2019 SVT Calibration/Alignment

Norman Graf (SLAC)

HPS SVT Meeting, September 23, 2019
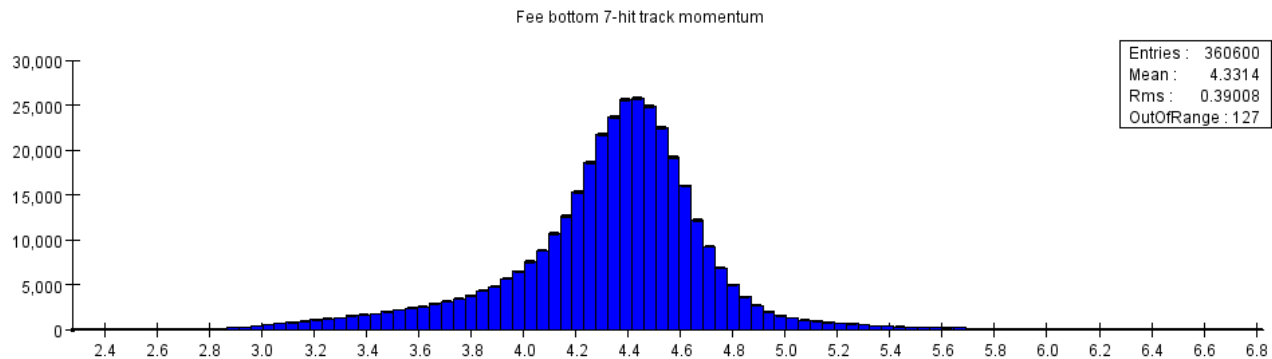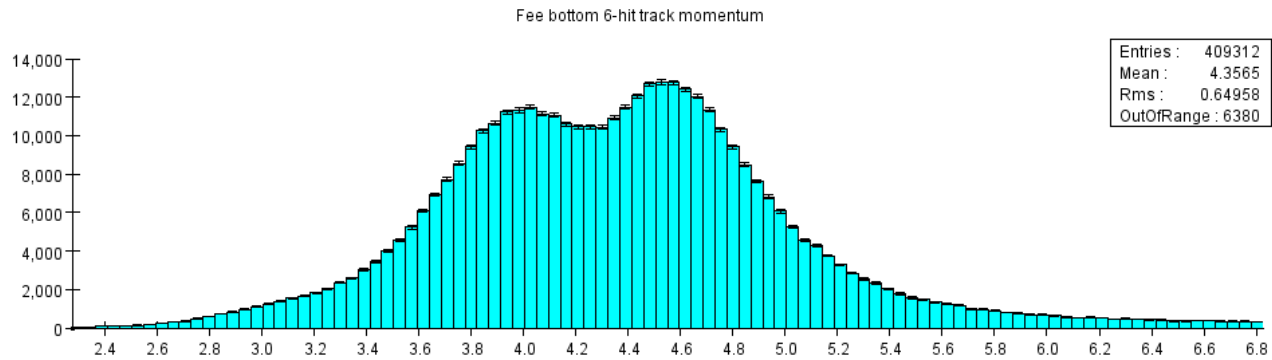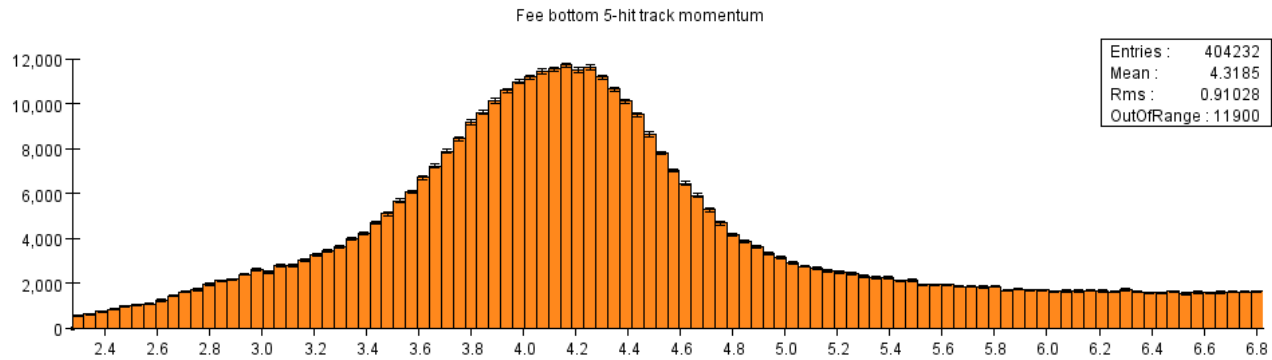
SVT Alignment & Calibration

- Will check that FEE tracks from top and bottom point to same target position.

  - Will allow alignment of "slim sensors" in stations 1 & 2 (old 0 & 1), which are not hit by straight-tracks in the field-off running.

  - Will allow determination of target position in z.

- Will use momentum scale and resolution of FEEs as one metric for the alignment.

hps_010104 FEE Run

- Processed events from one of the early dedicated FEE runs.

    - All bottom layers were working -> 14 hits tracks.

- Reconstructed using standard steering file

- Skimmed events separately from top and bottom.

- Selected events with one and only one cluster and track.
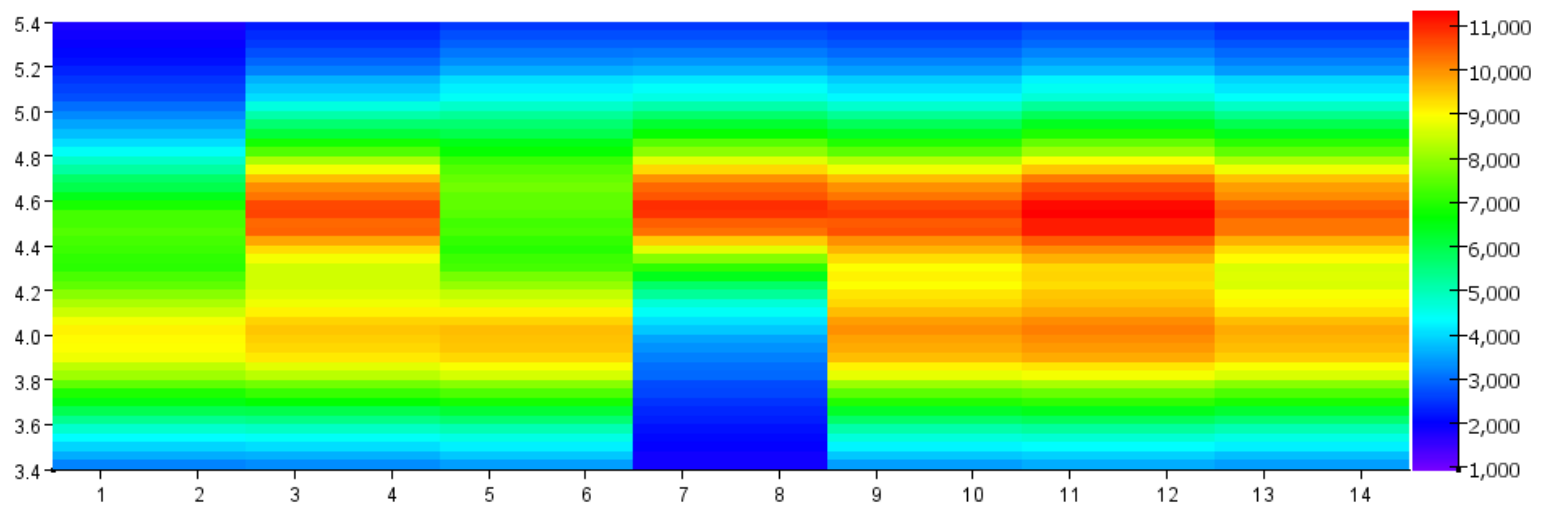
FEE 10104 Bottom Momenta

Fee bottom 5-hit track momentum

Entries :	404232
Mean :	4.3185
Rms :	0.91028
OutOfRange :	11900

Fee bottom 6-hit track momentum

Entries :	409312
Mean :	4.3565
Rms :	0.64958
OutOfRange :	6380

Fee bottom 7-hit track momentum

Entries :	360600
Mean :	4.3314
Rms :	0.39008
OutOfRange :	127

FEE 10104 Bottom Momenta vs Layer
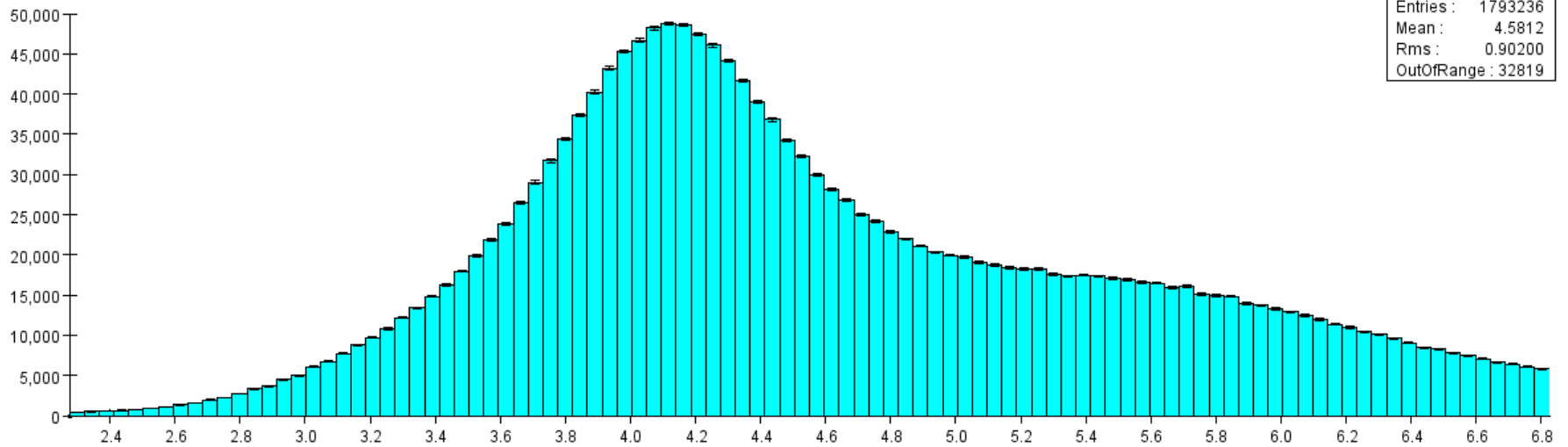

bottom 5-hit Track hit layer number vs track momentum
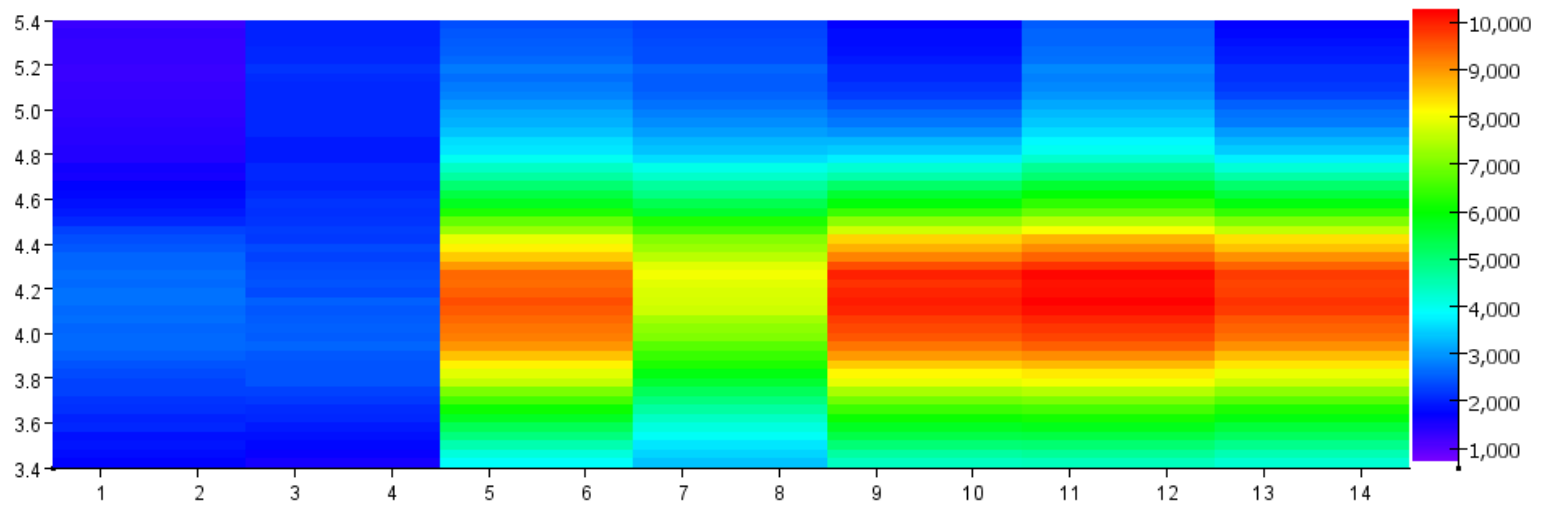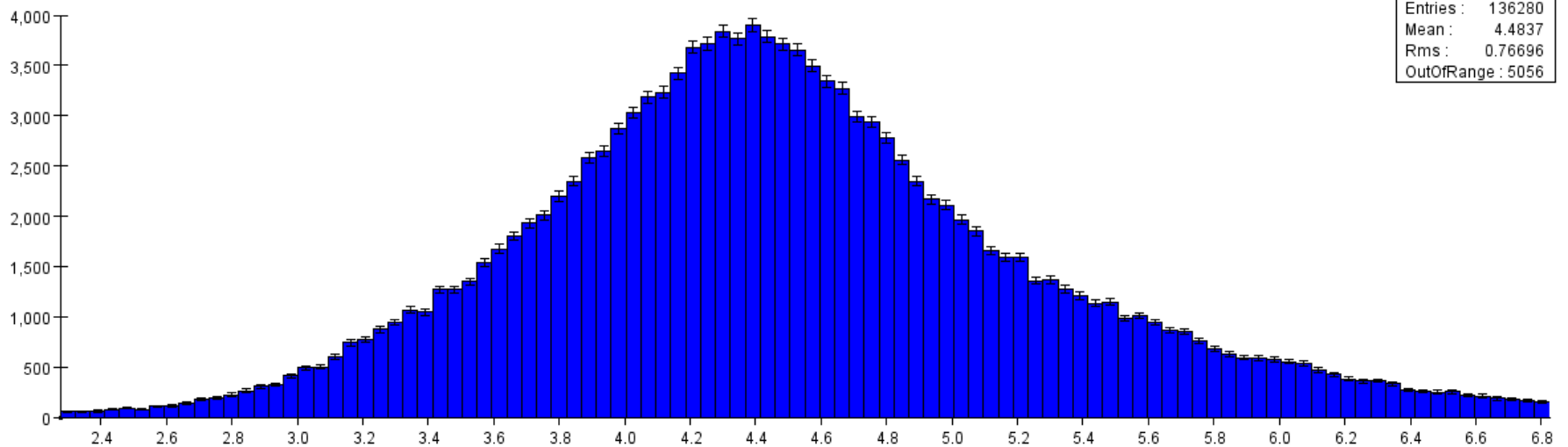

bottom 6-hit Track hit layer number vs track momentum

5

FEE 10104 Top Momenta
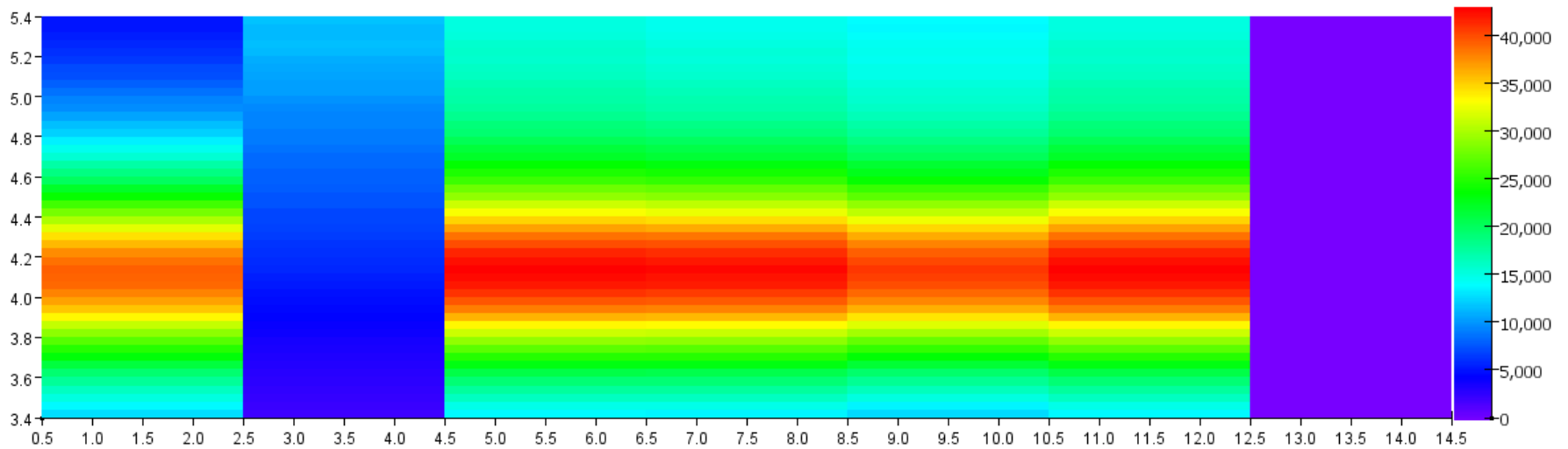

Fee top 5-hit track momentum

Entries :	1793236
Mean :	4.5812
Rms :	0.90200
OutOfRange : 32819

Fee top 6-hit track momentum

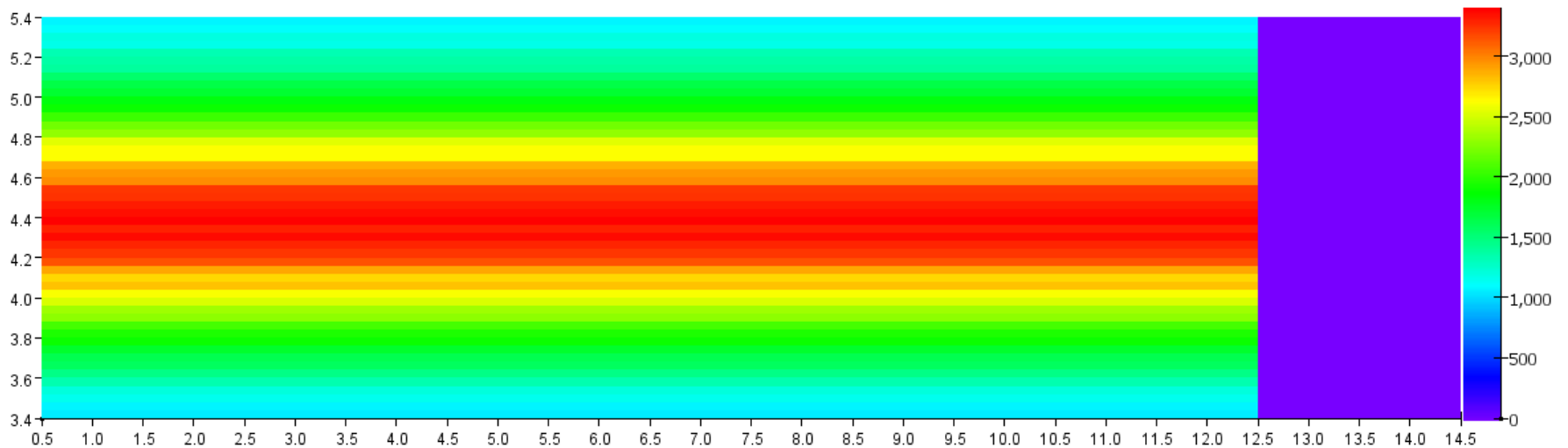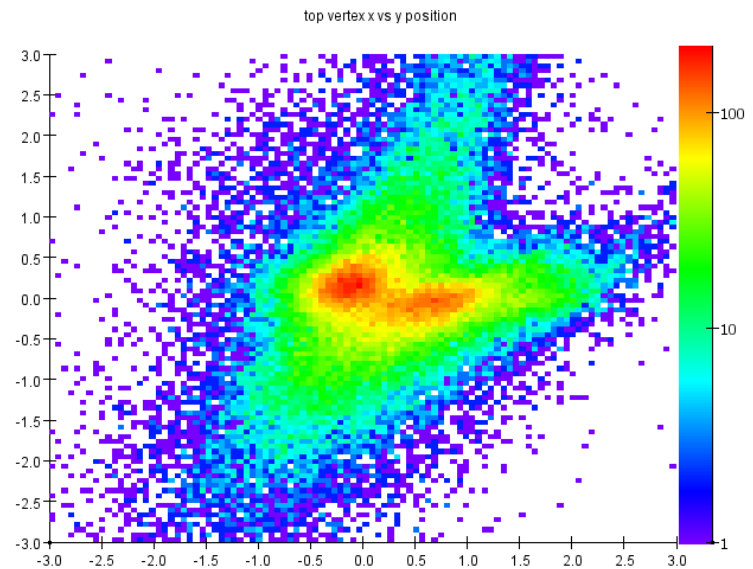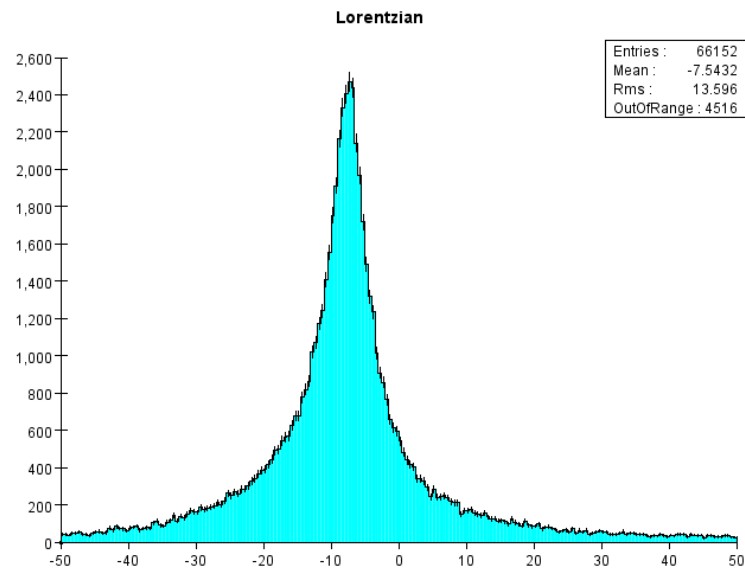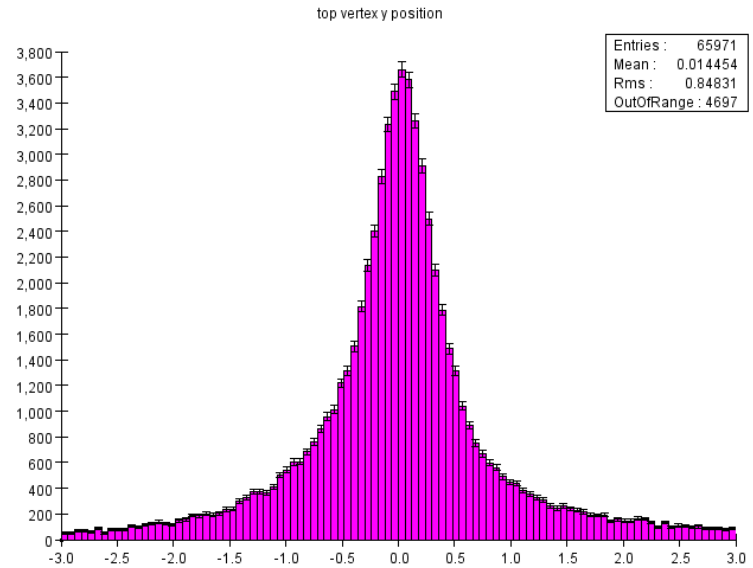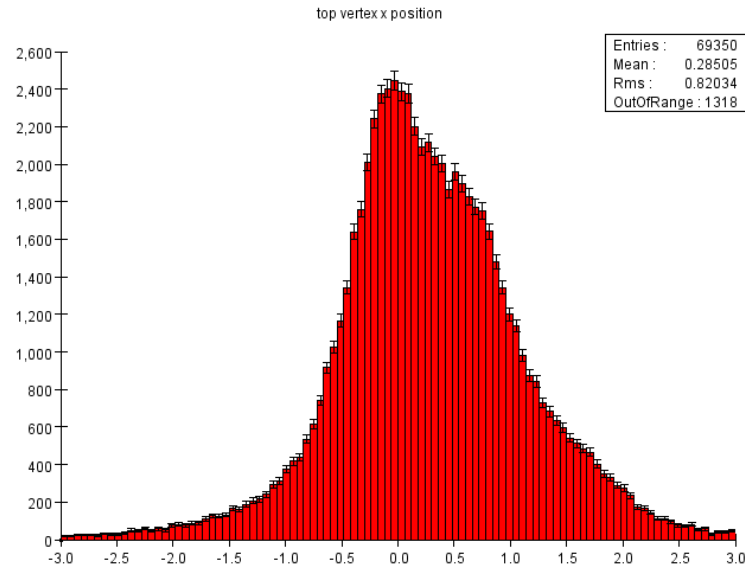| Entries :	136280
Mean :	4.4837
Rms :	0.76696
OutOfRange : 5056

FEE 10104 Top Momenta vs Layer

top 5-hit Track hit layer number vs track momentum
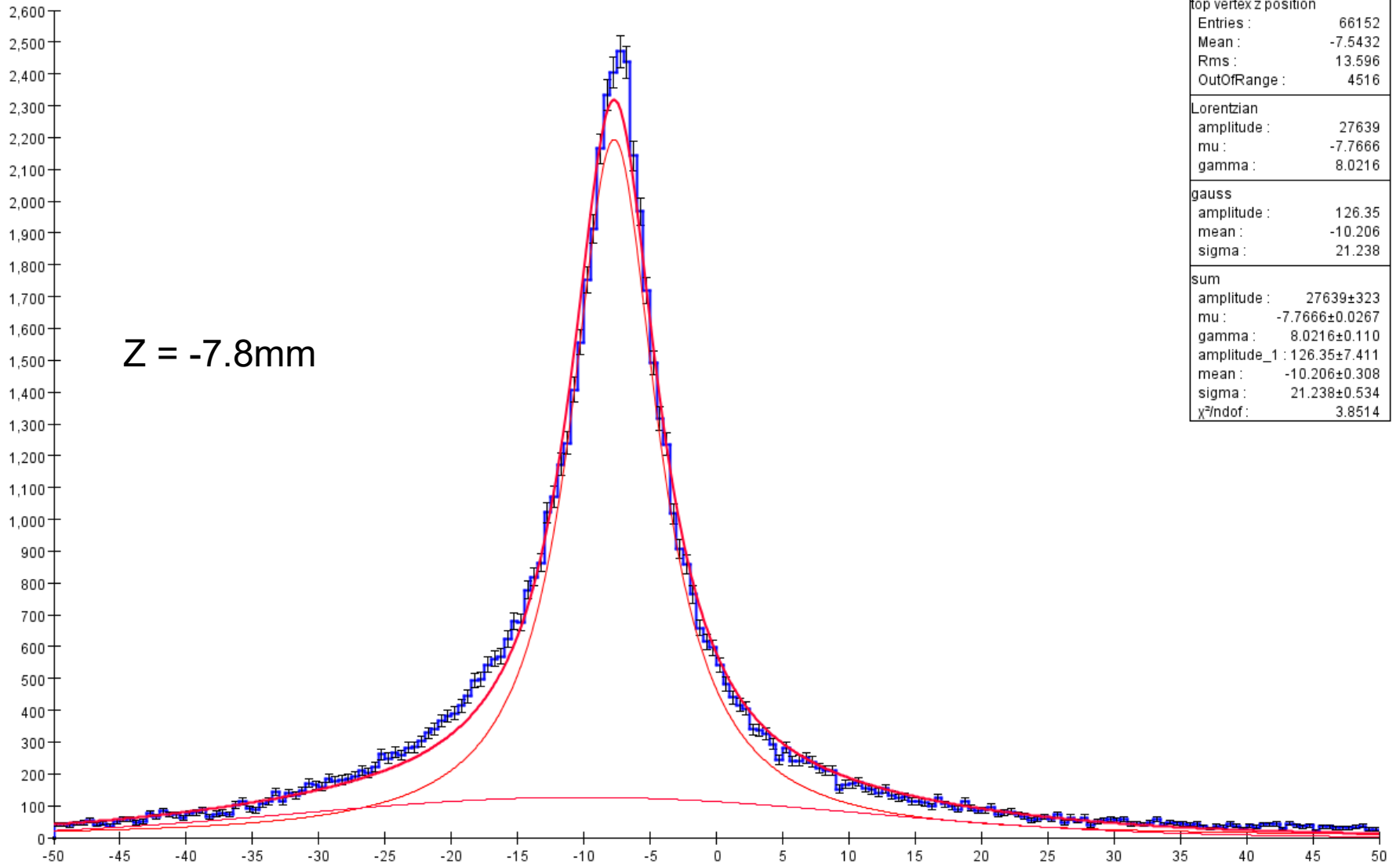

top 6-hit Track hit layer number vs track momentum

FEE 10104 Two Top Track Vertices

FEE 10104 Two Top Track Vertices

10104 Two Top FEE Tracks Vertex Z Position

Z = -7.8mm

top vertex z position	
Entries :	66152
Mean :	-7.5432
Rms :	13.596
OutOfRange :	4516
Lorentzian	
amplitude :	27639
mu :	-7.7666
gamma :	8.0216
gauss	
amplitude :	126.35
mean :	-10.206
sigma :	21.238
sum	
amplitude :	27639±323
mu :	-7.7666±0.0267
gamma :	8.0216±0.110
amplitude_1 :	126.35±7.411
mean :	-10.206±0.308
sigma :	21.238±0.534
χ^2/ndof :	3.8514

FEE 10104 2 Bottom Track Vertices

FEE 10104 Two Top Track Vertices

10104 10104 Two Bottom FEE Tracks Vertex Z Position

Z = -7.9mm
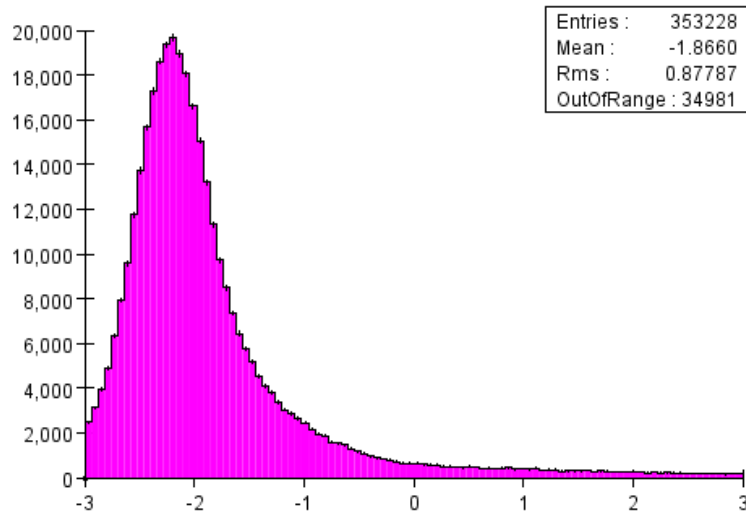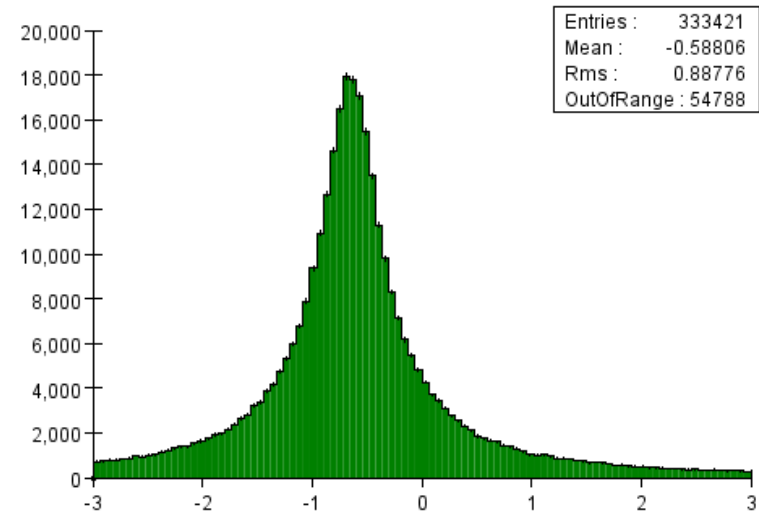
bottom vertex z position	
Entries :	332874
Mean :	-6.2407
Rms :	15.000
OutOfRange :	55335

Lorentzian	
amplitude :	142874
mu :	-7.9296
gamma :	10.056

gauss	
amplitude :	513.98
mean :	-2.8104
sigma :	26.893

sum	
amplitude :	142874±691
mu :	-7.9296±0.014
gamma :	10.056±0.0573
amplitude_1 :	513.98±12.0
mean :	-2.8104±0.2010
sigma :	26.893±0.295
χ^2/ndof :	5.0909
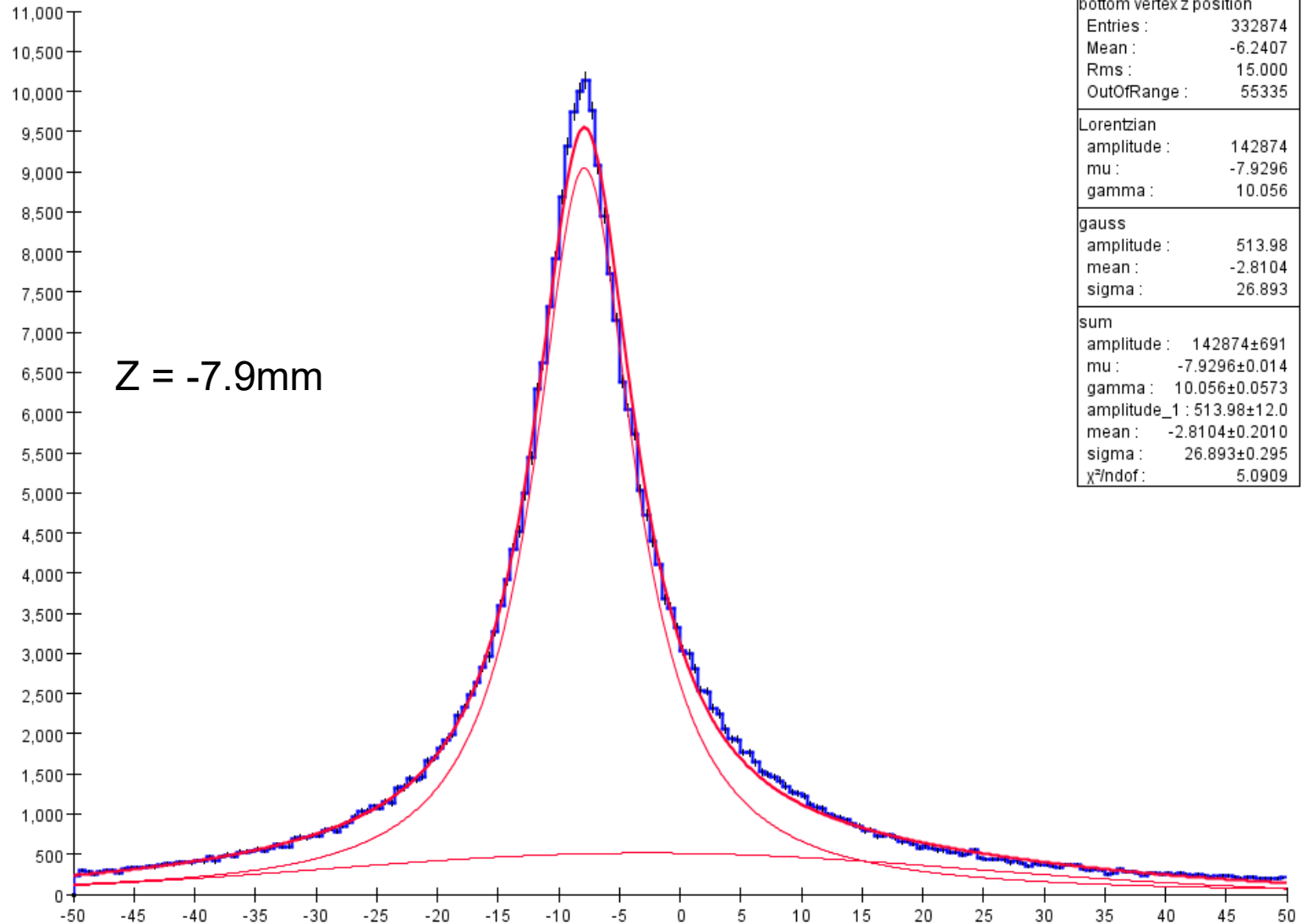
Summary

- A number of calibration and alignment efforts are ongoing, not all of which were touched on here.

- Have identified and in many cases staged and reconstructed event samples (field-off & FEE).

- Will have full reports on all calibration projects at upcoming meetings.

- Stay tuned to the Ecal, SVT, software and DAWG meetings.