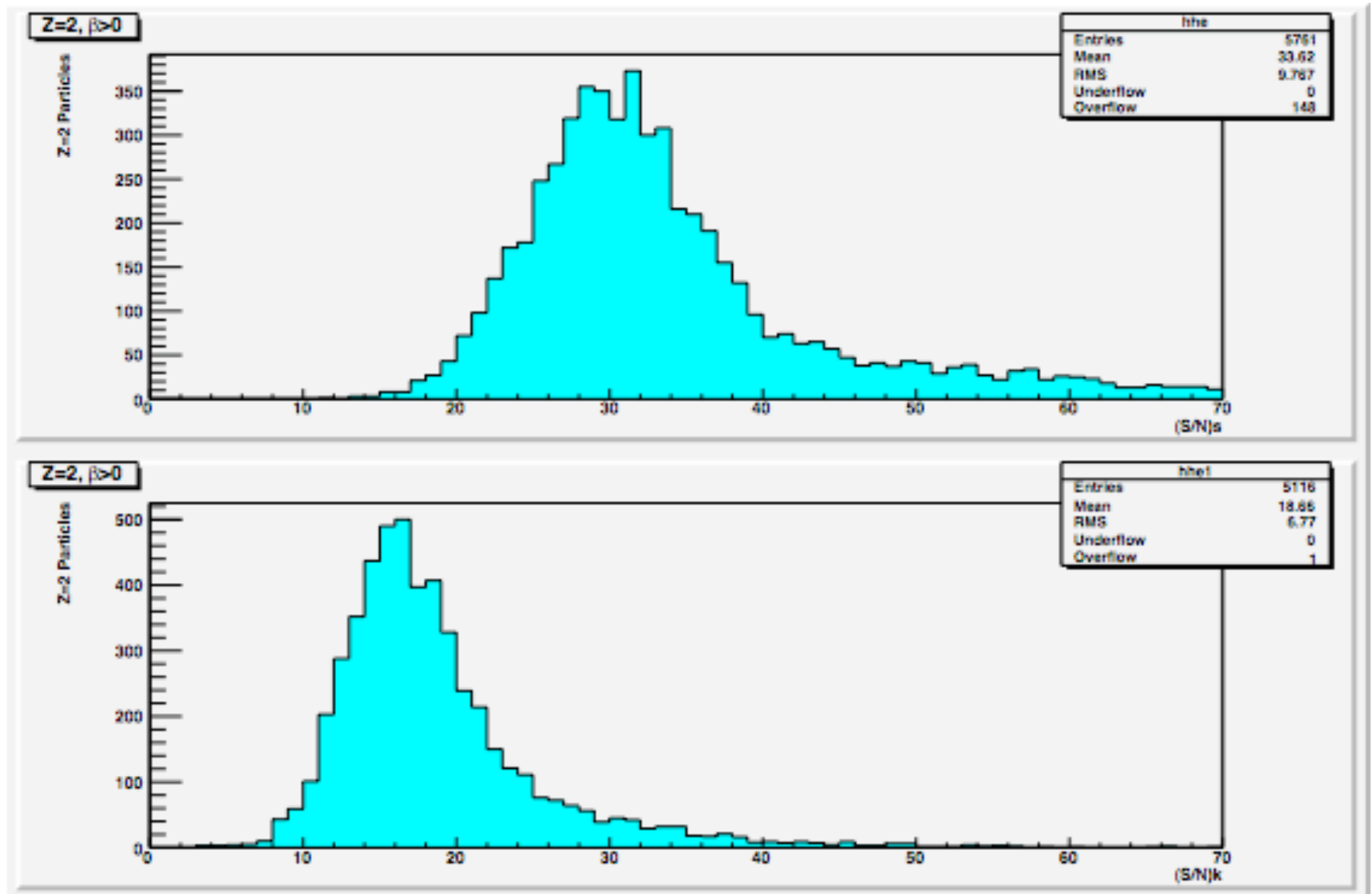
Z=-1 particles, Signal over noise (Mean S,K=9.6,6.0)



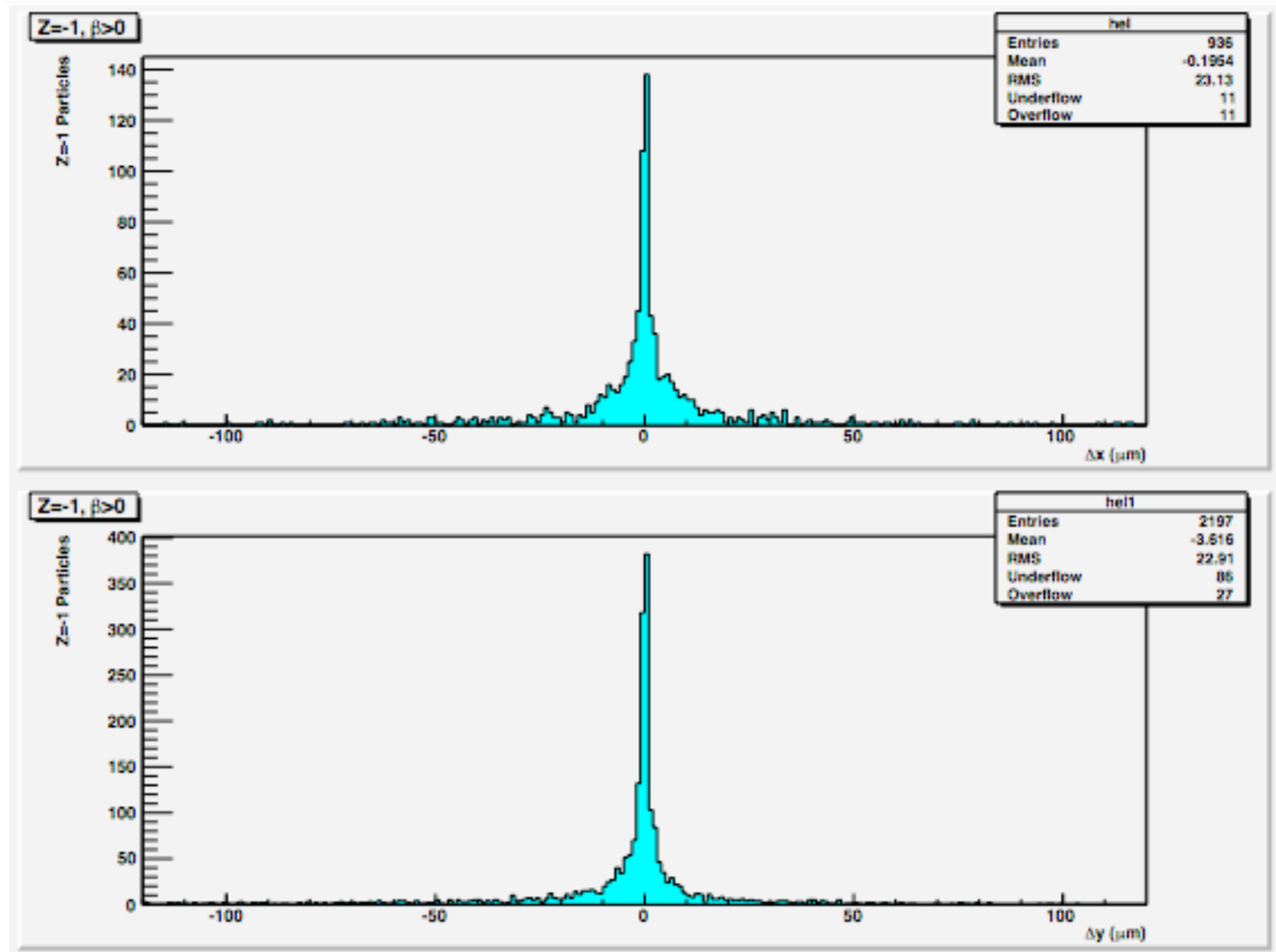
# Z=1 particles, Signal over noise (Mean S,K=9.6,6.2)



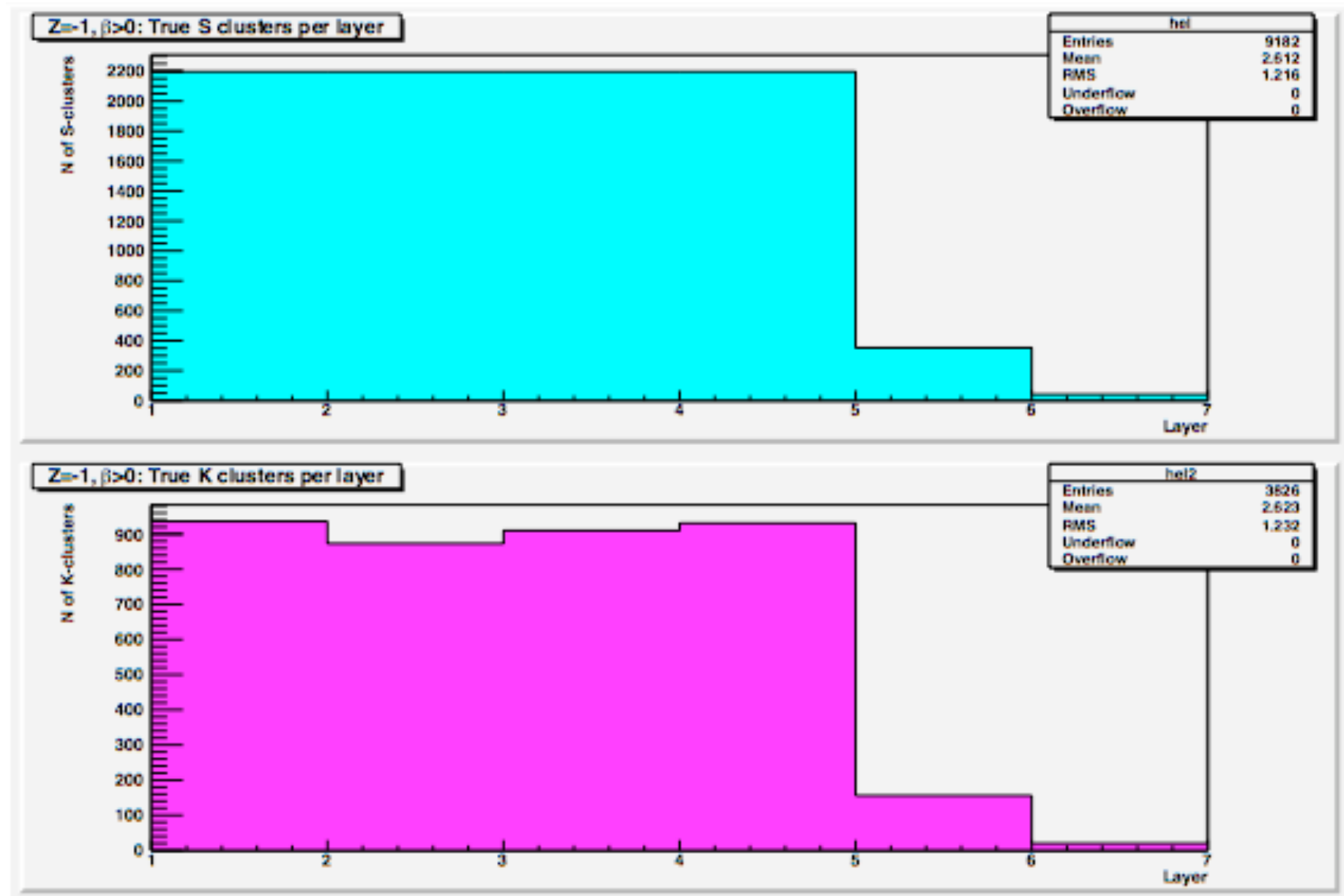
# Z=2 particles, Signal over noise (Mean S,K=33.6,18.7)



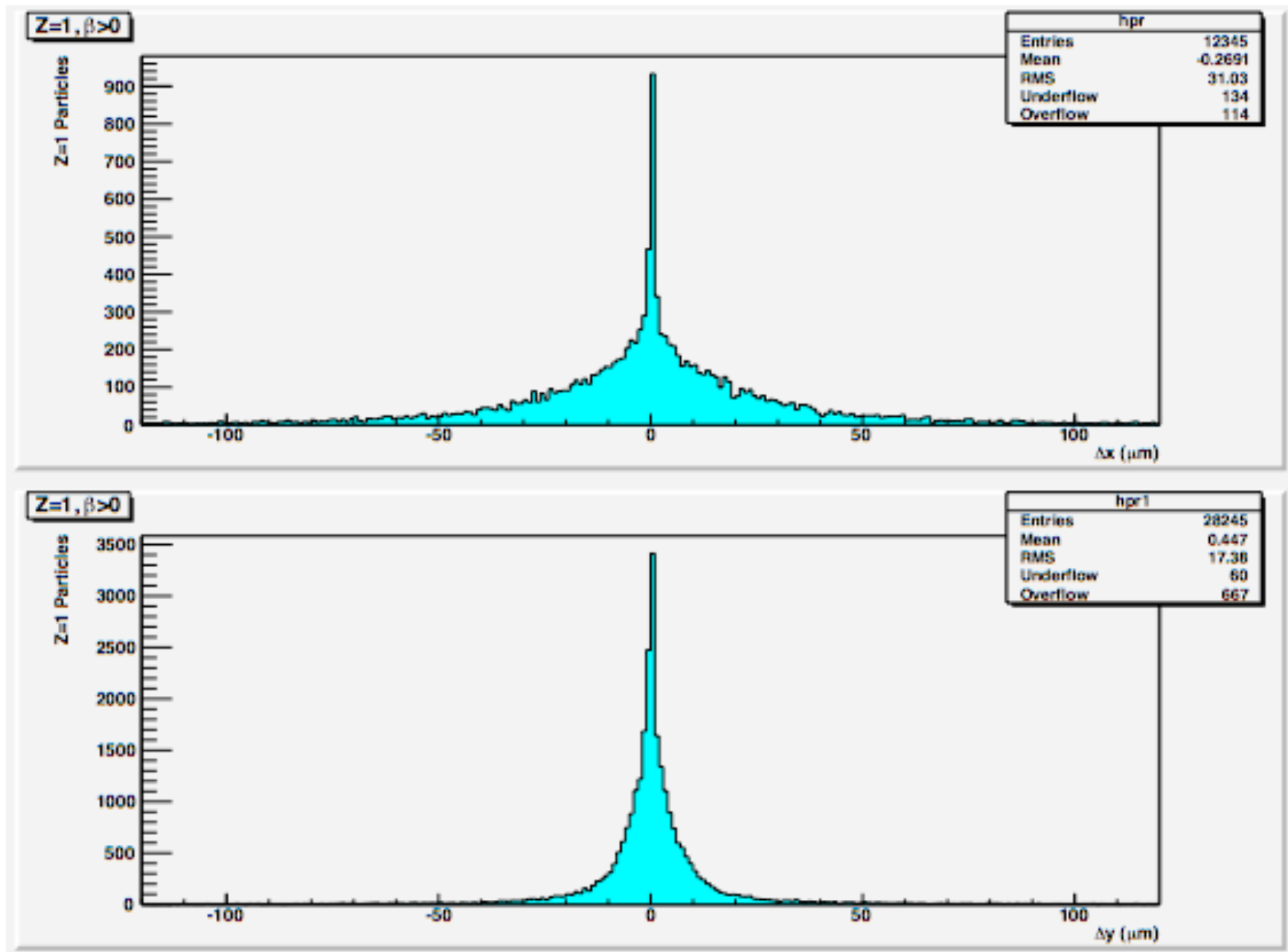
# Z=-1 particles, Impact point residual



# Z=-1 particles, Number of True Tracker Clusters per plane

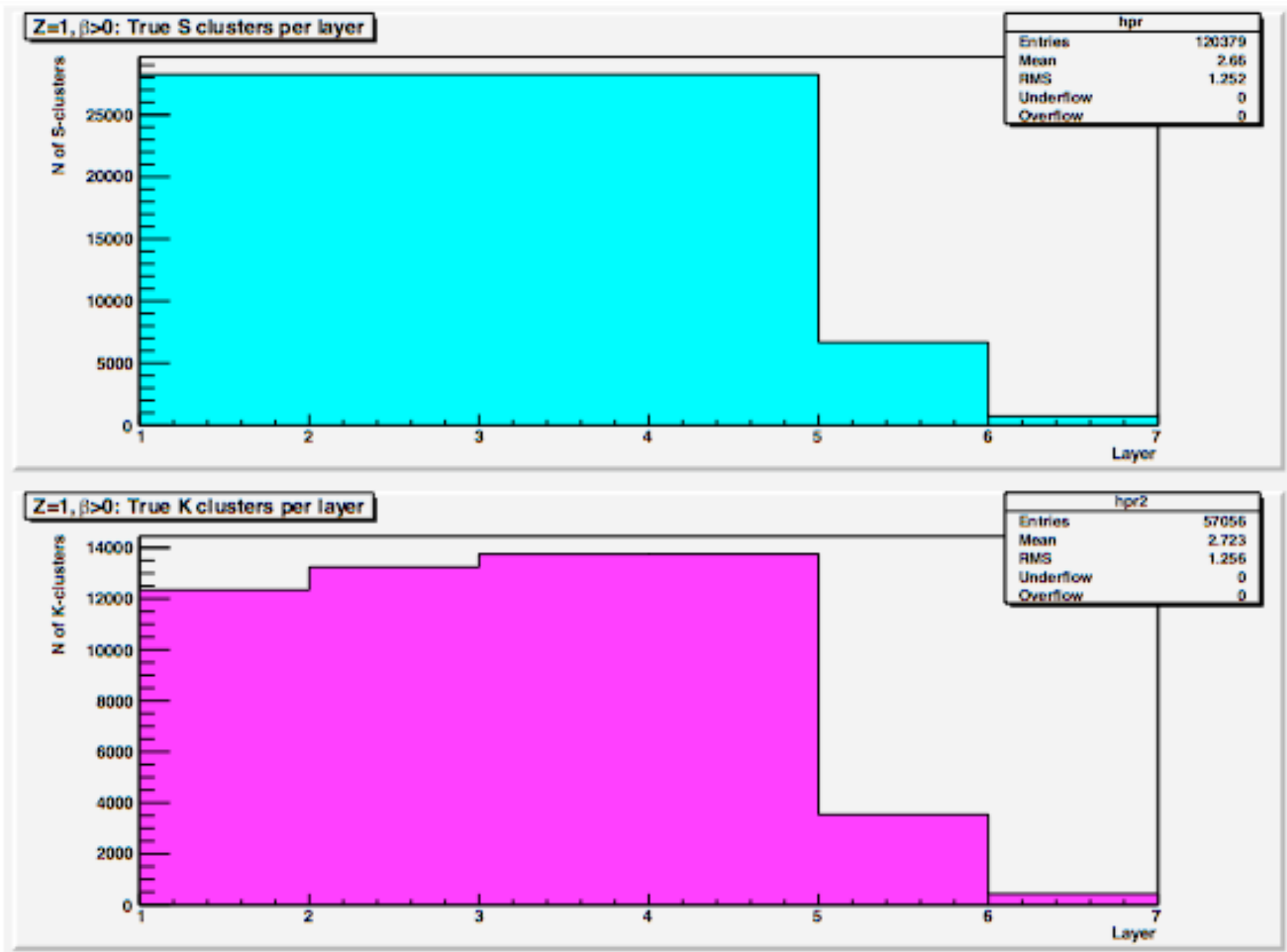


# Z=1 particles, Impact point residual

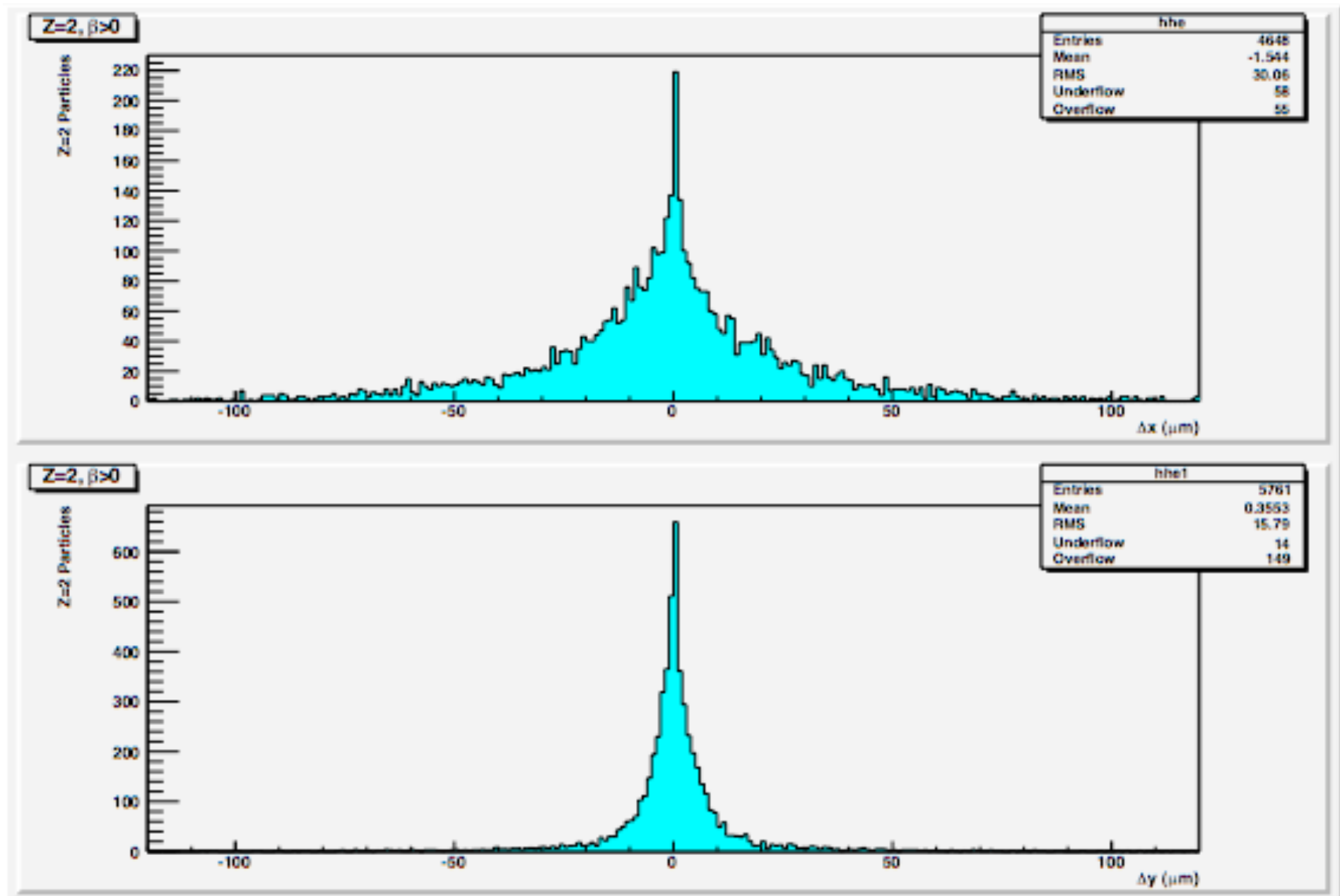




# Z=1 particles, Number of True Tracker Clusters per plane

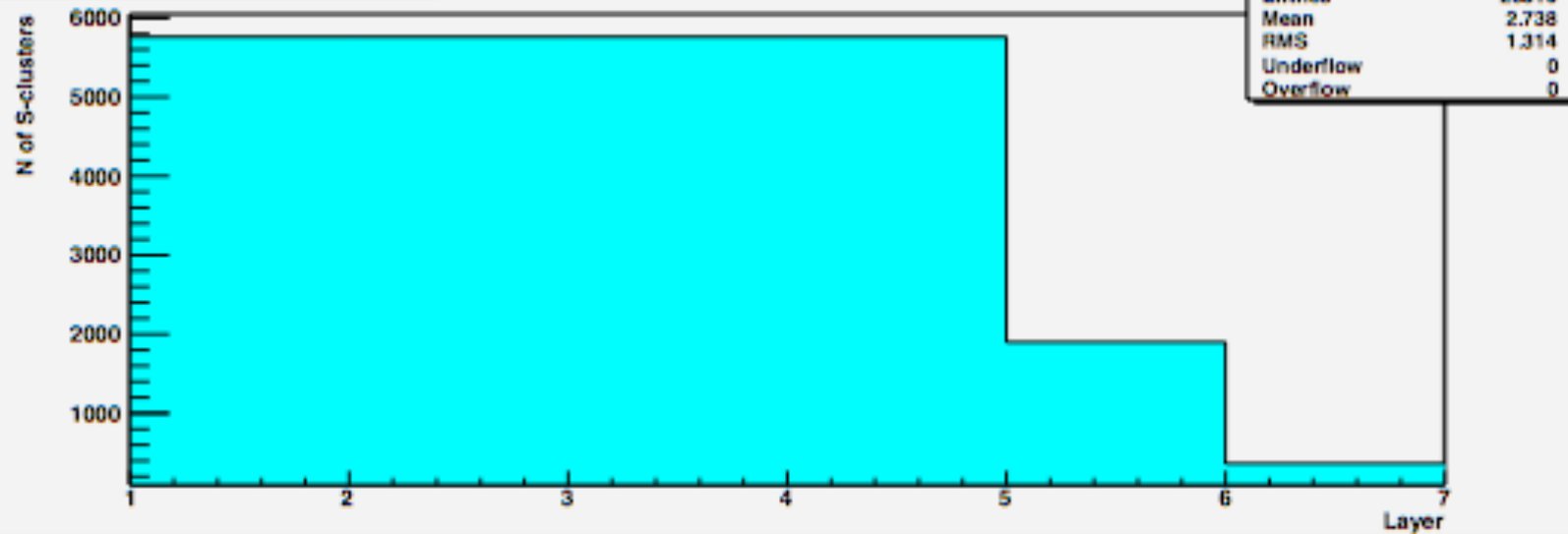


# Z=2 particles, Impact point residual

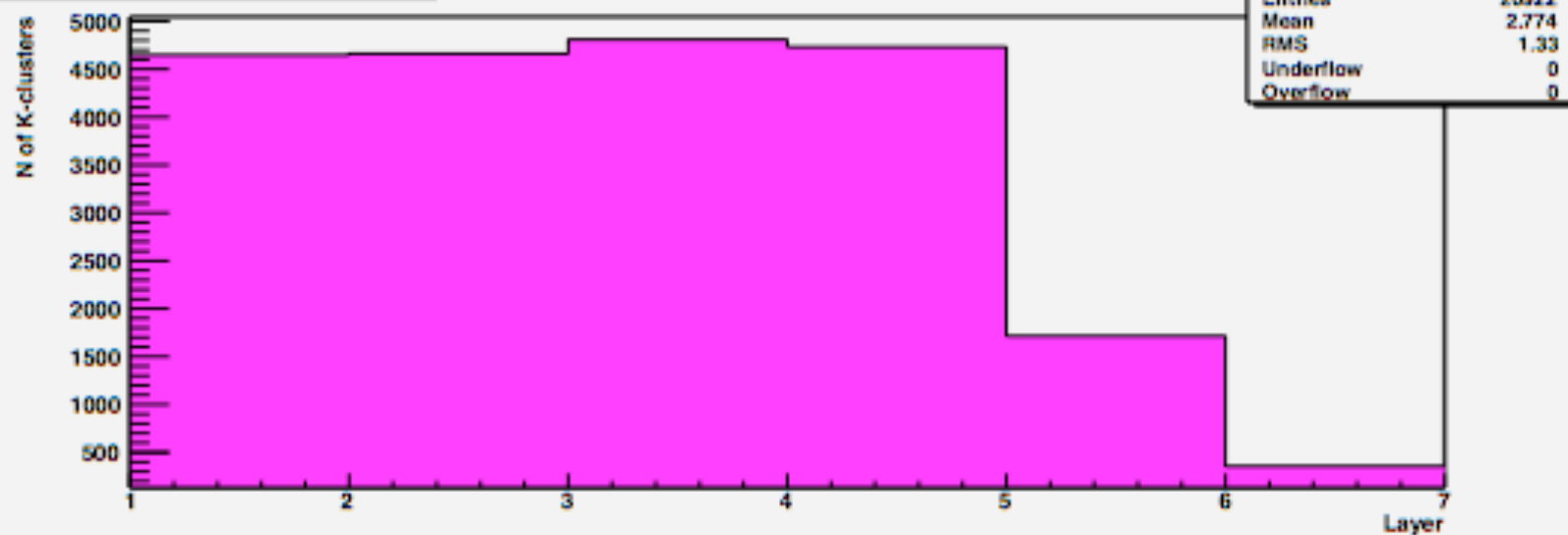


# Z=2 particles, Number of True Tracker Clusters per plane

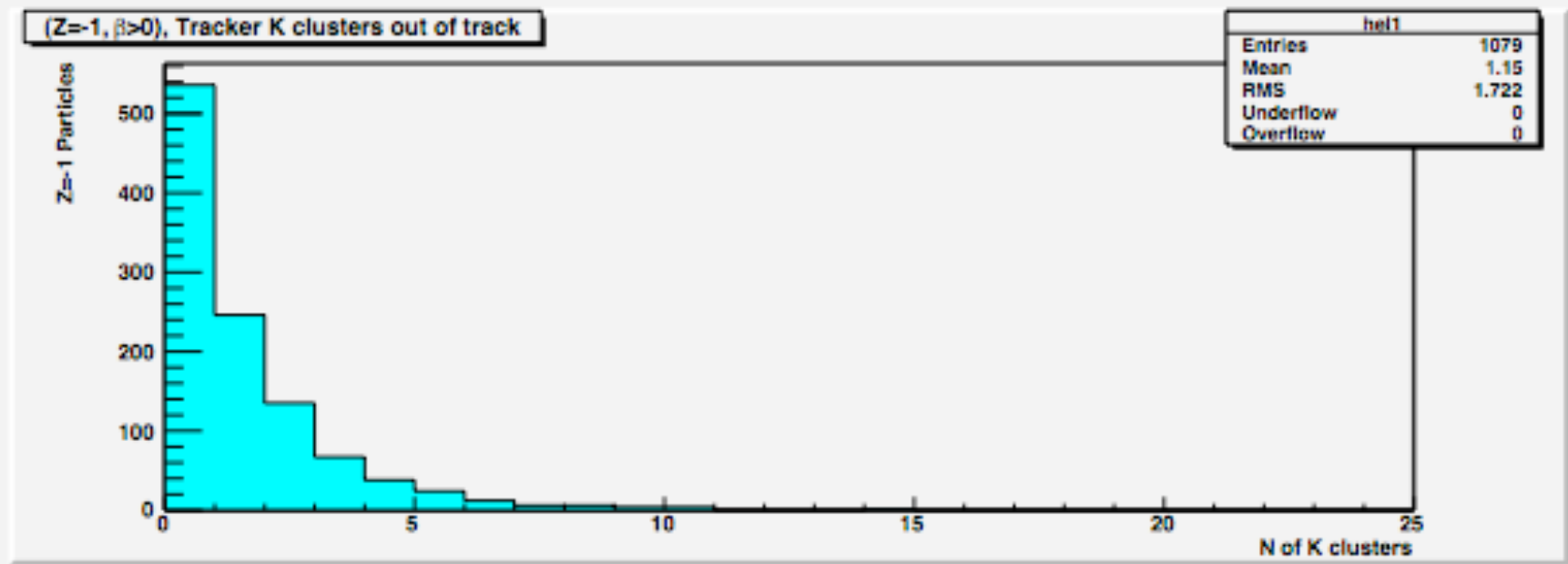
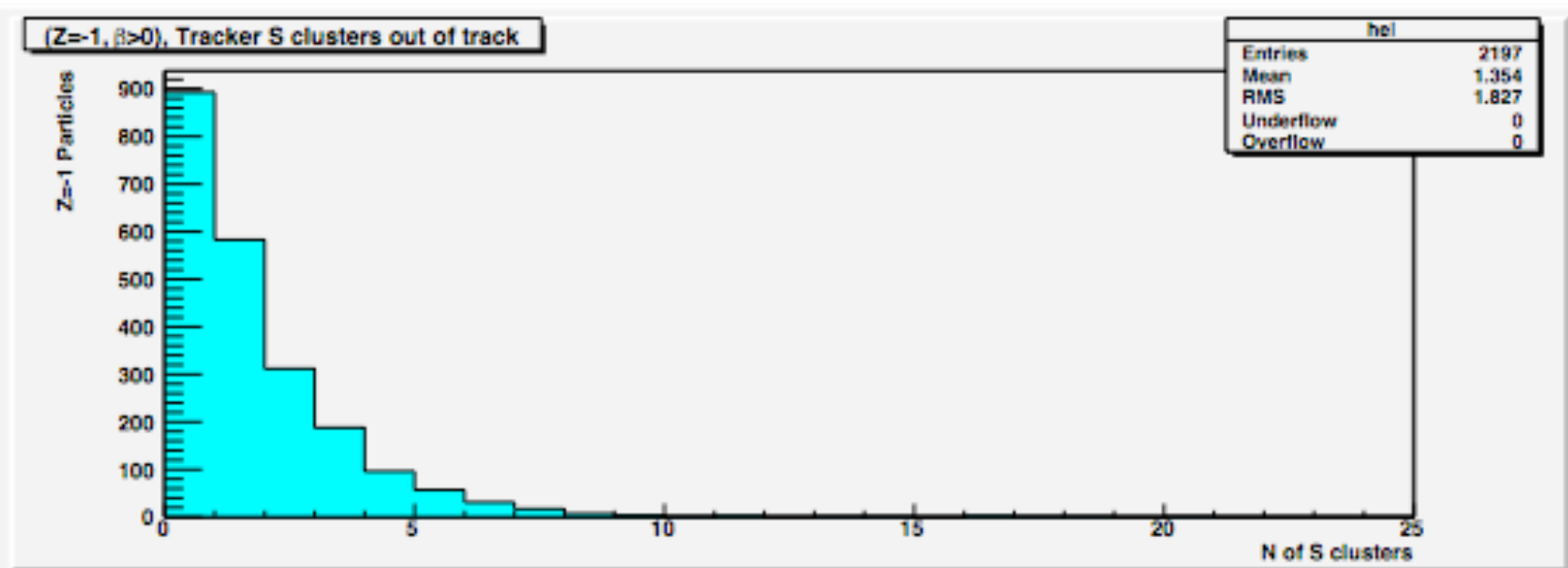
Z=2,  $\beta > 0$ : True S clusters per layer



Z=2,  $\beta > 0$ : True K clusters per layer

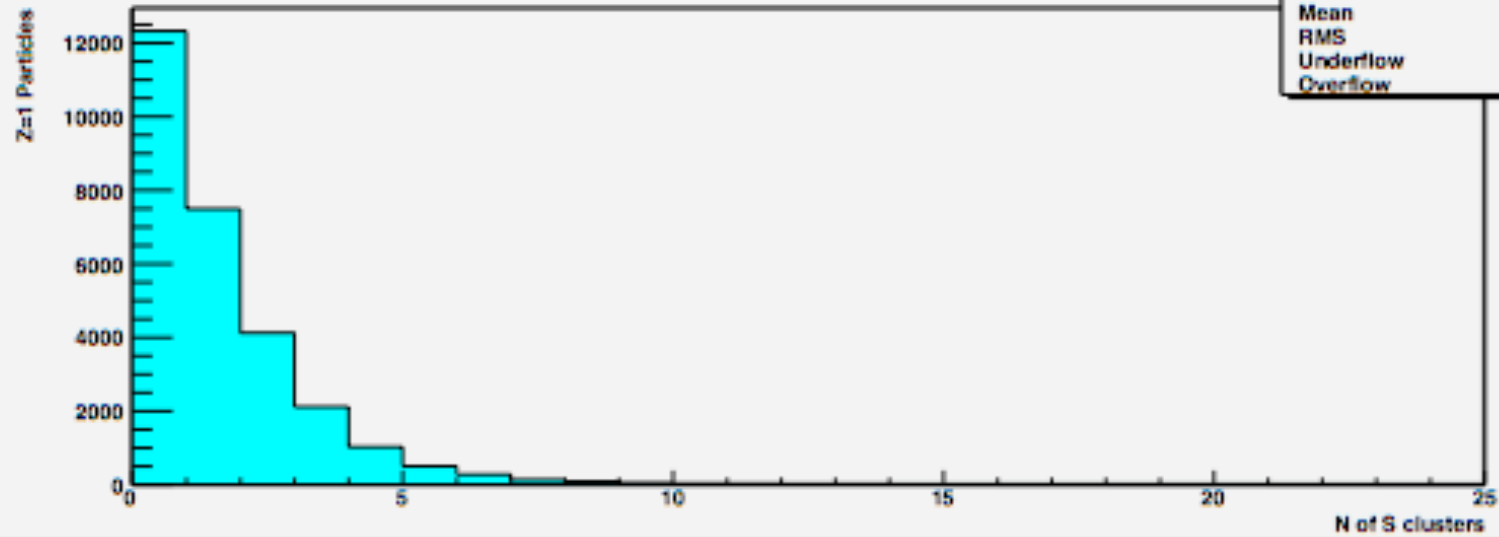


# Z=-1 particles, Number of Tracker clusters out of track



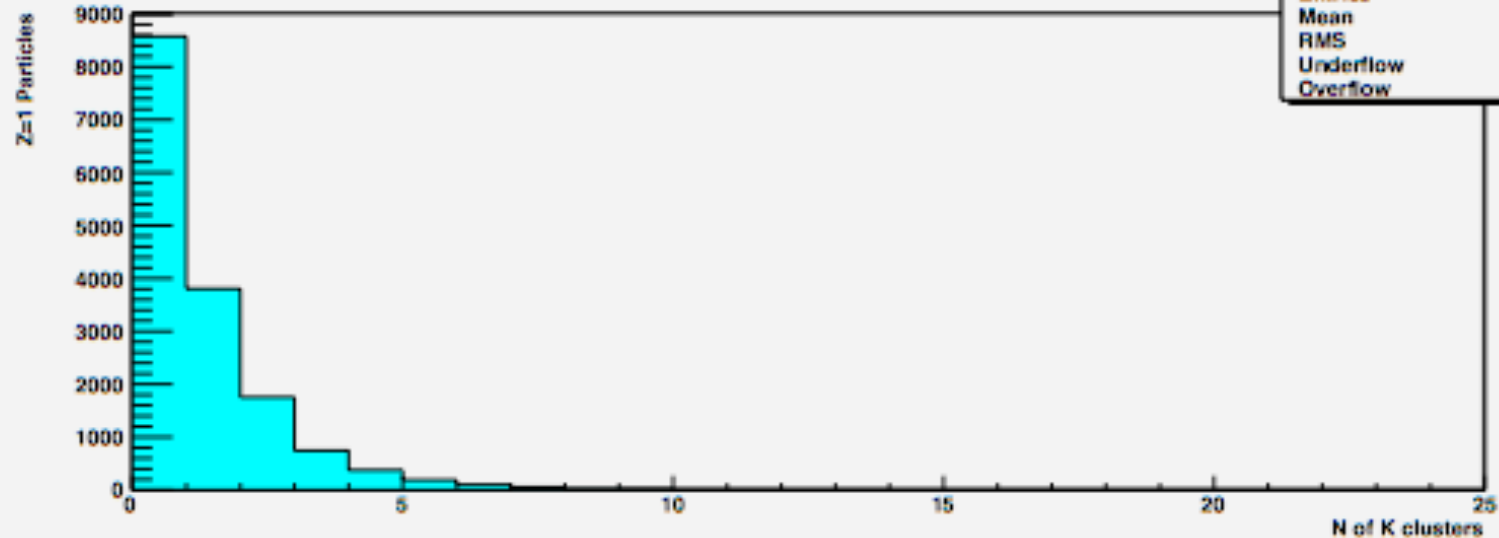
# Z=1 particles, Number of Tracker clusters out of track

(Z=1,  $\beta > 0$ ), Tracker S clusters out of track



hpr	
Entries	28245
Mean	1.195
RMS	1.634
Underflow	0
Overflow	4

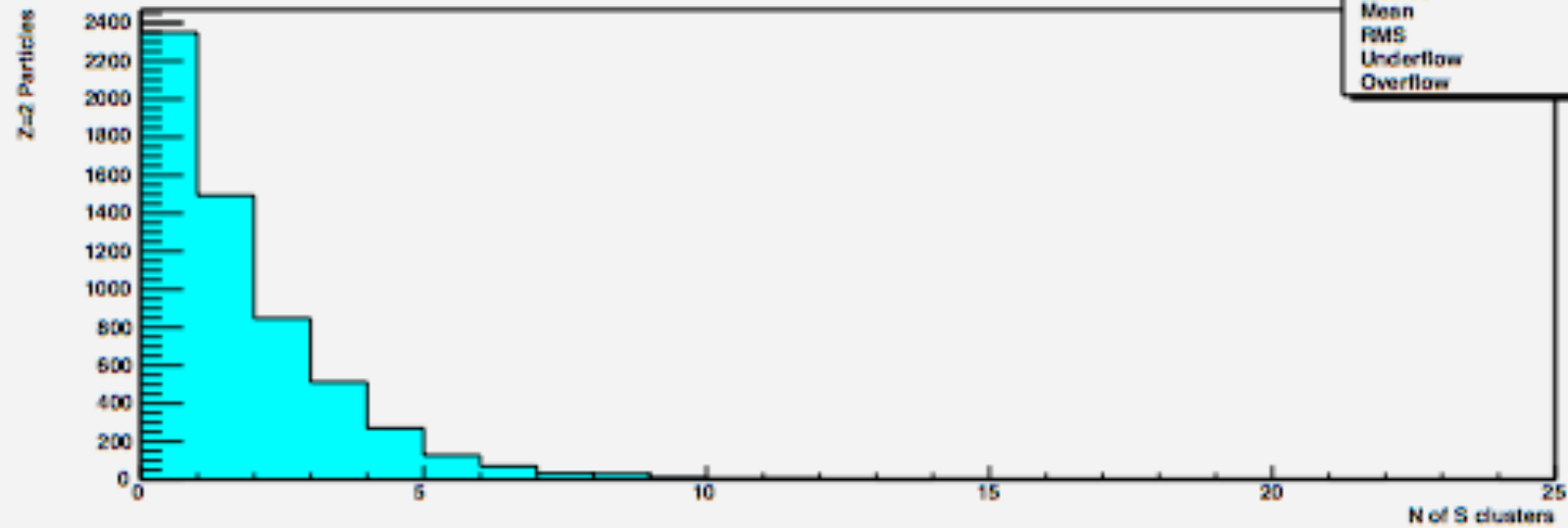
(Z=1,  $\beta > 0$ ), Tracker K clusters out of track



hpr1	
Entries	15689
Mean	0.8883
RMS	1.46
Underflow	0
Overflow	0

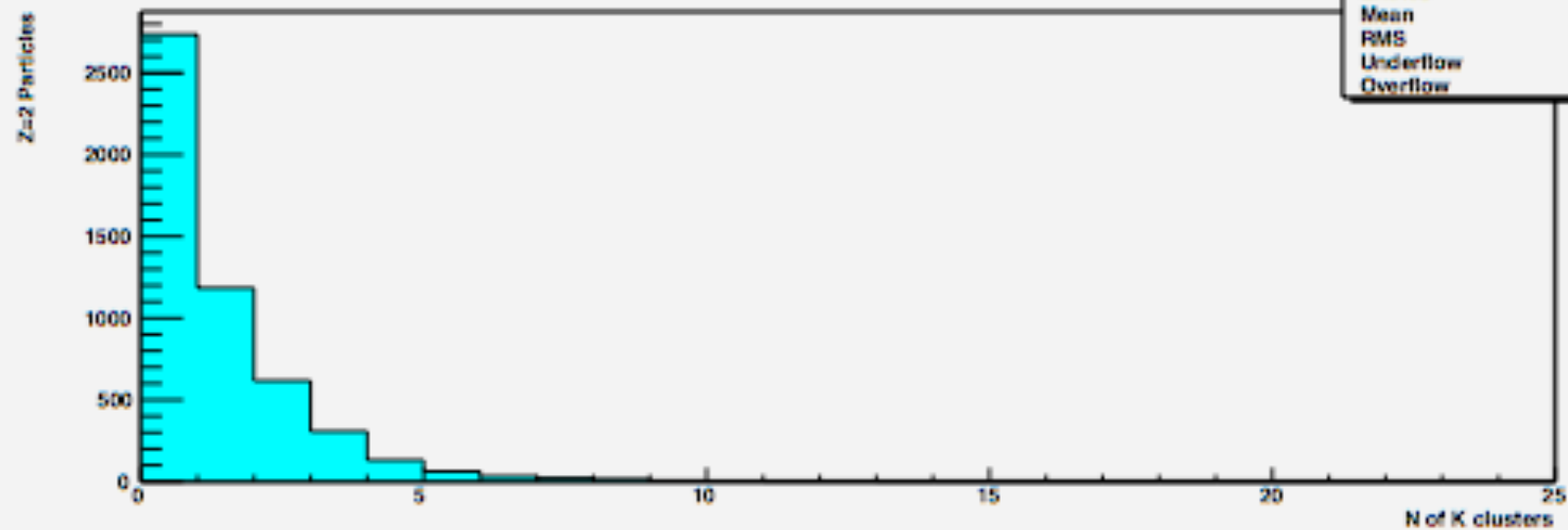
# Z=2 particles, Number of Tracker clusters out of track

(Z=2,  $\beta > 0$ ), Tracker S clusters out of track



hhe	
Entries	5761
Mean	1.329
RMS	1.72
Underflow	0
Overflow	1

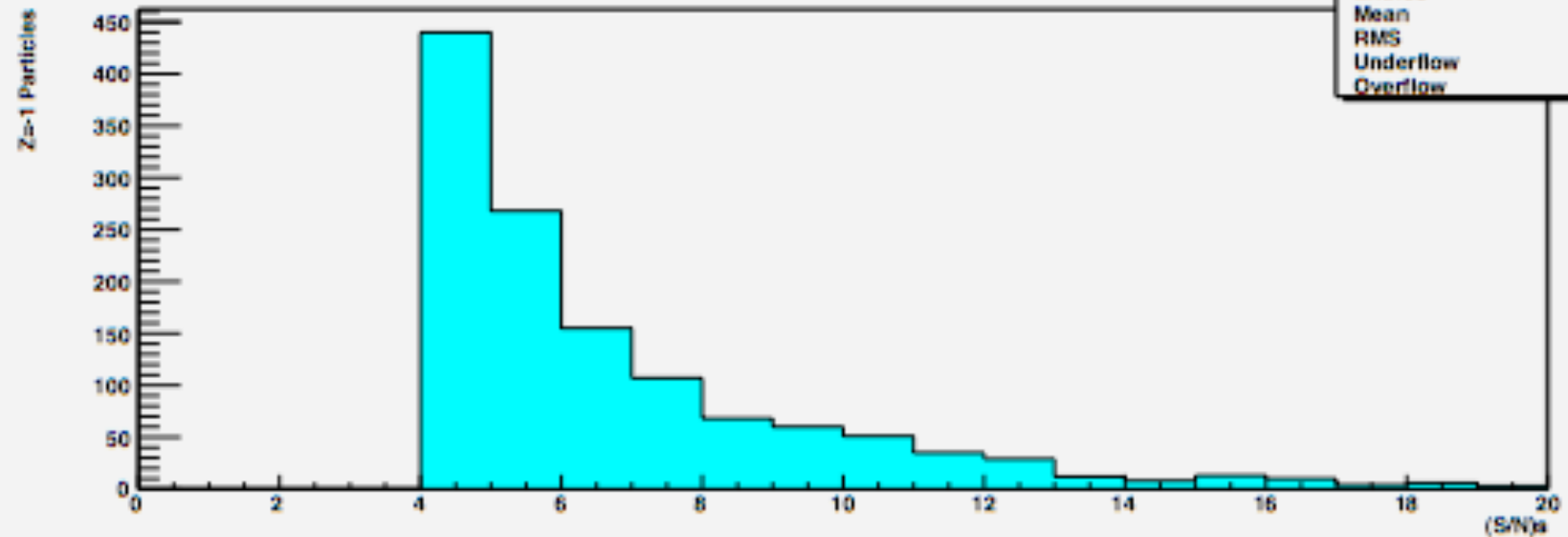
(Z=2,  $\beta > 0$ ), Tracker K clusters out of track



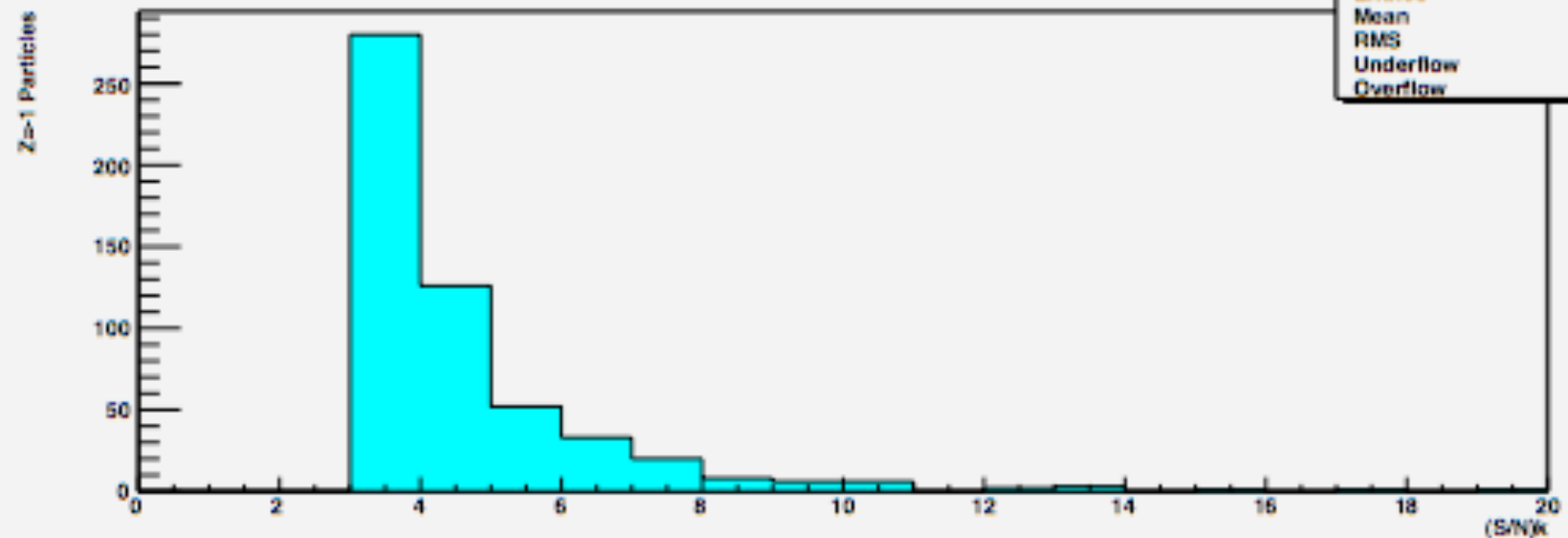
hhe1	
Entries	5116
Mean	0.9257
RMS	1.386
Underflow	0
Overflow	0

# Z=-1 particles, $\langle S/N \rangle$ of Tracker clusters out of track

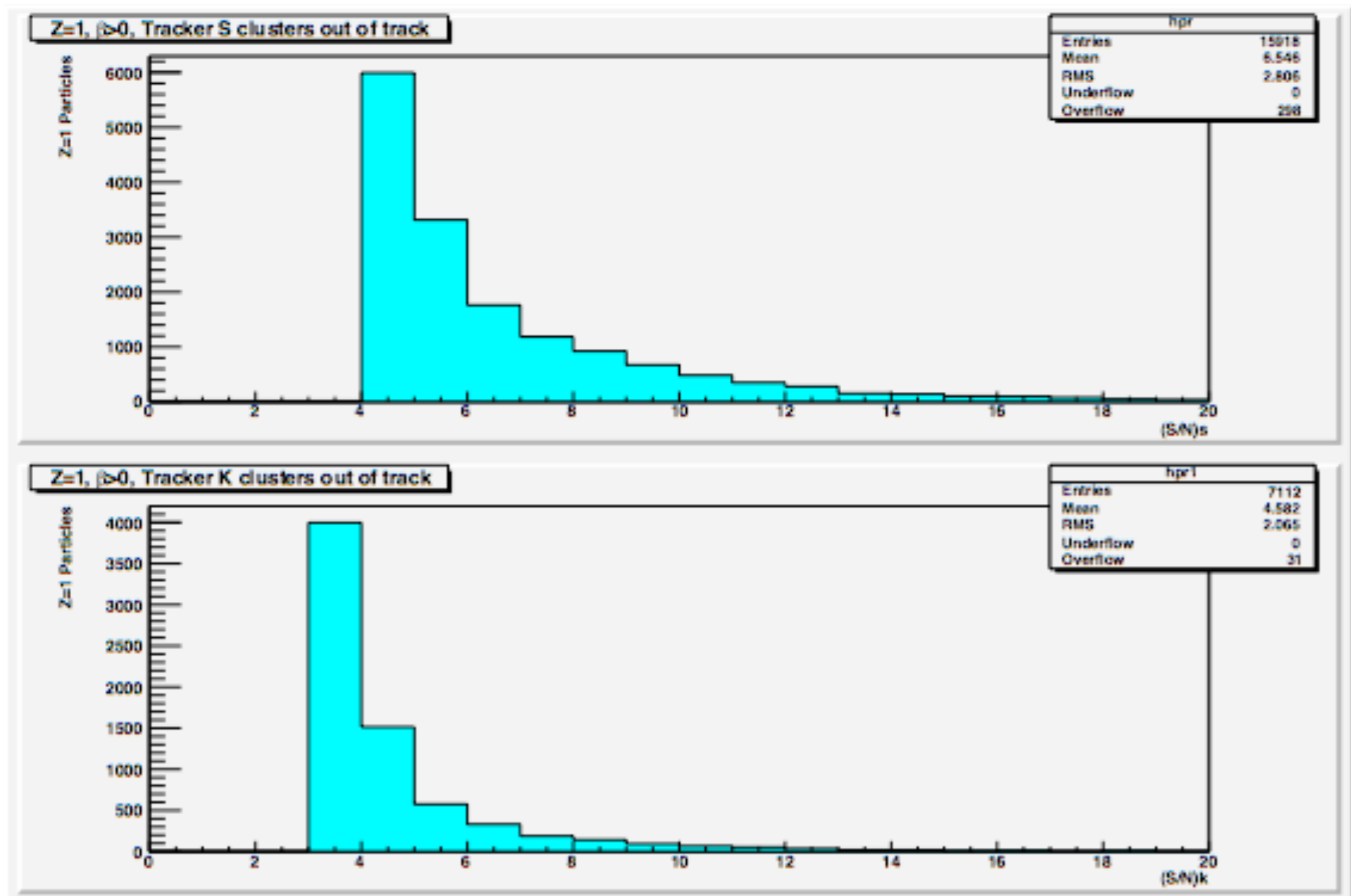
Z=-1,  $\beta > 0$ , Tracker S clusters out of track



Z=-1,  $\beta > 0$ , Tracker K clusters out of track

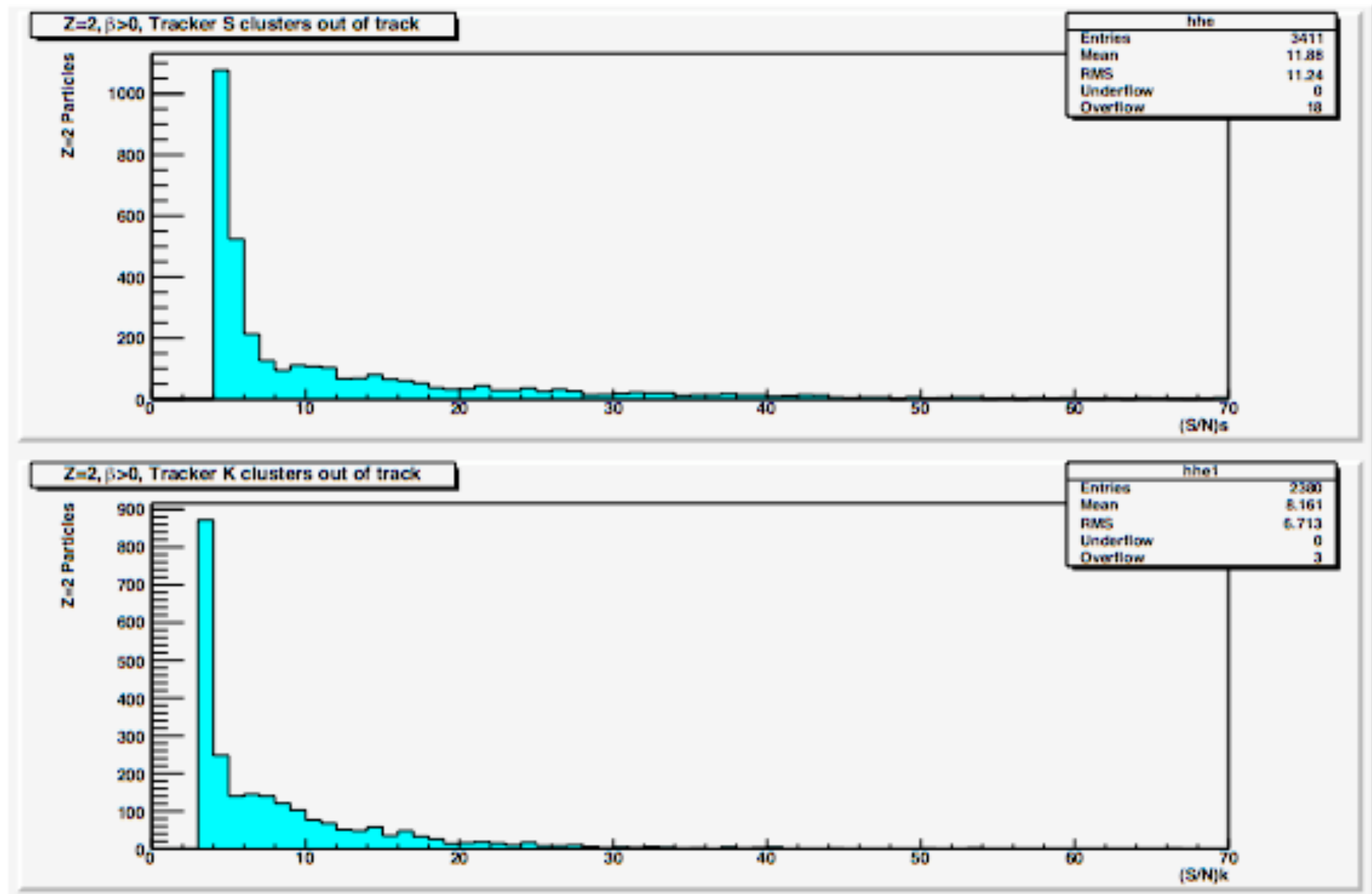


# Z=1 particles, $\langle S/N \rangle$ of Tracker clusters out of track

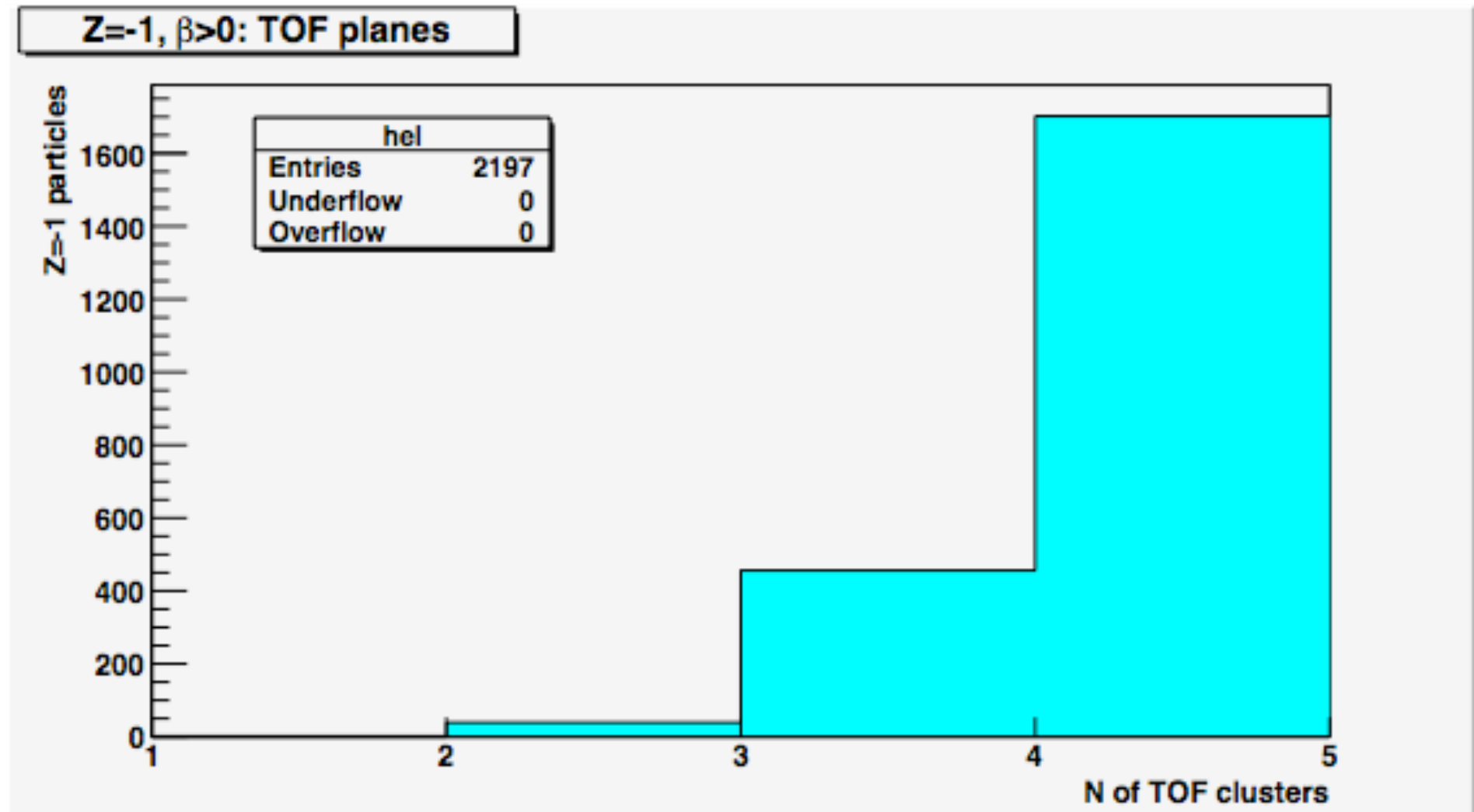




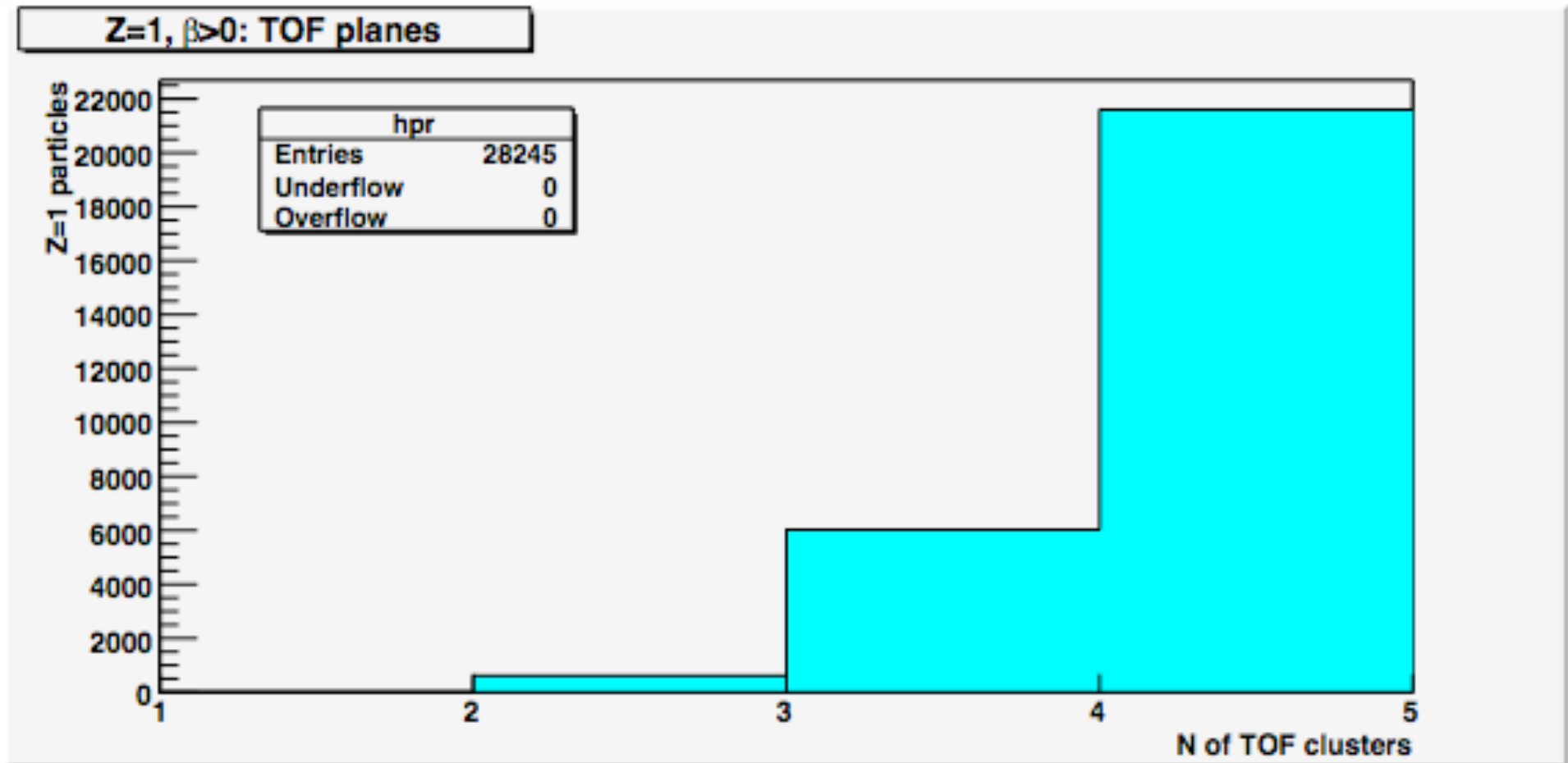
# Z=2 particles, $\langle S/N \rangle$ of Tracker clusters out of track



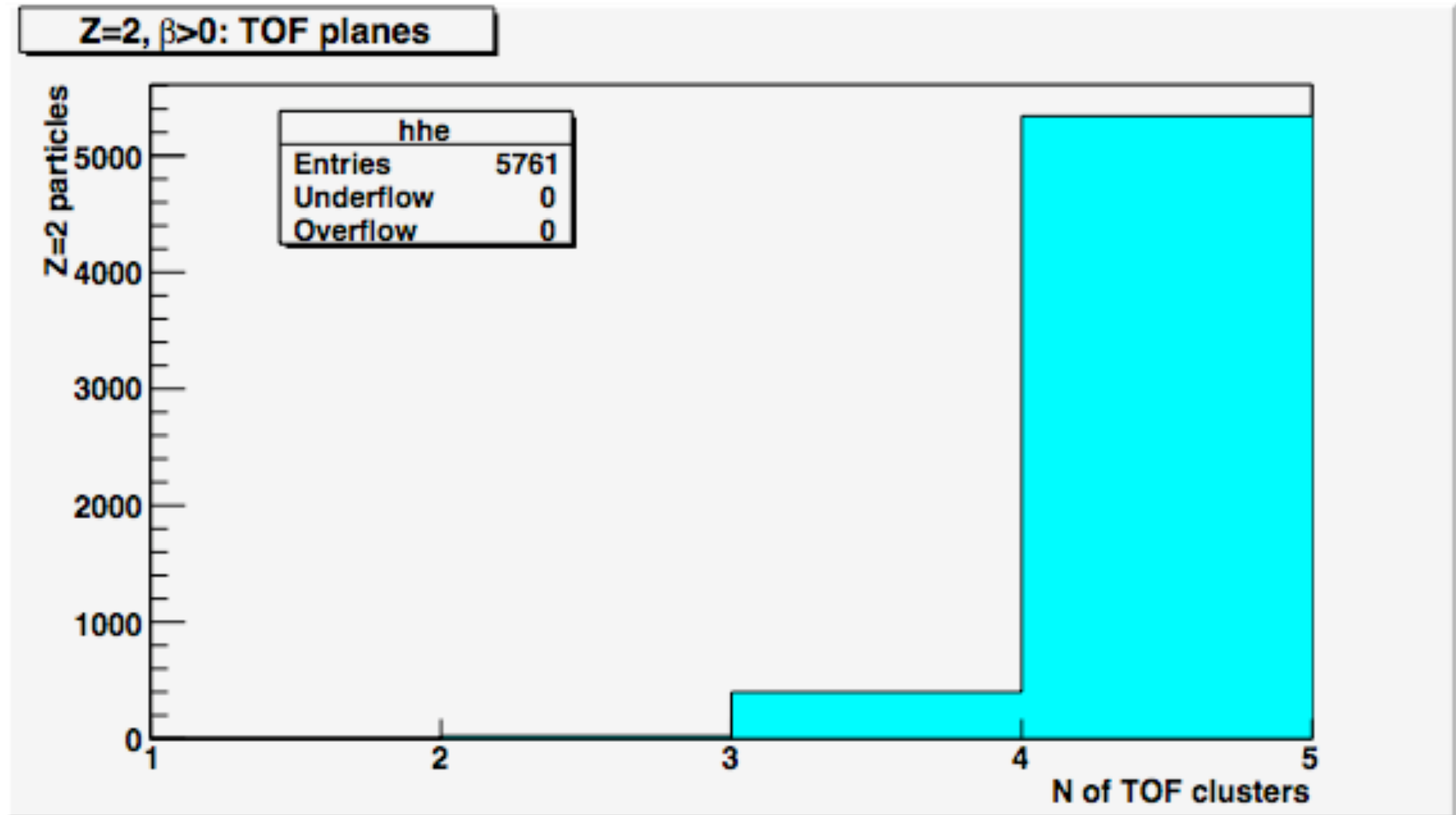
# Z=-1 particles, Number of TOF Clusters



# Z=1 particles, Number of TOF Clusters



# Z=2 particles, Number of TOF Clusters



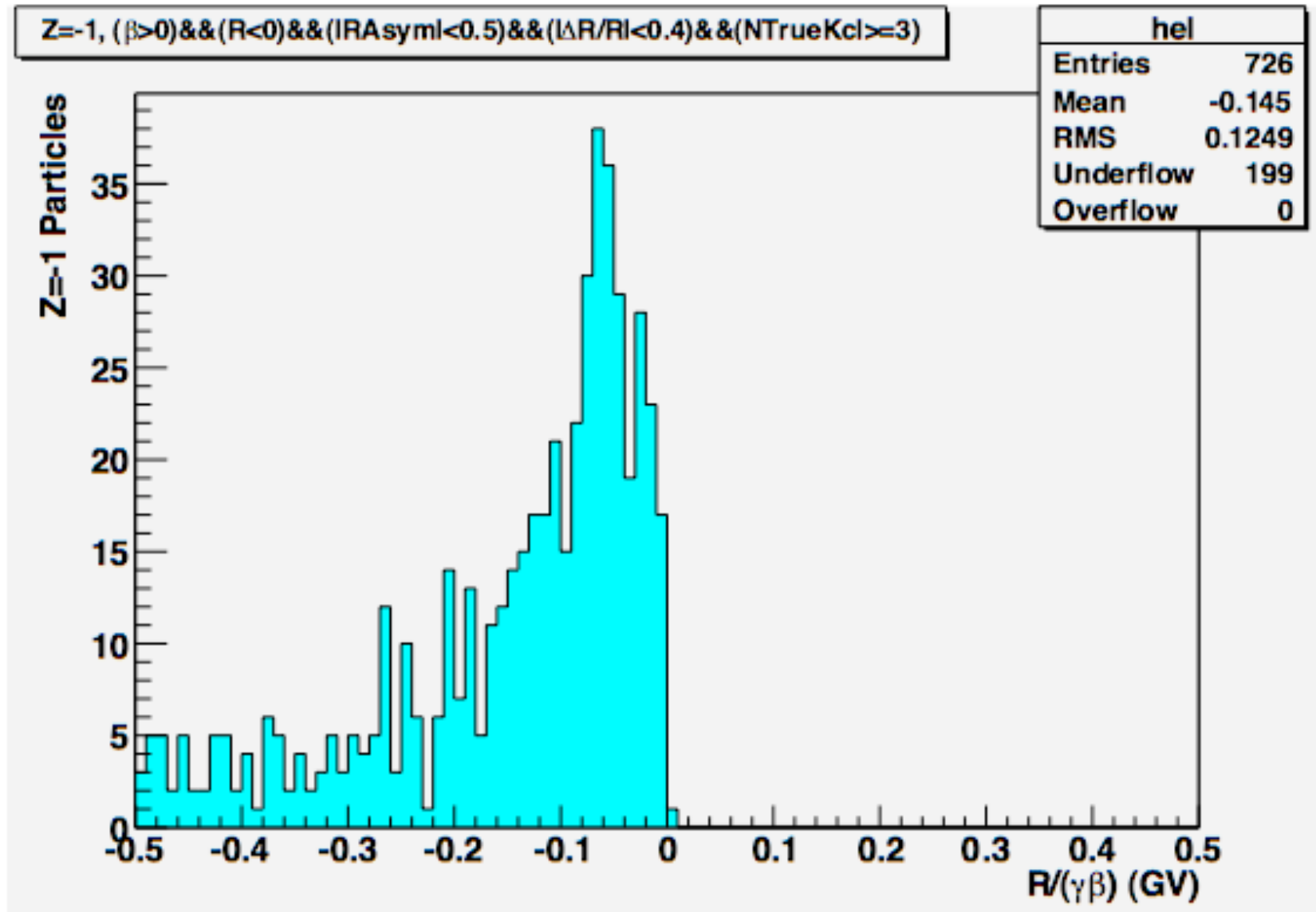
## SELECTION CUTS SUMMARY:

CUTS	e-	p	He
Preselection	2434	36241	5798
Downward going	2197	28245	5761
sign(R)	2167	28245	5761
ABS(R asymmetry ) < 0.5	1412	22068	4733
ABS( $\Delta R/R$ ) < 0.4	1393	21072	4563

# Z=-1 particles,

(signR) &(ABS(R asymmetry) < 0.5)&(ABS( $\Delta R/R$ ) < 0.4)

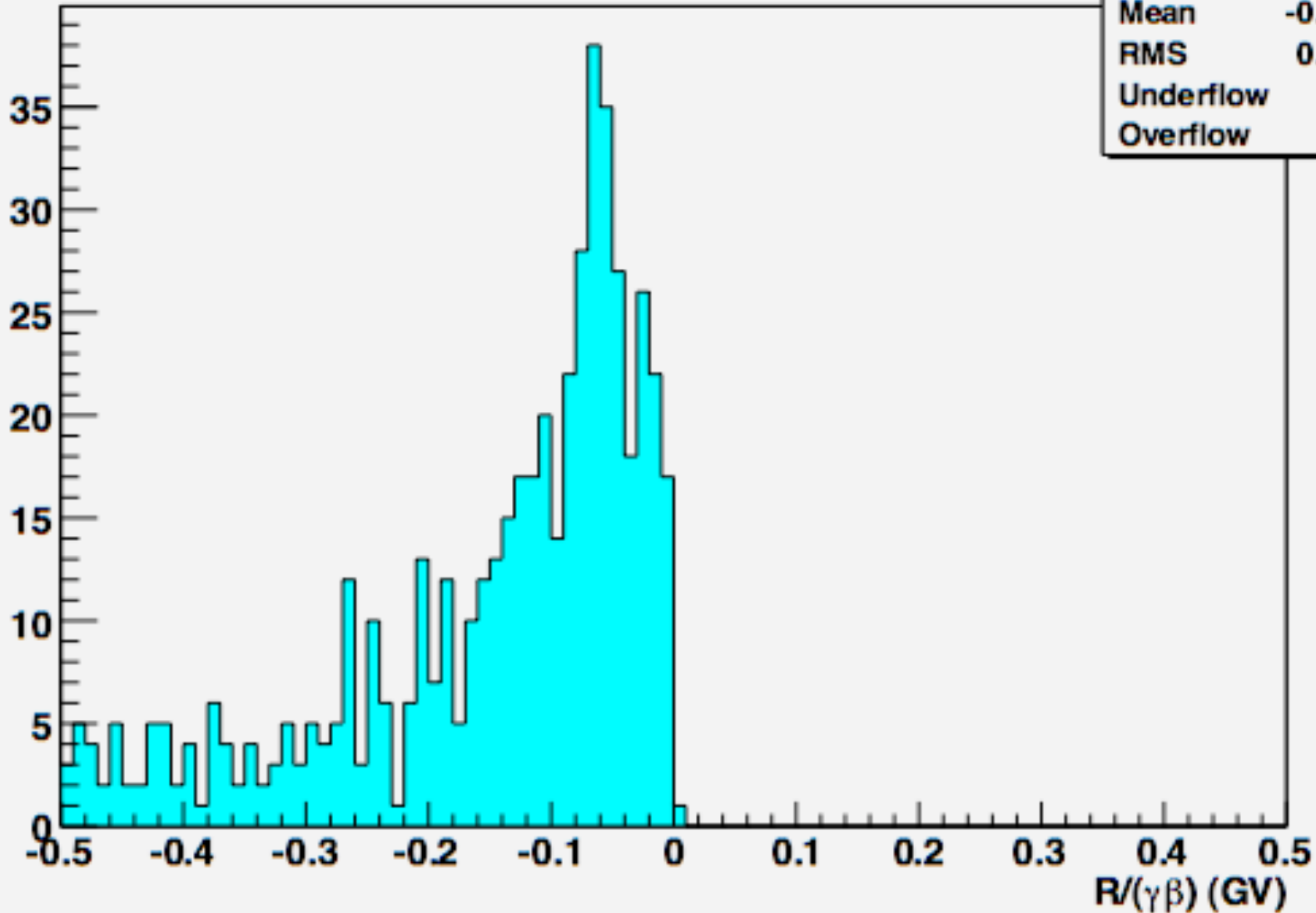
AND ( True K Clusters  $\geq 3$  )



Z=-1 particles, ...AND (Track (S/N)<sub>s</sub> ≥ 6 & (S/N)<sub>k</sub> ≥ 4 )

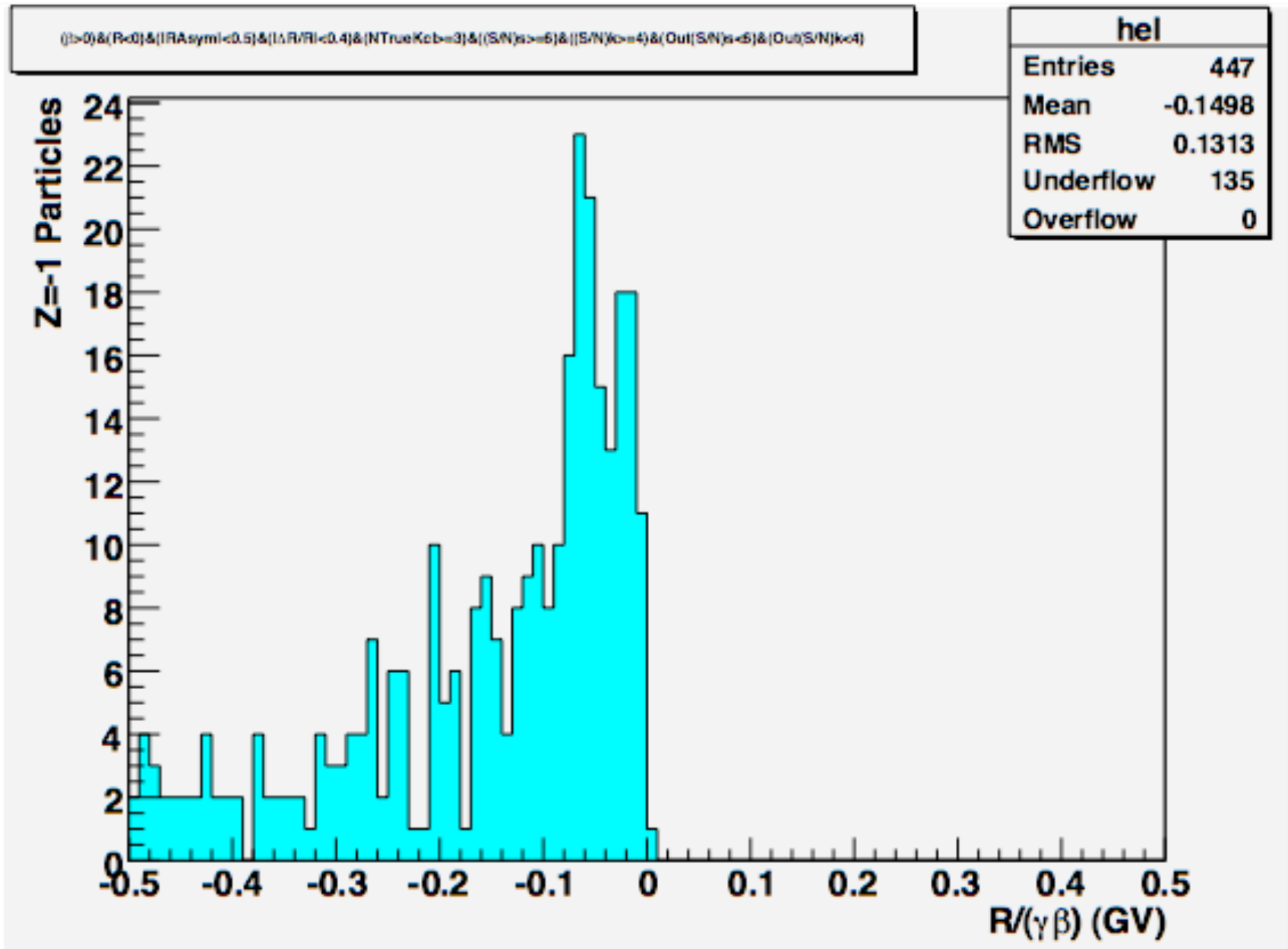
`((l>0)&&(R<0)&&(lRA sym<0.5)&&(lΔR/R|<0.4)&&(NTrueKc b=3)&&((S/N)s≥6)&&((S/N)k≥4)`

Z=-1 Particles



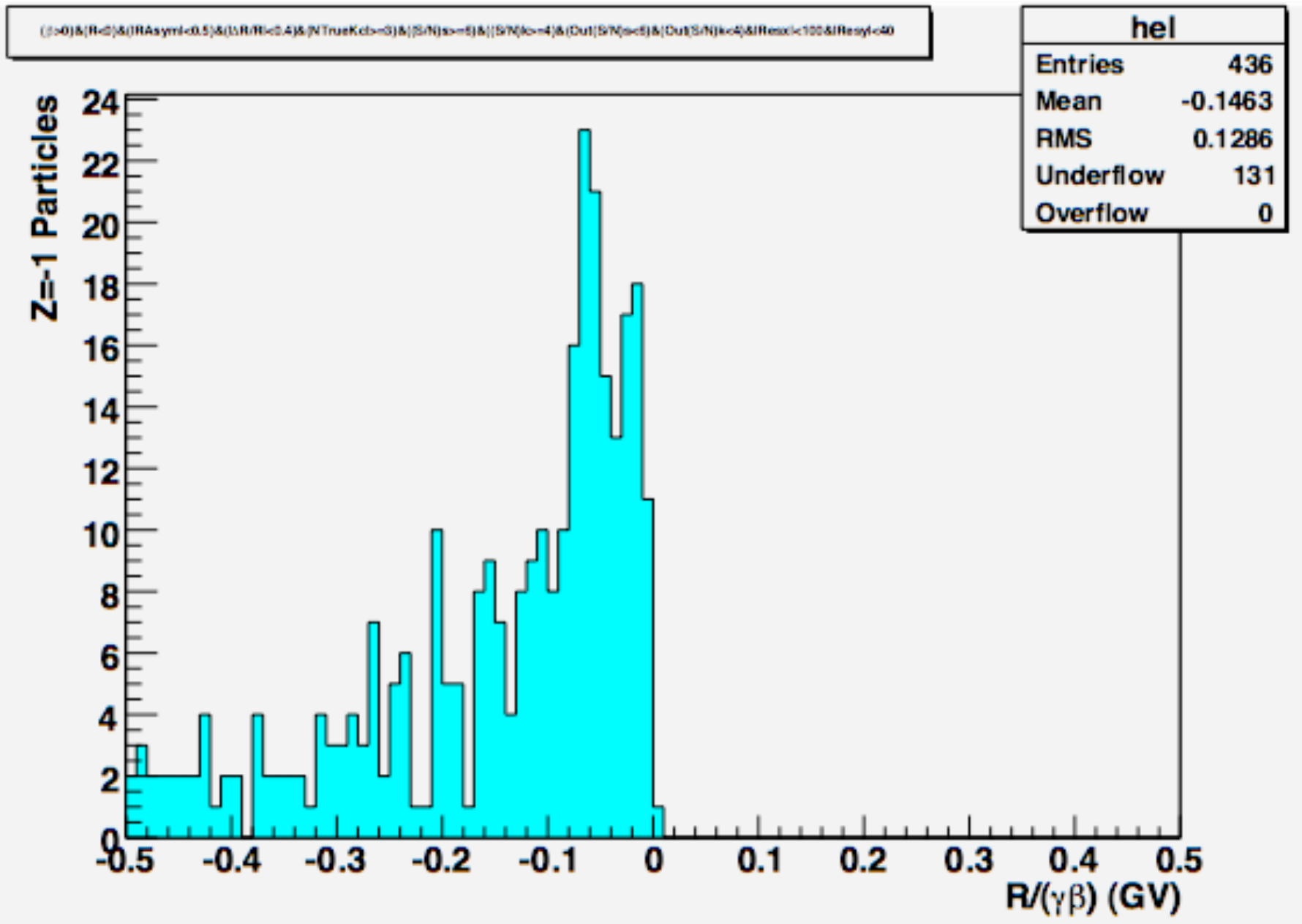
hel	
Entries	706
Mean	-0.1456
RMS	0.1249
Underflow	196
Overflow	0

Z=-1 particles, ..AND Out Of Track (S/N)<sub>s</sub><6 & (S/N)<sub>k</sub><4

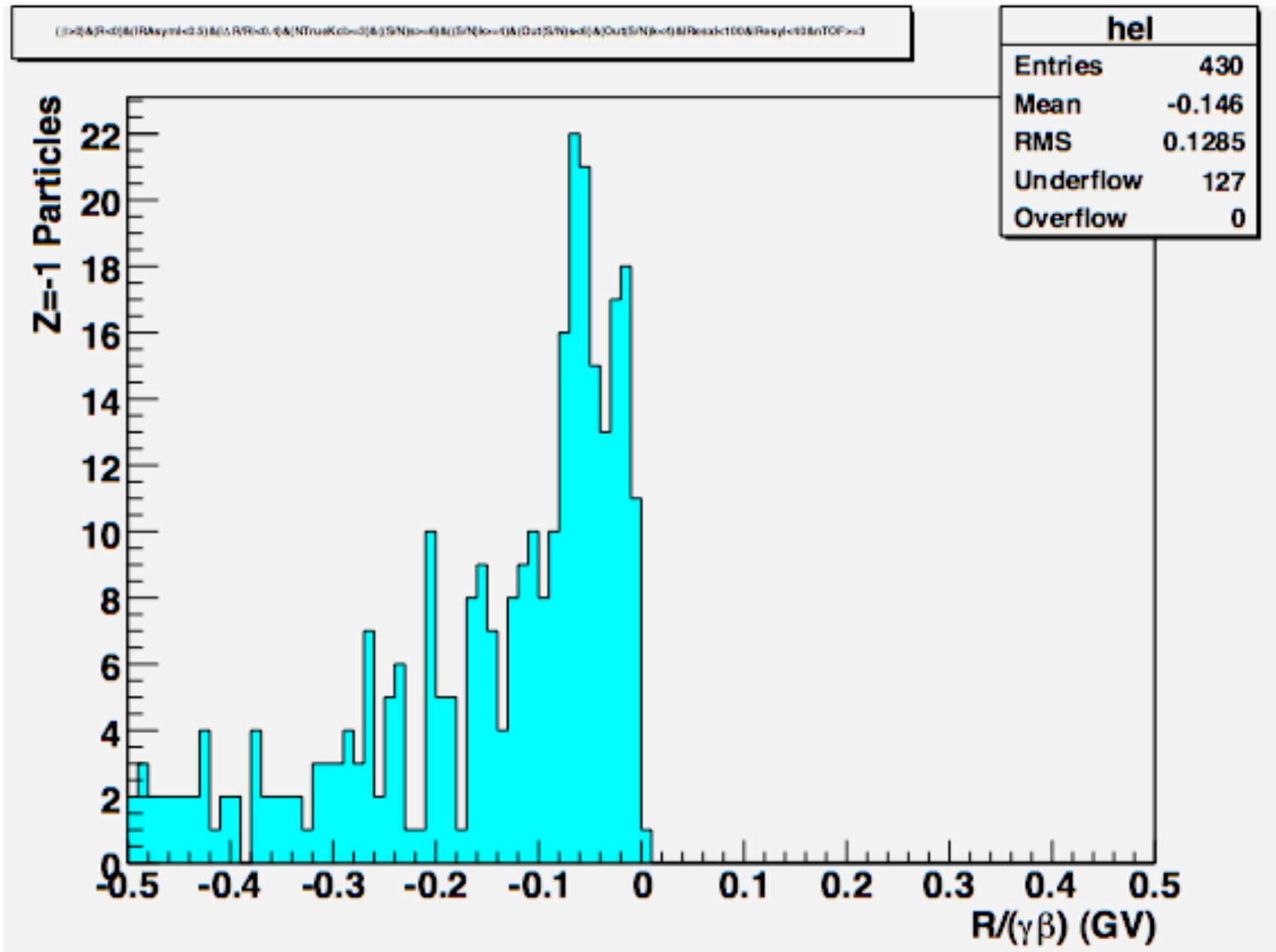




Z=-1 particles, ..AND ABS(Res(x))<100 & ABS(Res(y))<40



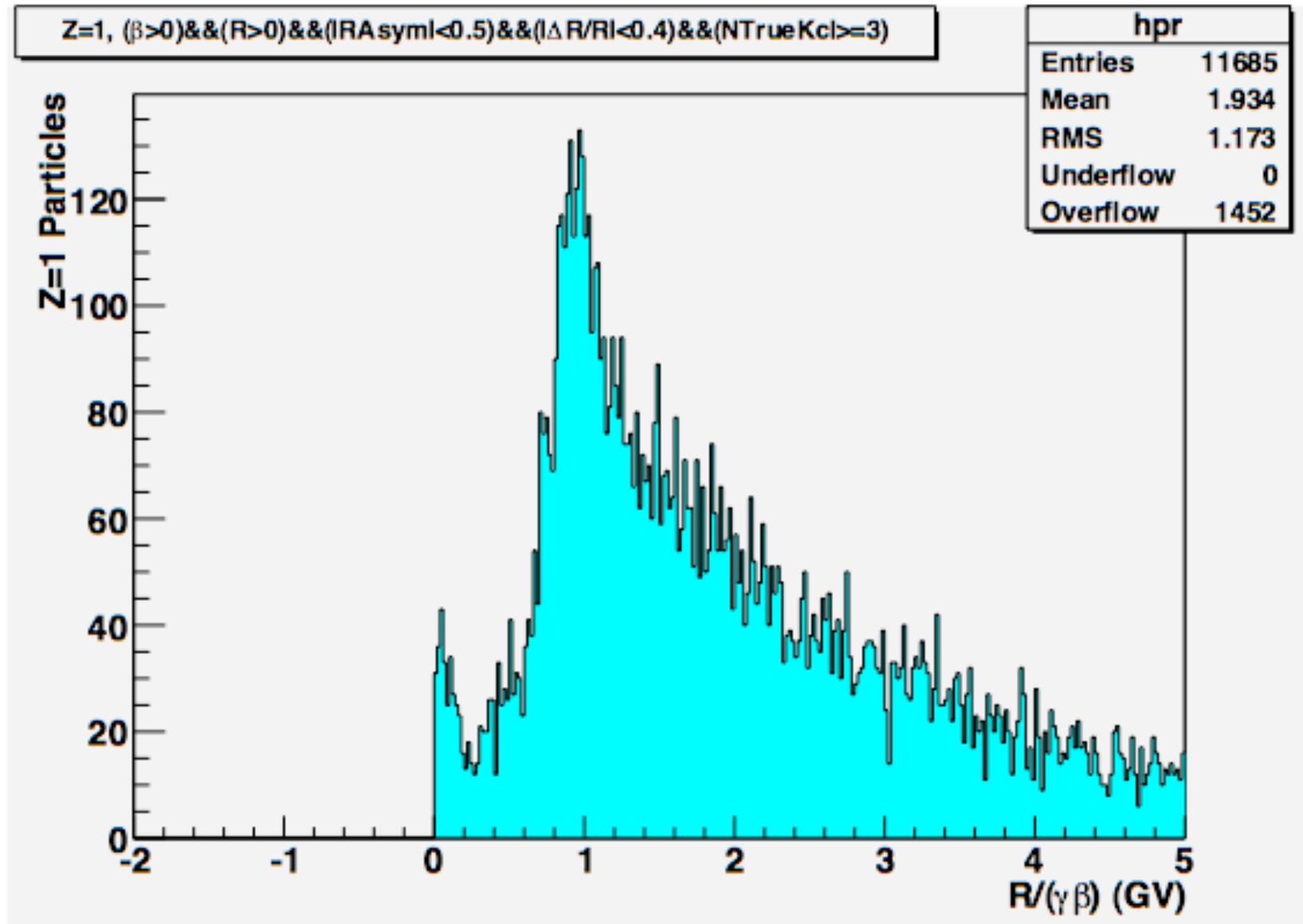
Z=-1 particles, ..AND Number of TOF Planes >=3



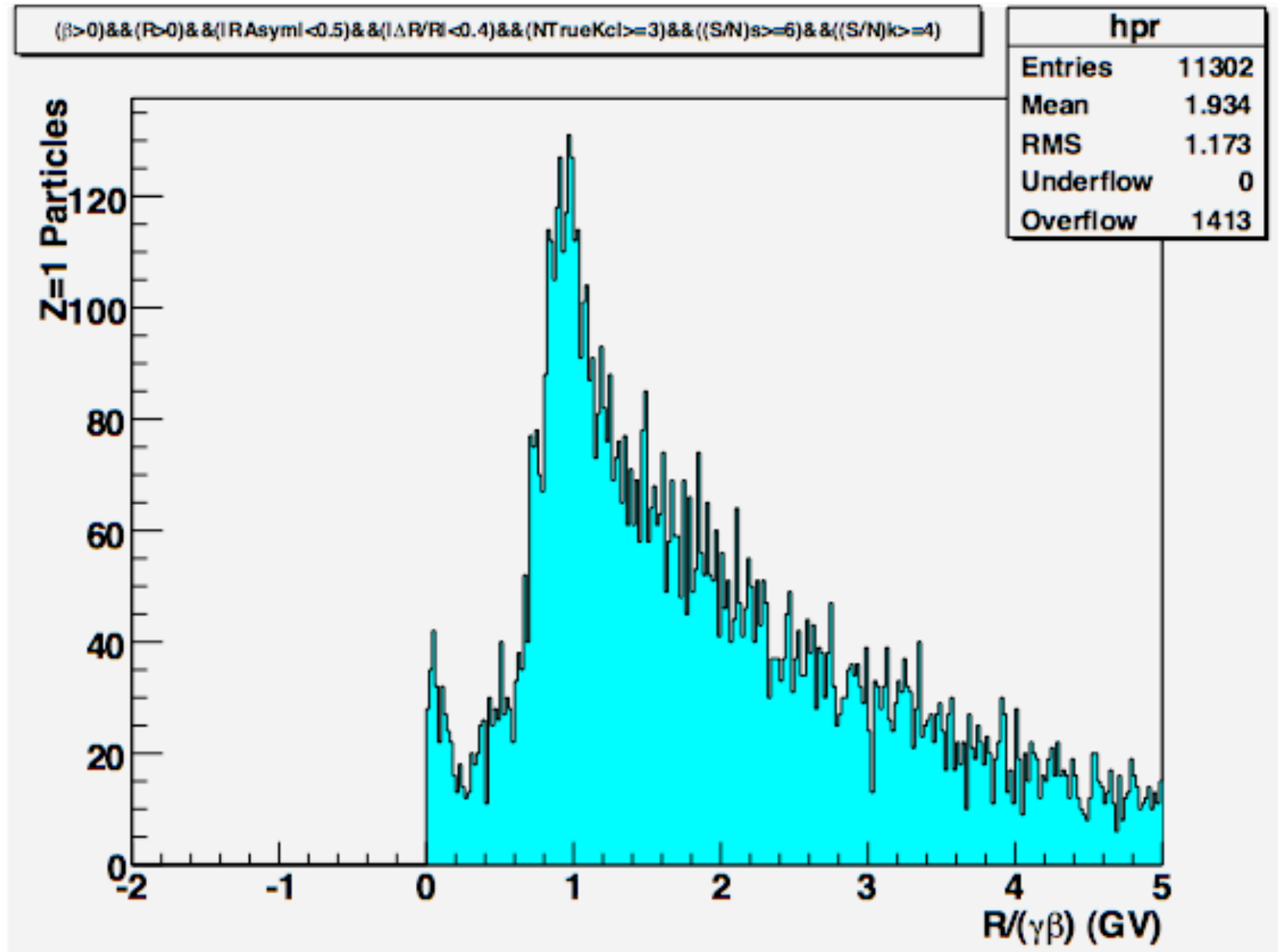
# Z=1 particles,

$(\text{sign}R) \ \&(\text{ABS}(R \text{ asymmetry}) < 0.5) \ \&(\text{ABS}(\Delta R/R) < 0.4)$

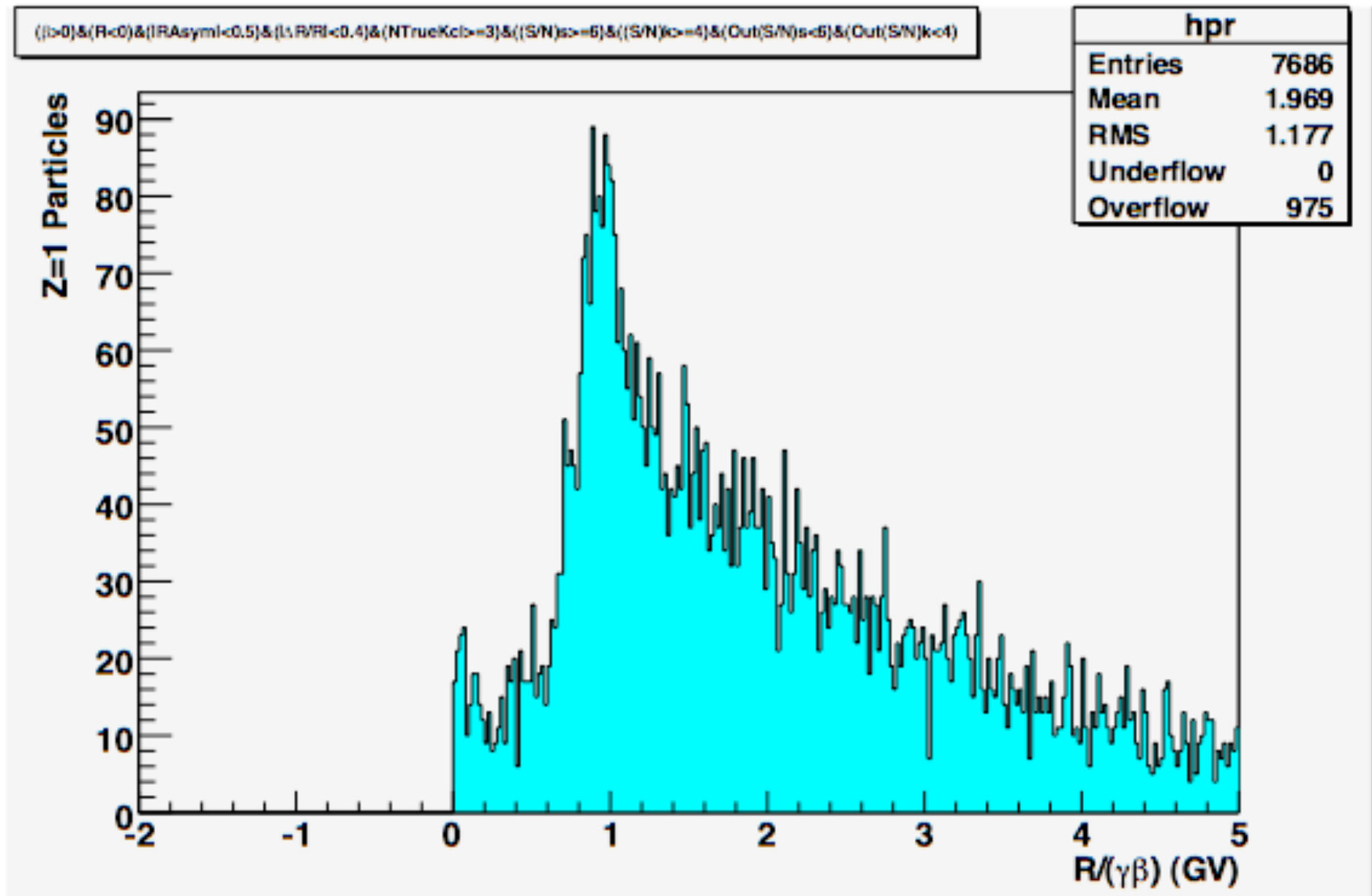
AND ( True K Clusters  $\geq 3$  )



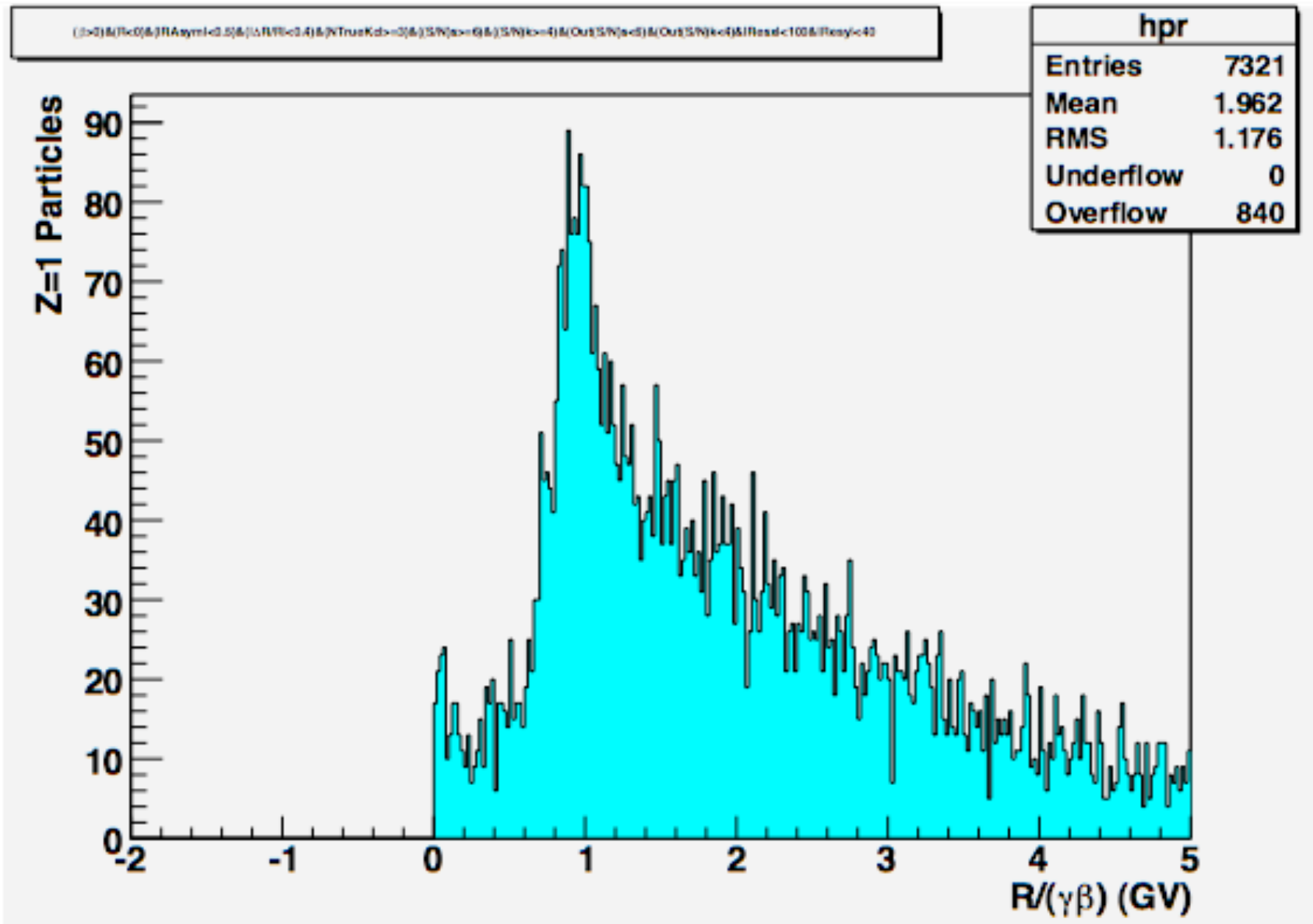
Z=1 particles, ...AND (Track (S/N)<sub>s</sub> ≥ 6 & (S/N)<sub>k</sub> ≥ 4 )



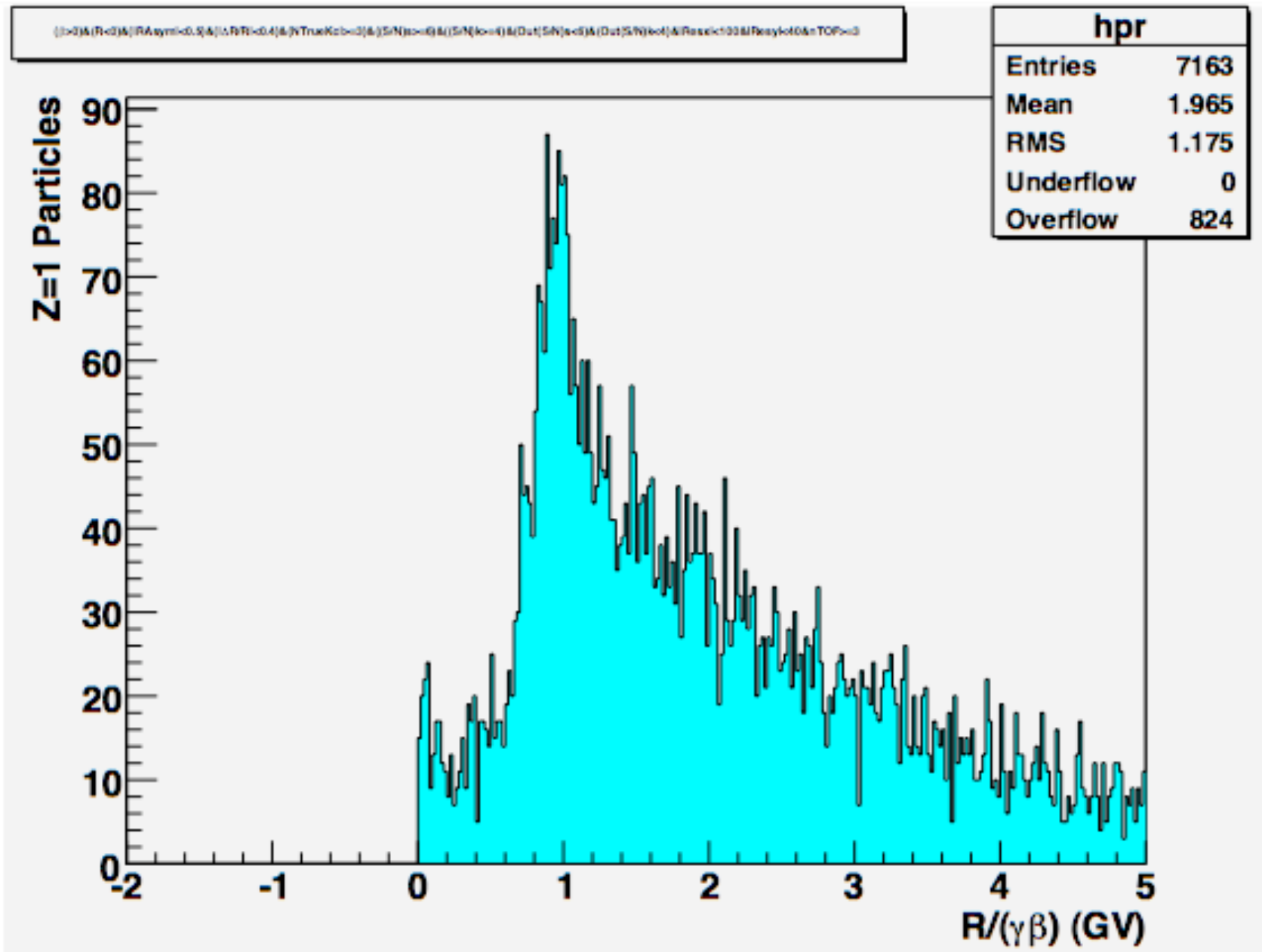
Z=1 particles, ..AND Out Of Track (S/N)<sub>s</sub><6 & (S/N)<sub>k</sub><4



Z=1 particles, ..AND ABS(Res(x))<100 & ABS(Res(y))<40



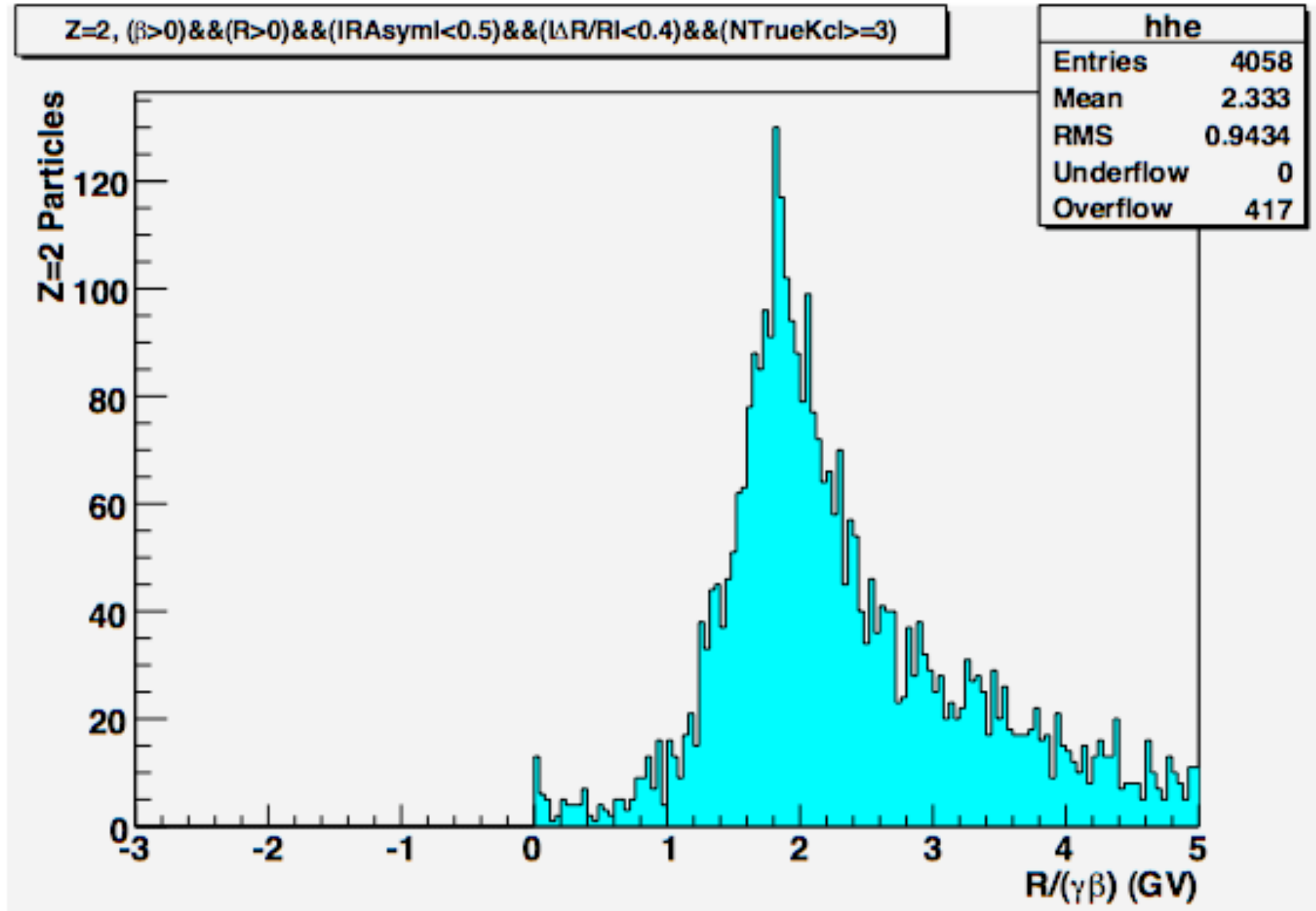
Z=1 particles, ..AND Number of TOF Planes  $\geq 3$



# Z=2 particles,

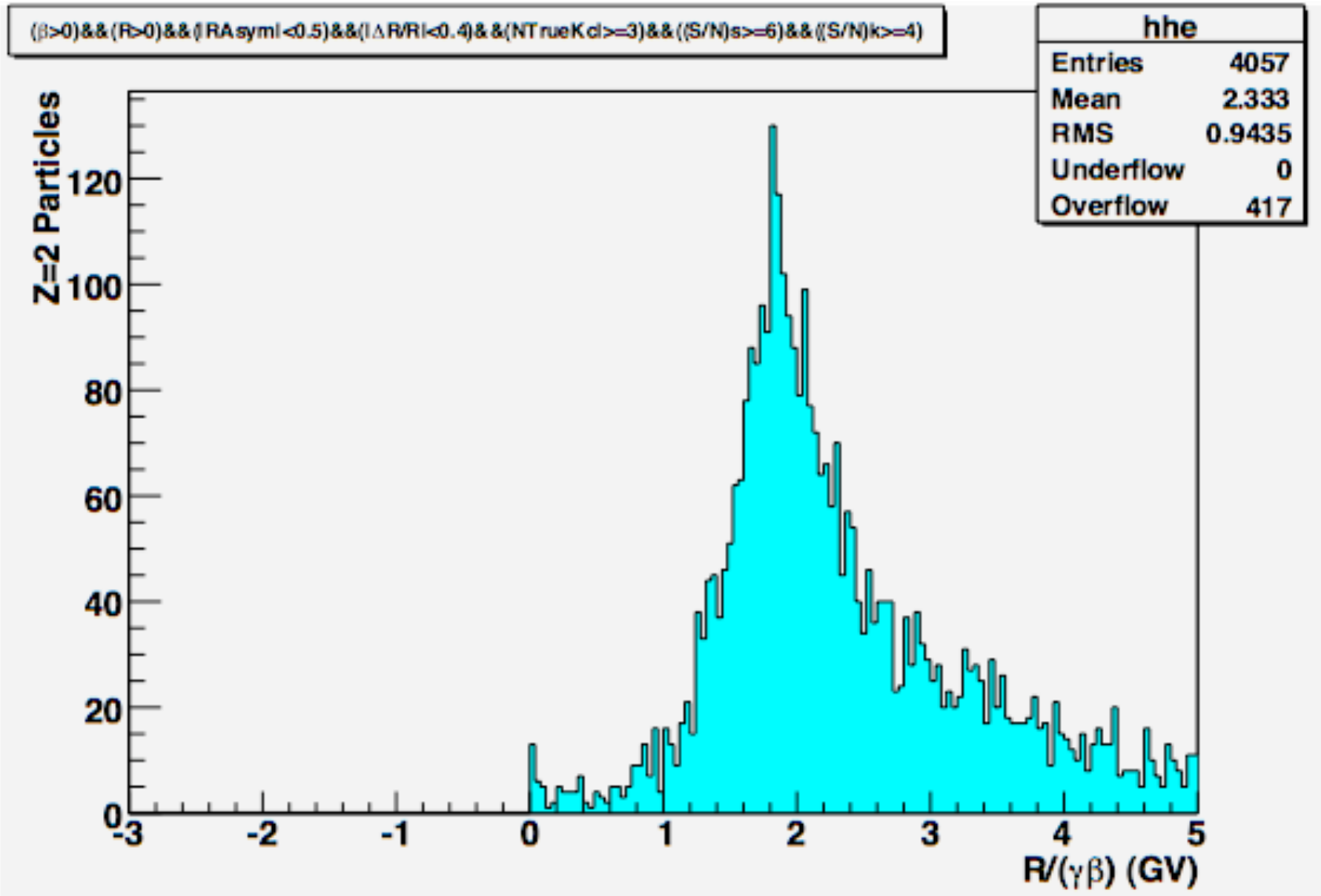
(signR) &(ABS(R asymmetry) < 0.5)&(ABS( $\Delta R/R$ ) < 0.4)

AND ( True K Clusters  $\geq 3$  )

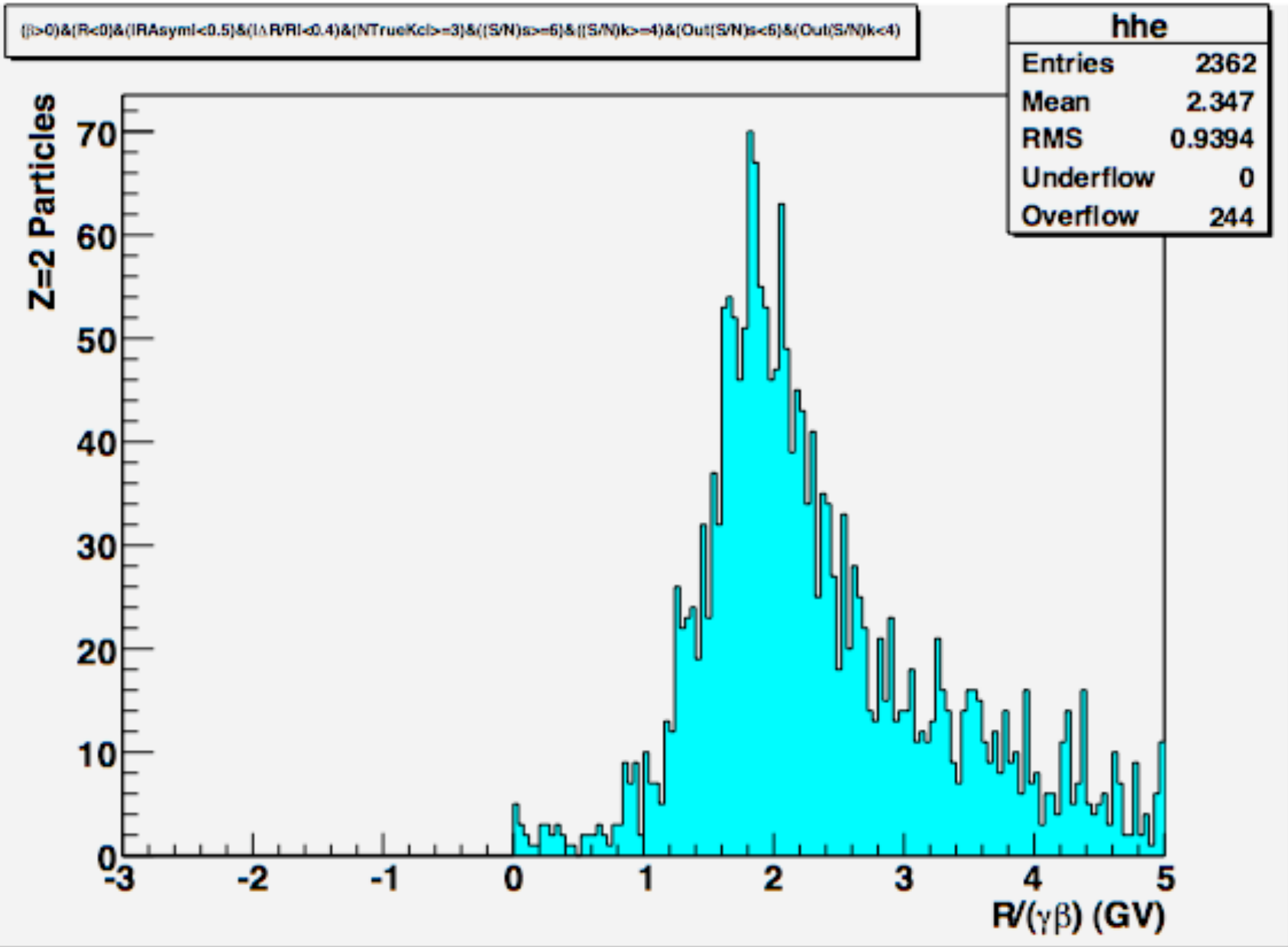




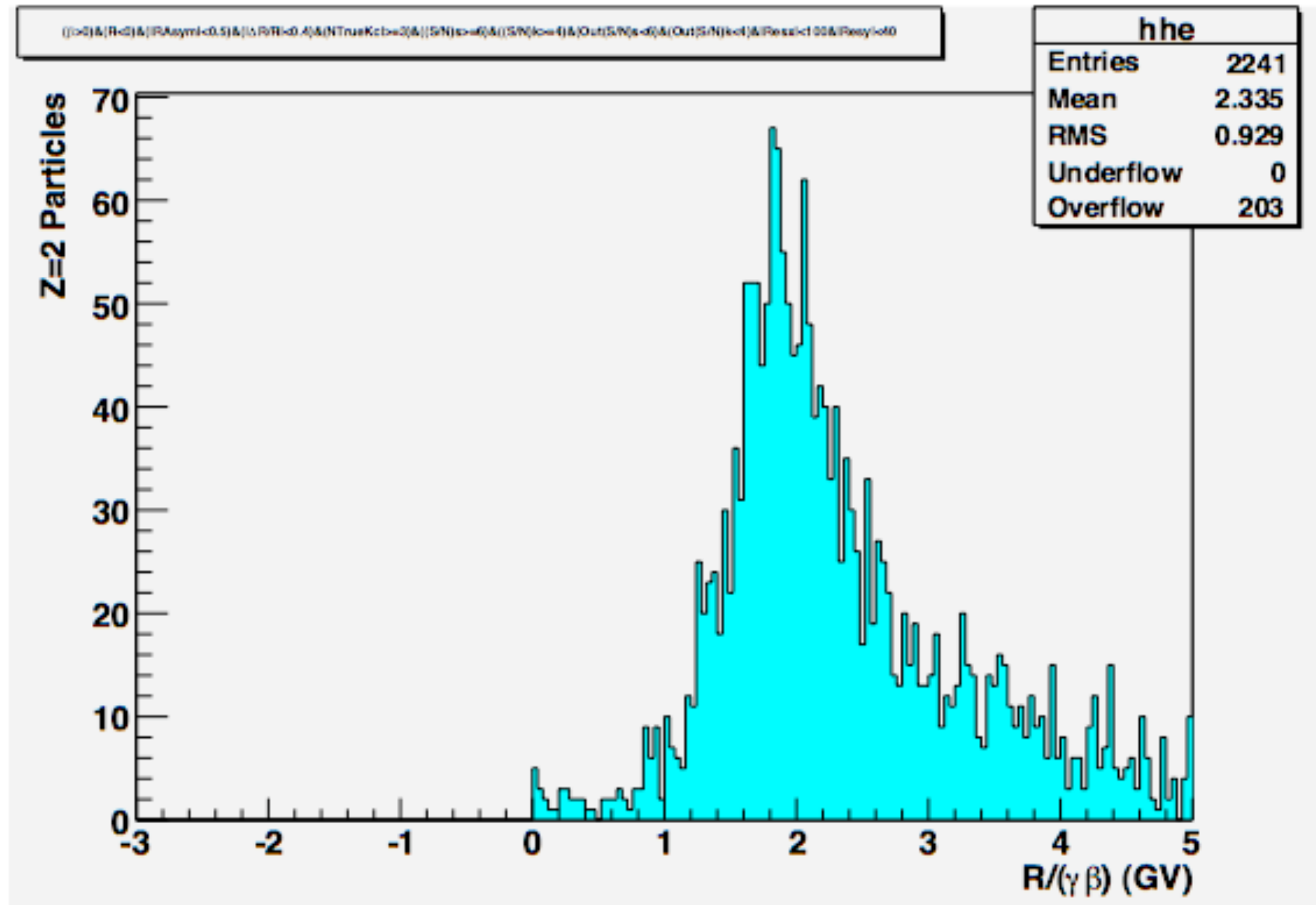
Z=2 particles, ...AND (Track (S/N)<sub>s</sub> ≥ 6 & (S/N)<sub>k</sub> ≥ 4 )



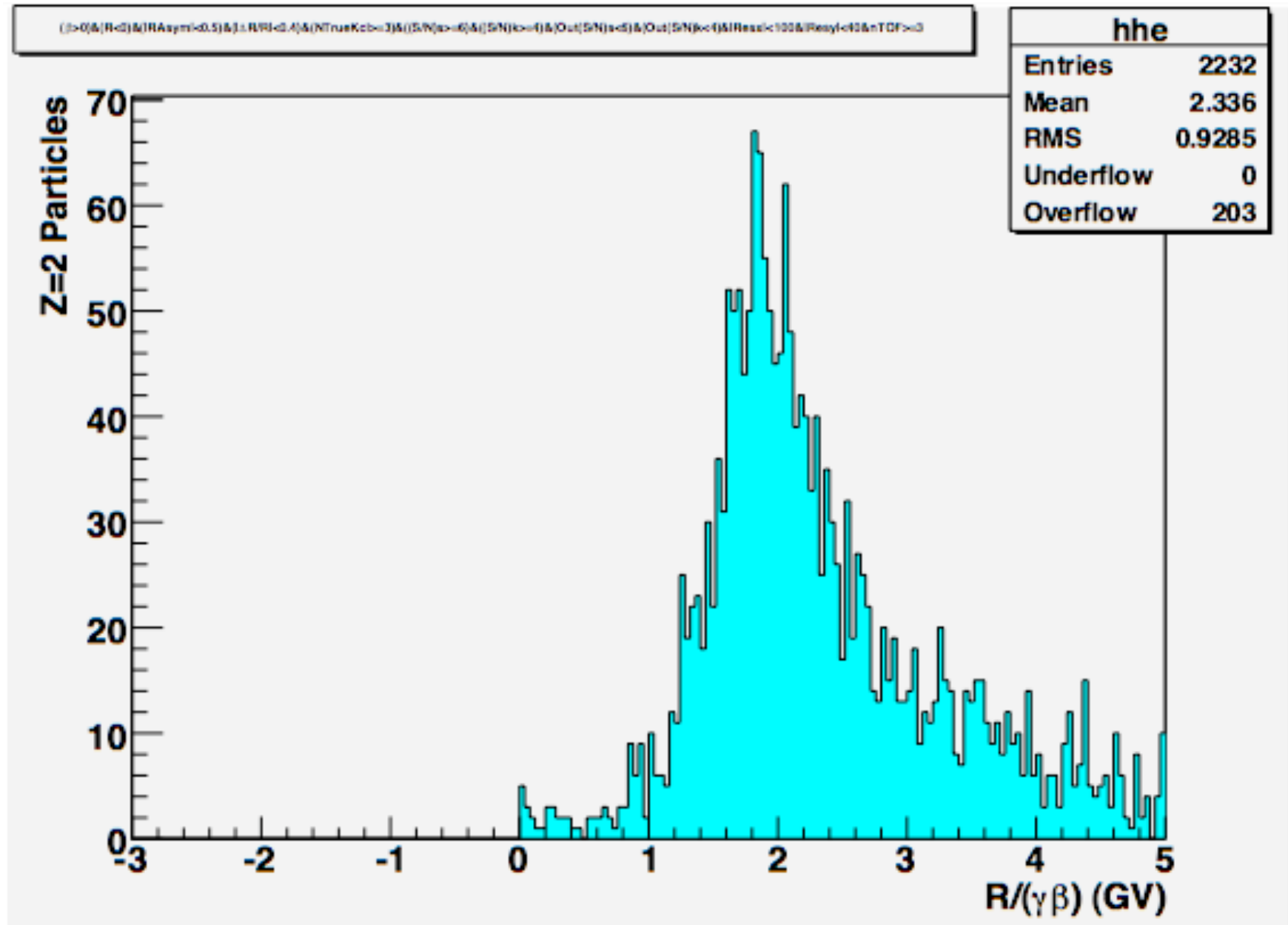
Z=2 particles, ..AND Out Of Track (S/N)<sub>s</sub><6 & (S/N)<sub>k</sub><4



Z=2 particles, ..AND ABS(Res(x))<100 & ABS(Res(y))<40



Z=2 particles, ..AND Number of TOF Planes  $\geq 3$



## SELECTION CUTS SUMMARY:

CUTS	e-	p	He
Preselection	2434	36241	5798
Downward going	2197	28245	5761
sign(R)	2167	28245	5761
ABS(R asymmetry ) < 0.5	1412	22068	4733
ABS( $\Delta R/R$ ) < 0.4	1393	21072	4563
True K Clusters $\geq 3$	726	11685	4058
Track (S/N) <sub>s</sub> $\geq 6$ & (S/N) <sub>k</sub> $\geq 4$	706	11302	4057
Out Of Track (S/N) <sub>s</sub> $< 6$ & (S/N) <sub>k</sub> $< 4$	447	7686	2362
ABS(Res(x)) $< 100$ & ABS(Res(y)) $< 40$	436	7321	2241
Number of TOF Planes $\geq 3$	430	7163	2232