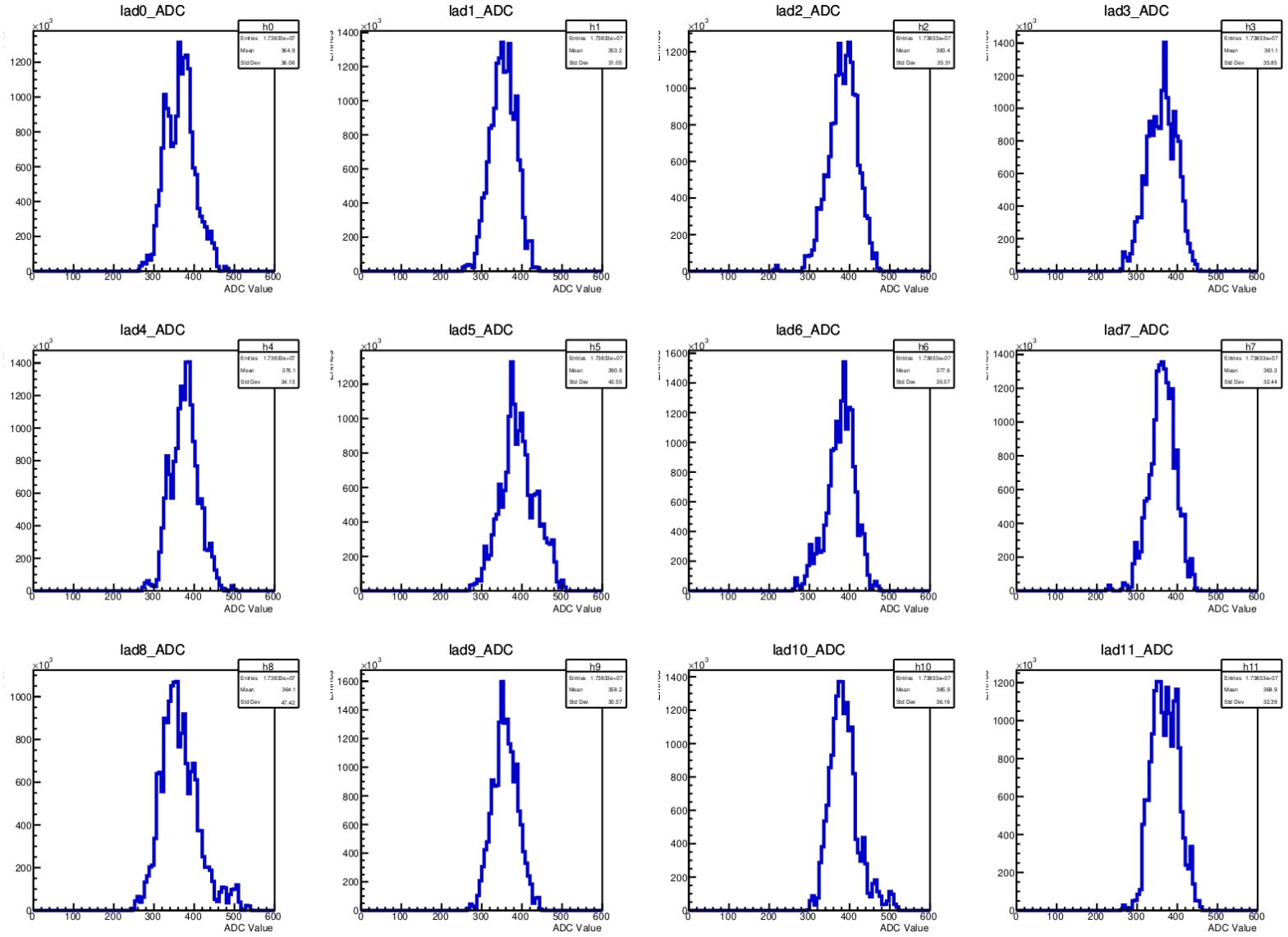
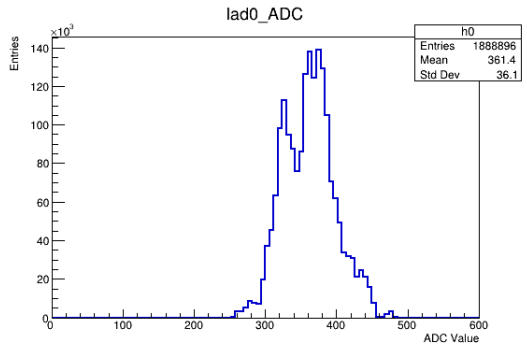
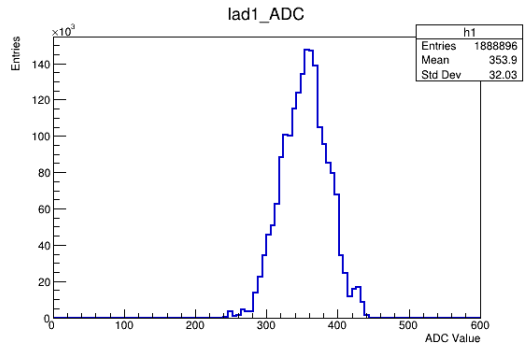
紫台进展

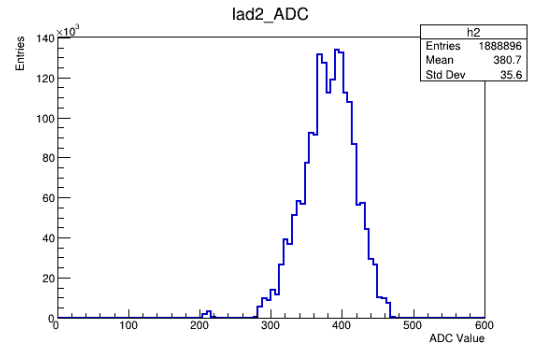
Ped ADC of 12 panel

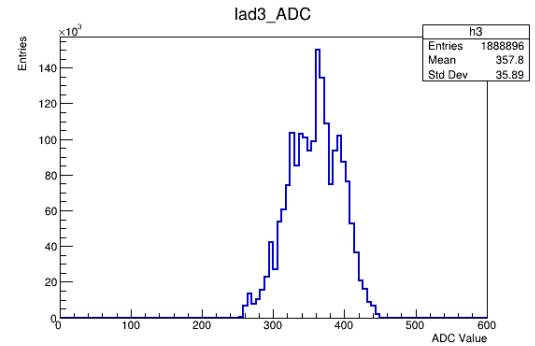


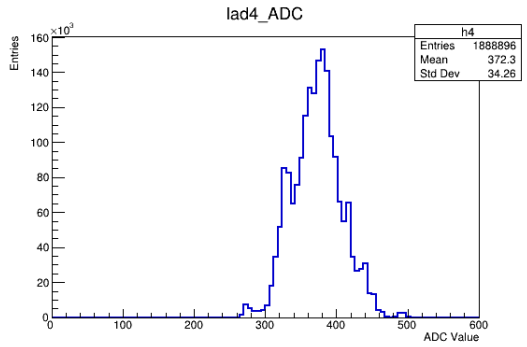
ADC of events

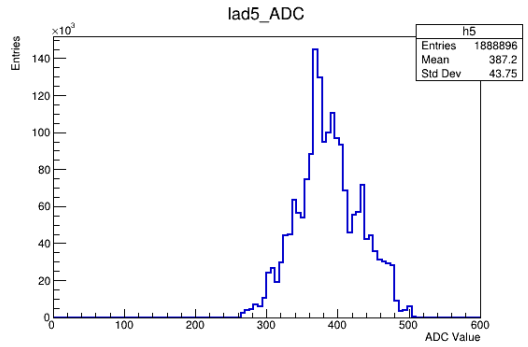


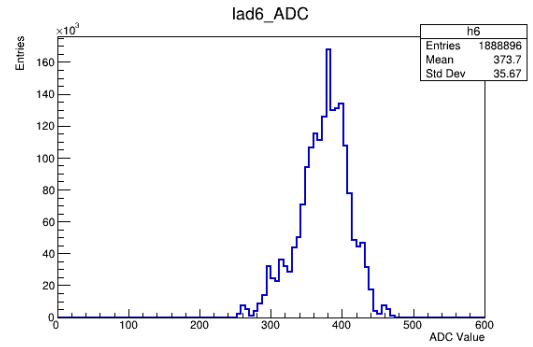


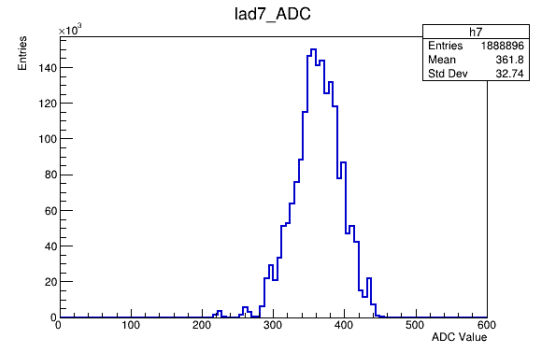


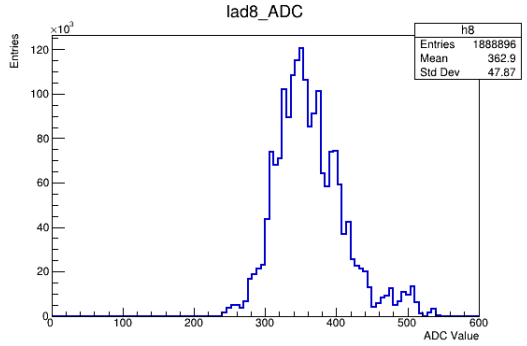


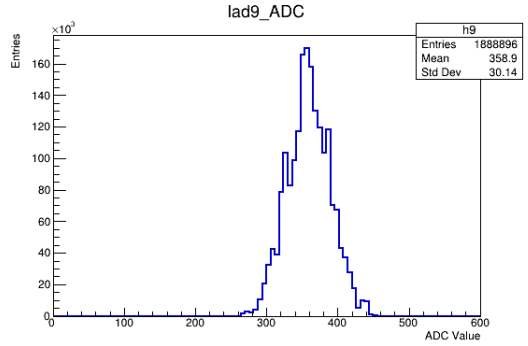


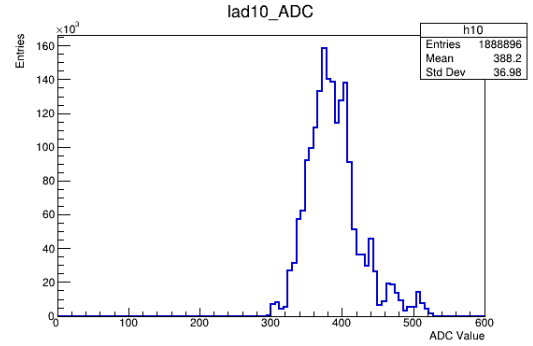


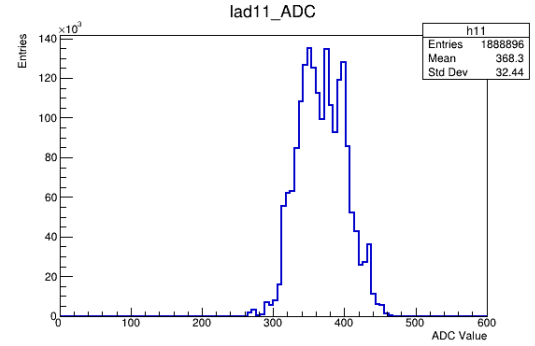




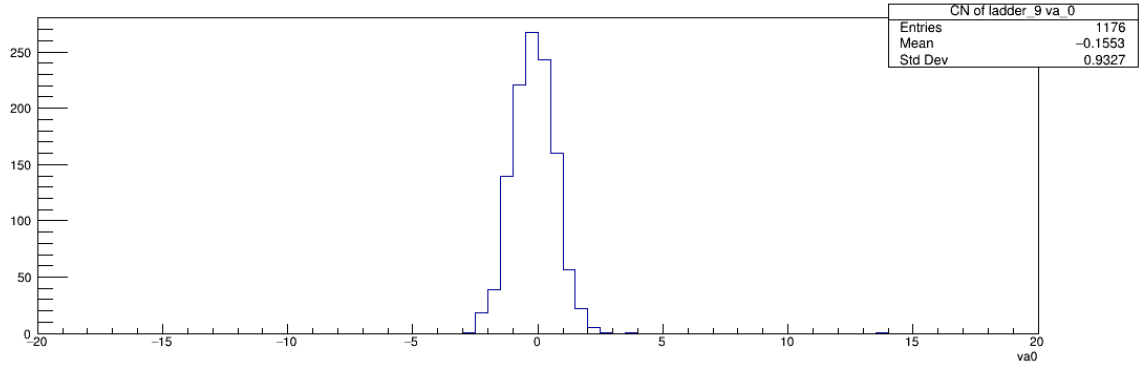


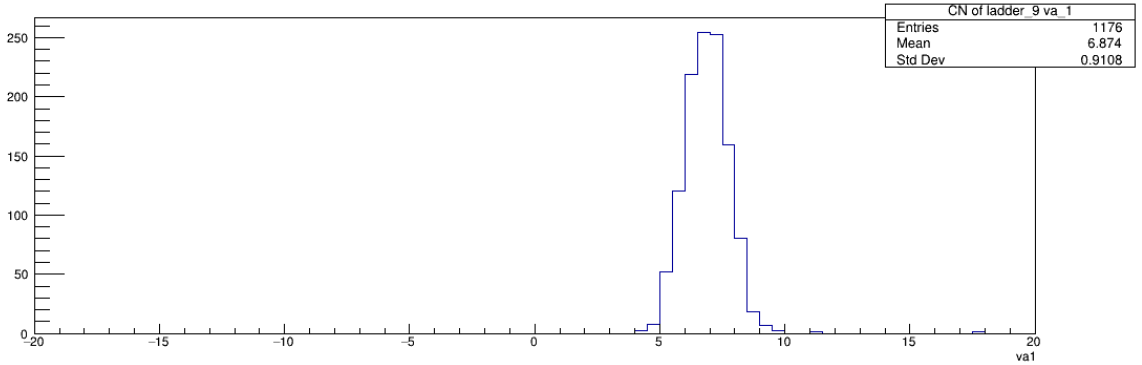


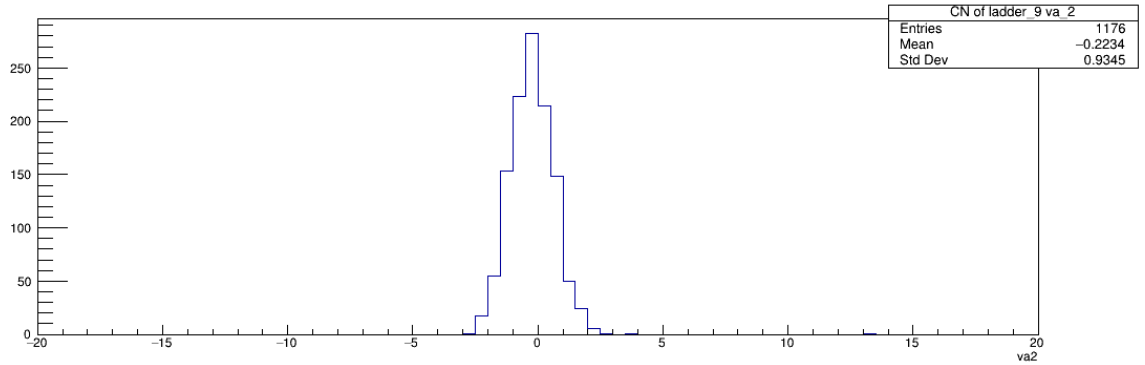


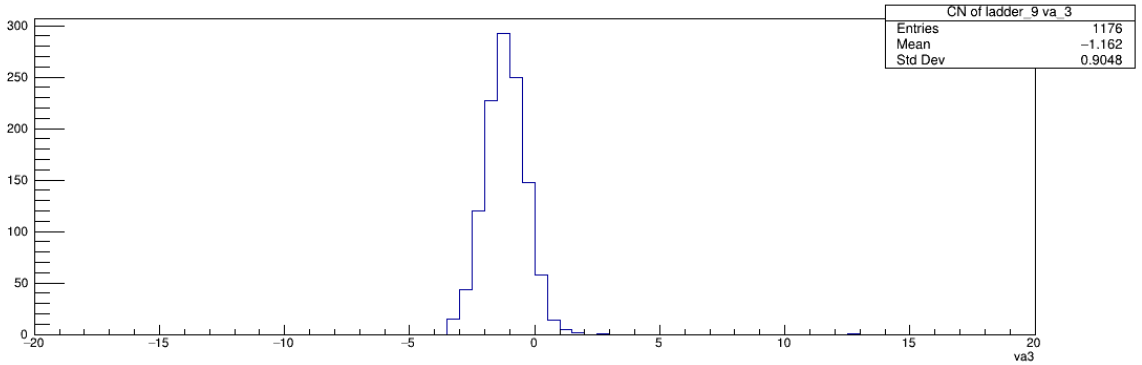


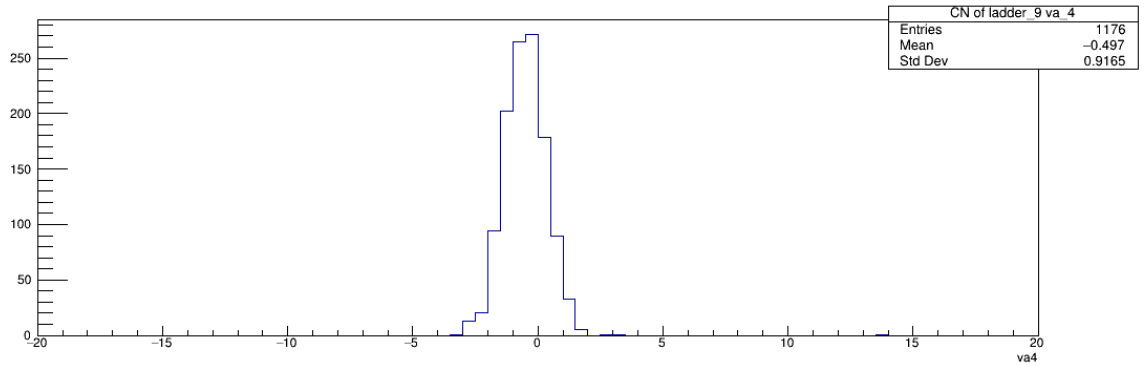
Werid CN noise

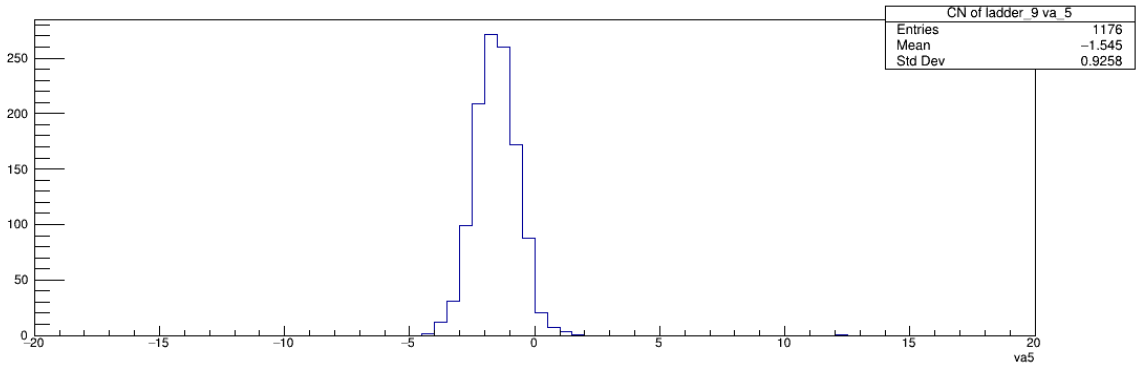




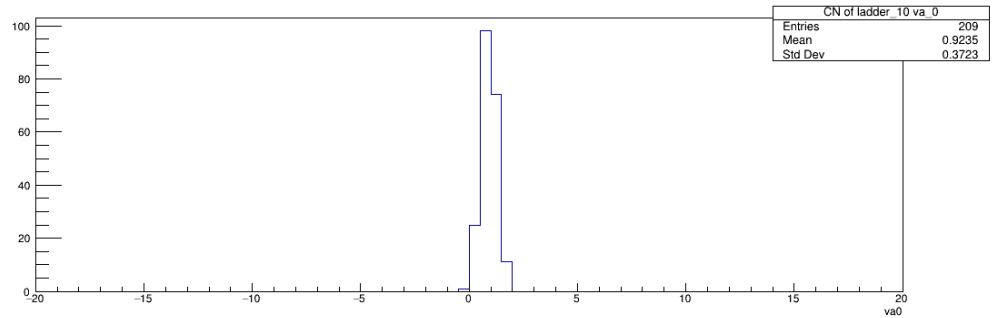


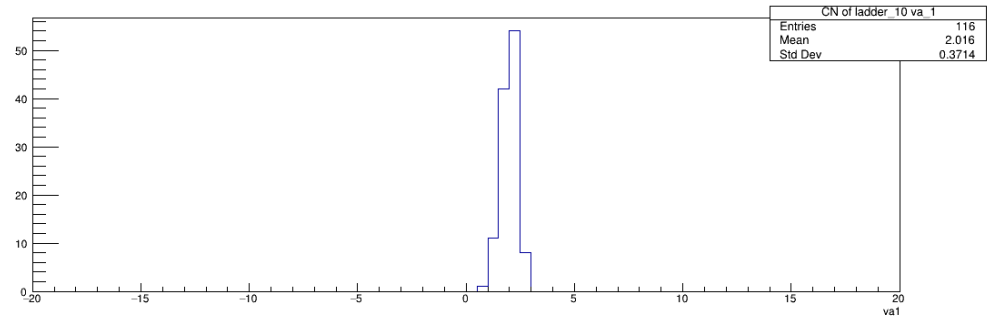


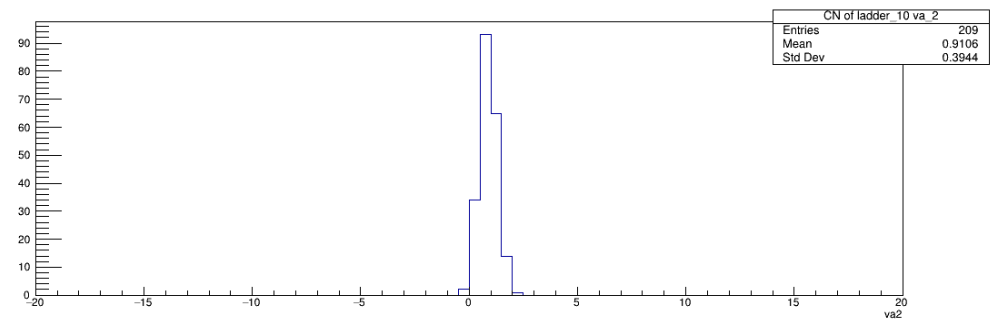


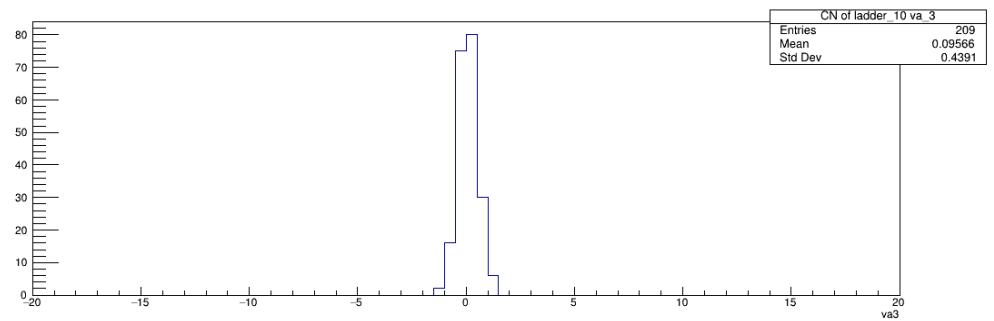


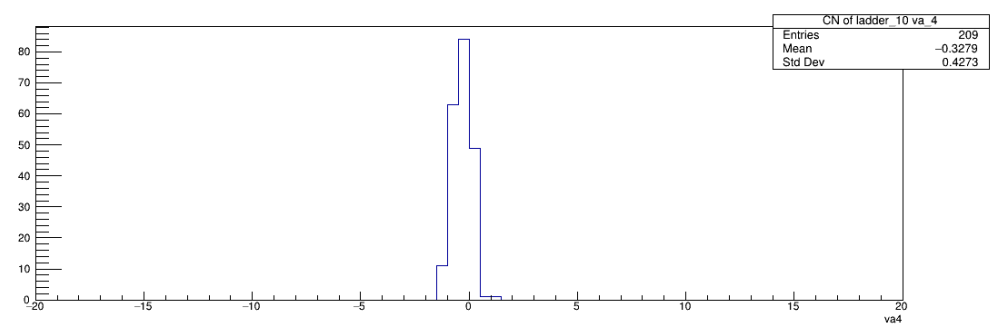
```
if(fabs(ADC[i][j] - pedestal[i][j]) < 1.5*noise[i][j])
```

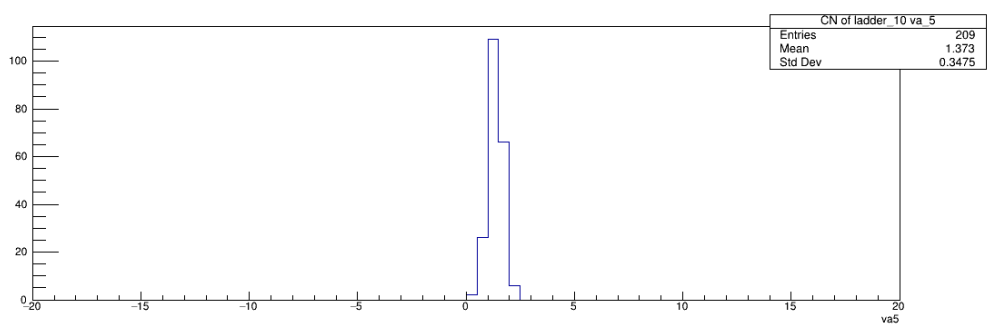




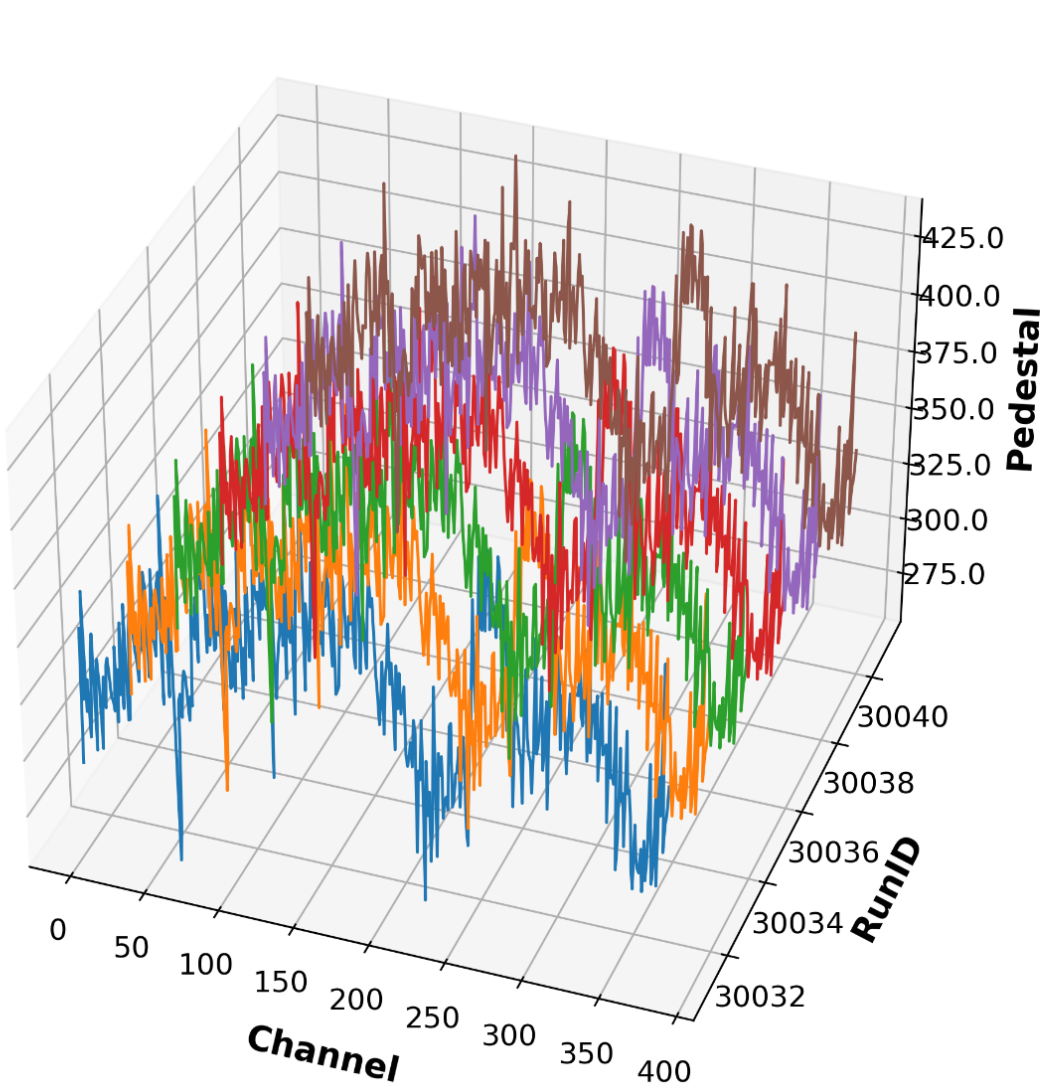


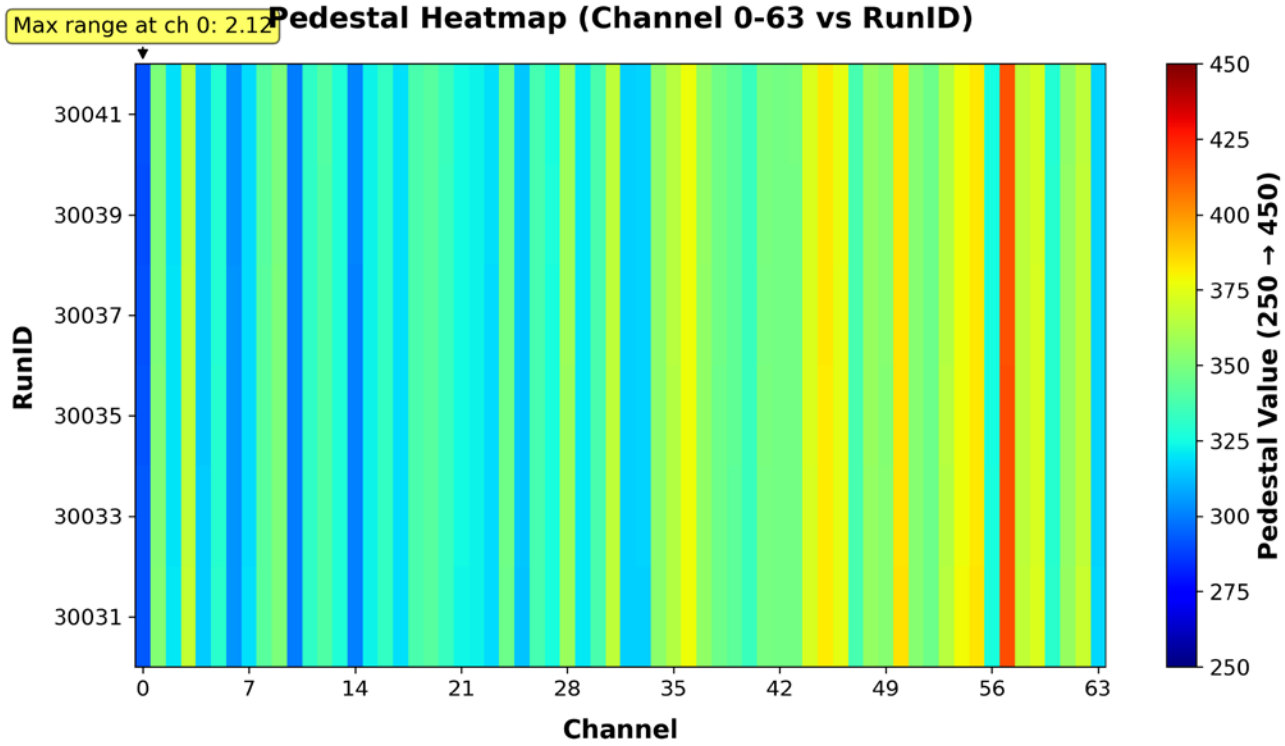


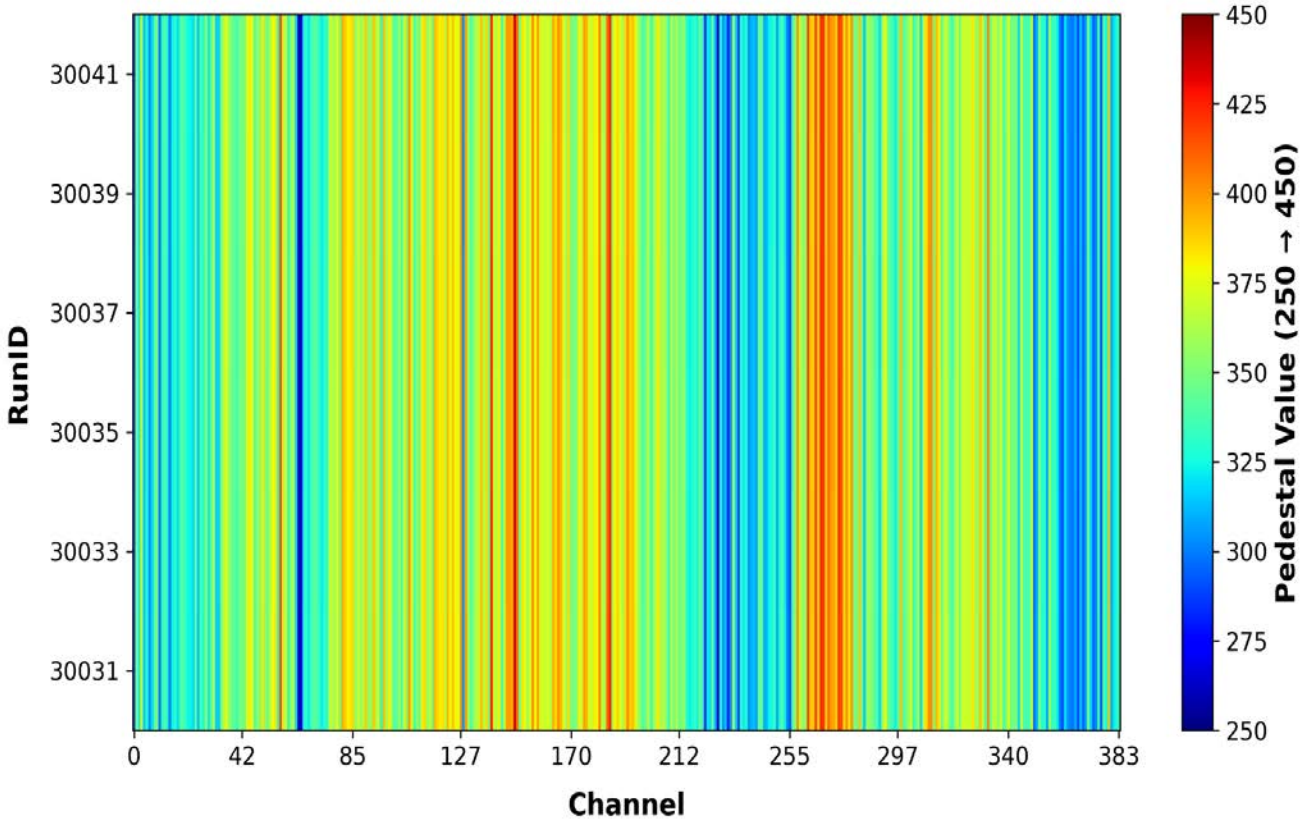


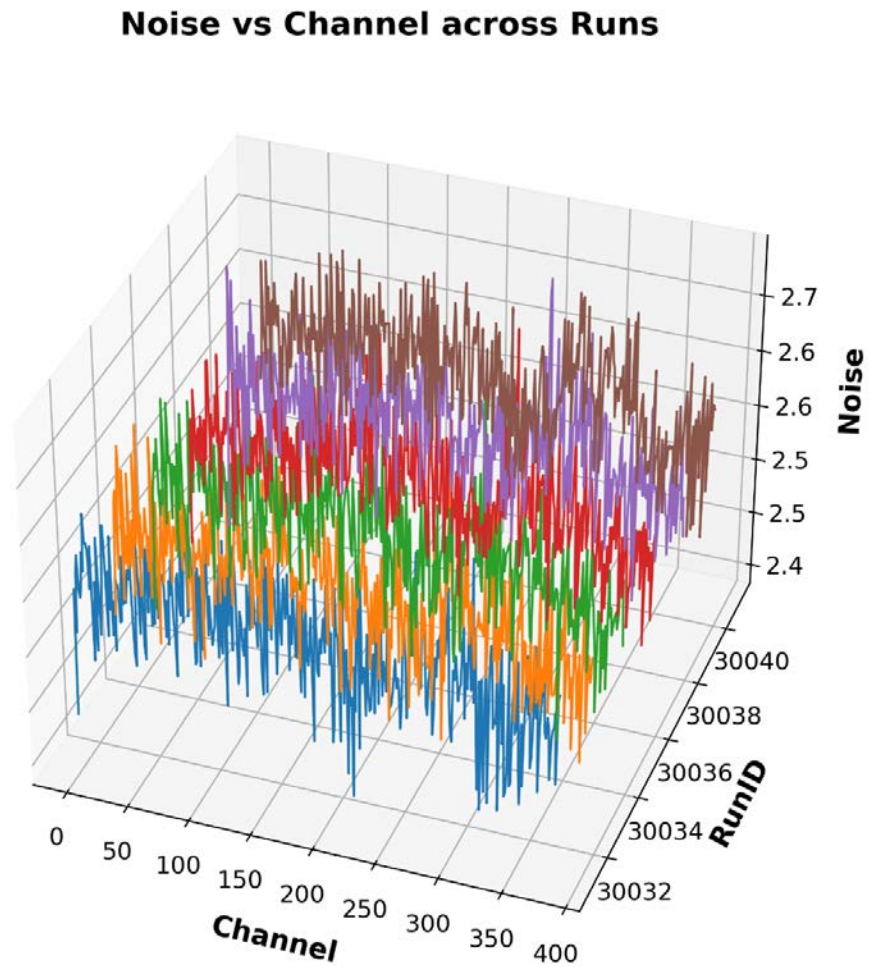


Pedestal vs Channel across Runs






Pedestal Heatmap (Channel vs RunID)
RunID
30041
30039
30037
30035
30033
30031
0
42
85
127
170
212
255
297
340
383
Channel
Pedestal Value (250 → 450)
450
425
400
375
350
325
300
275
250


Noise vs Channel across Runs
RunID 30031
RunID 30033
RunID 30035
RunID 30037
RunID 30039
RunID 30041
Noise
2.7
2.6
2.6
2.5
2.5
2.4
RunID
30040
30038
30036
30034
30032
Channel
0
50
100
150
200
250
300
350
400

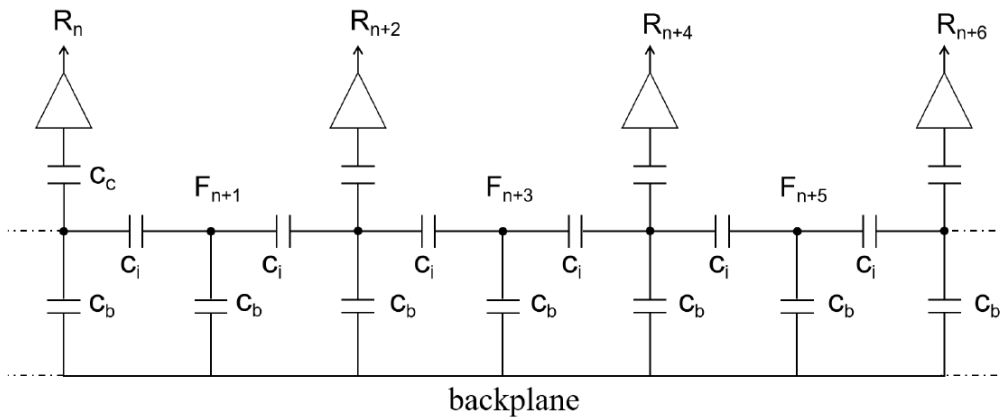
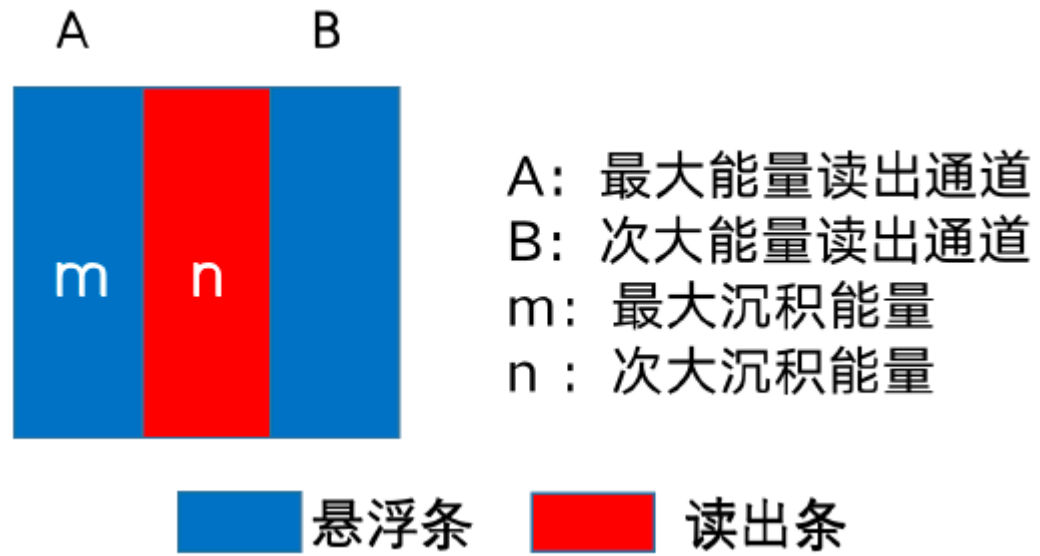
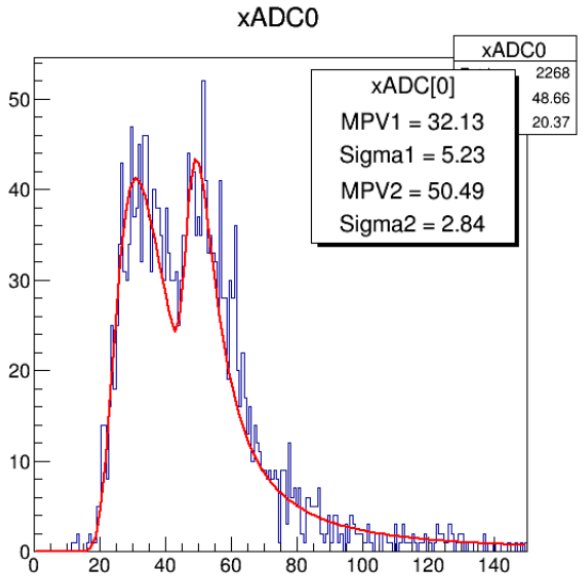
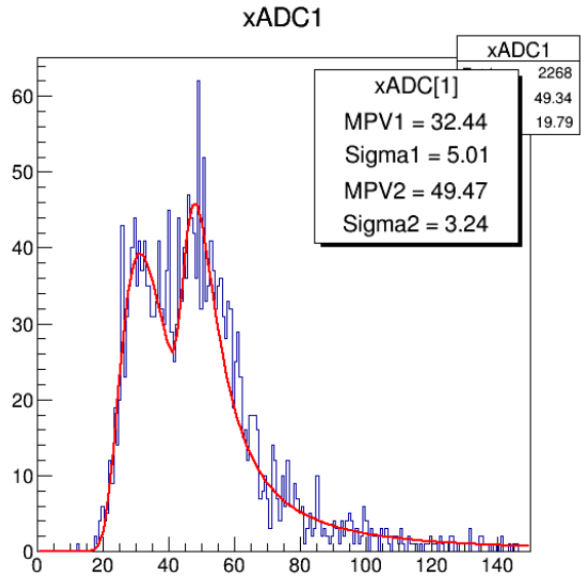
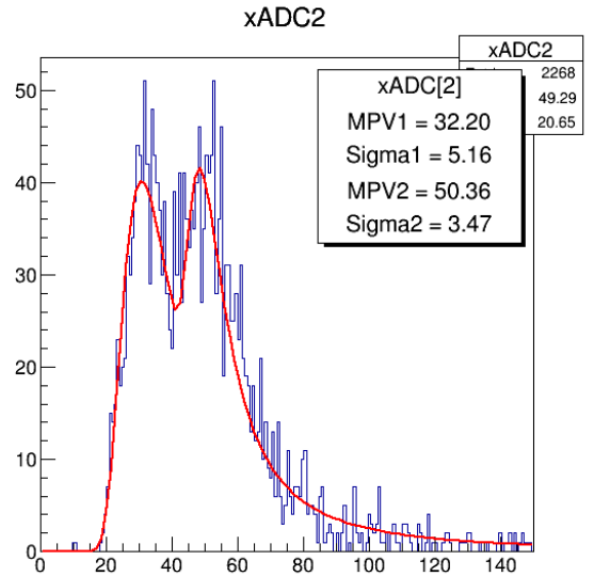


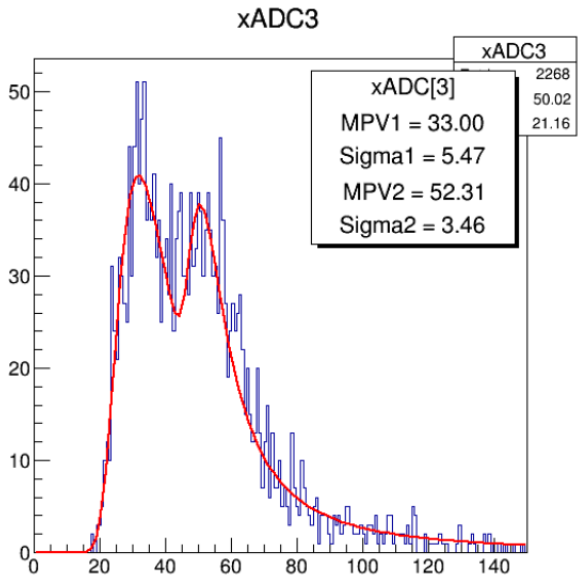
图 4.7　硅微条探测器的等效电路模型

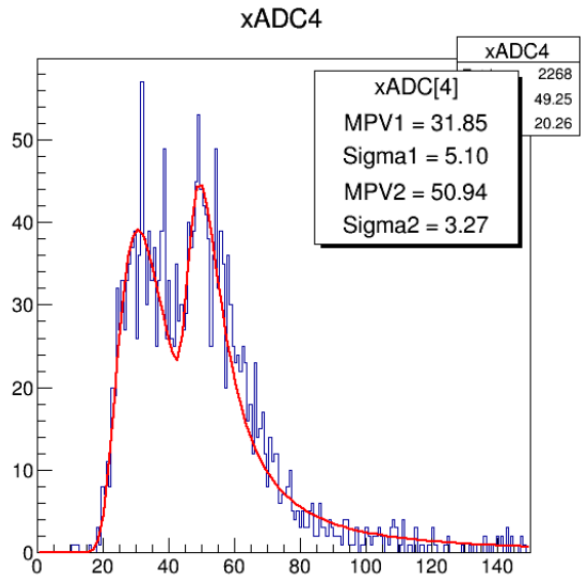


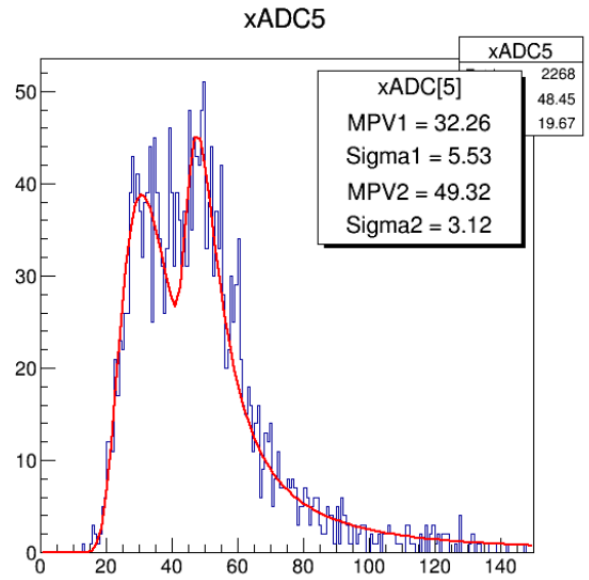

xADC0
xADC0
2268
48.66
20.37
xADC[0]
MPV1 = 32.13
Sigma1 = 5.23
MPV2 = 50.49
Sigma2 = 2.84


xADC1
xADC1
2268
49.34
19.79
xADC[1]
MPV1 = 32.44
Sigma1 = 5.01
MPV2 = 49.47
Sigma2 = 3.24

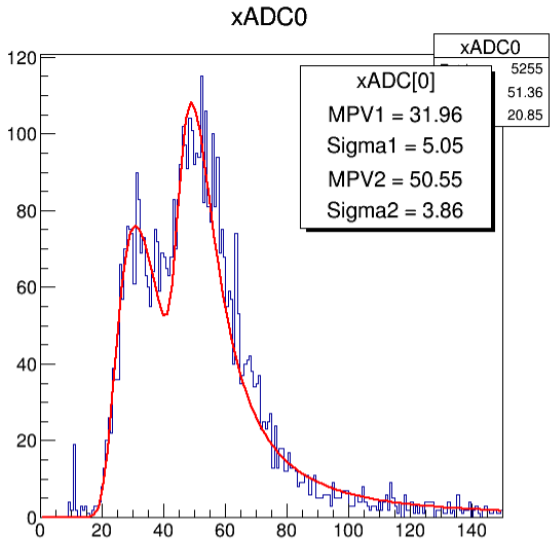

xADC2
xADC2
2268
49.29
20.65
xADC[2]
MPV1 = 32.20
Sigma1 = 5.16
MPV2 = 50.36
Sigma2 = 3.47

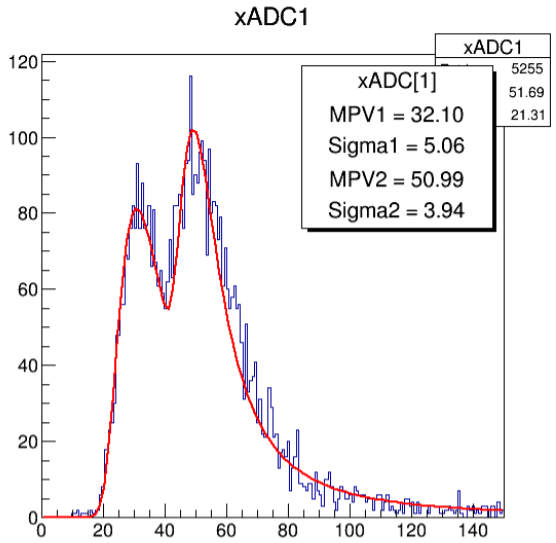

xADC3
xADC3
2268
50.02
21.16
xADC[3]
MPV1 = 33.00
Sigma1 = 5.47
MPV2 = 52.31
Sigma2 = 3.46

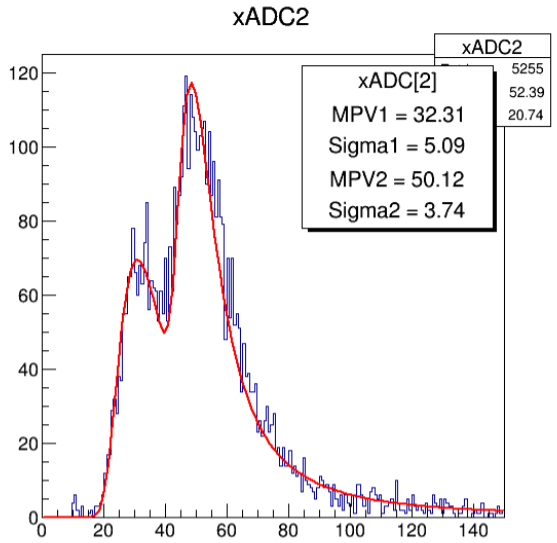

xADC4
xADC4
2268
49.25
20.26
xADC[4]
MPV1 = 31.85
Sigma1 = 5.10
MPV2 = 50.94
Sigma2 = 3.27

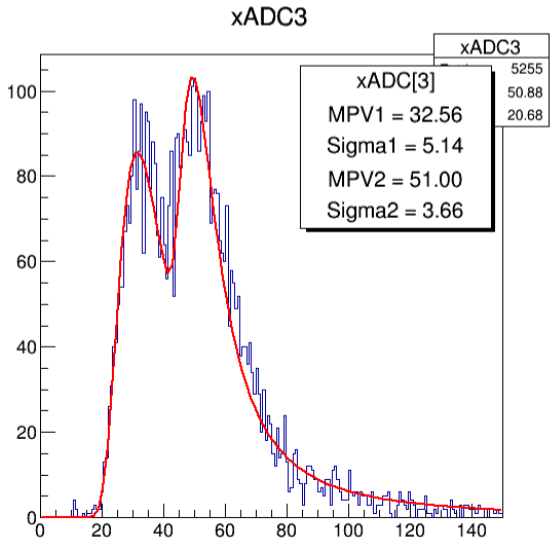

xADC5
xADC5
2268
48.45
19.67
xADC[5]
MPV1 = 32.26
Sigma1 = 5.53
MPV2 = 49.32
Sigma2 = 3.12

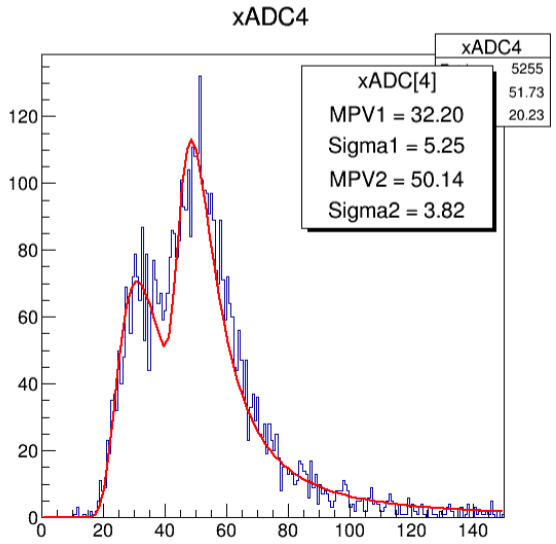
With pb, VA增益校准？

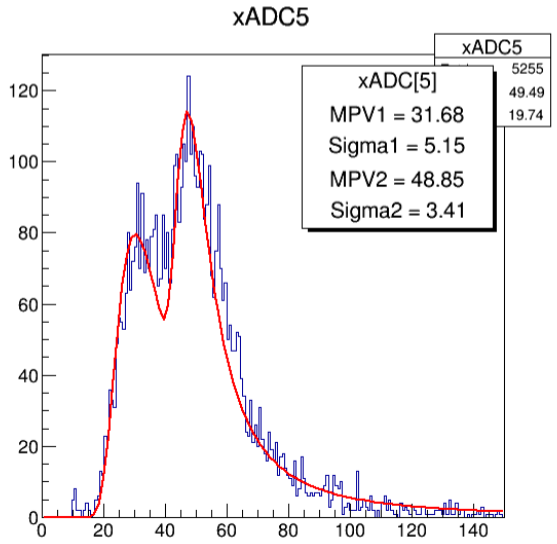


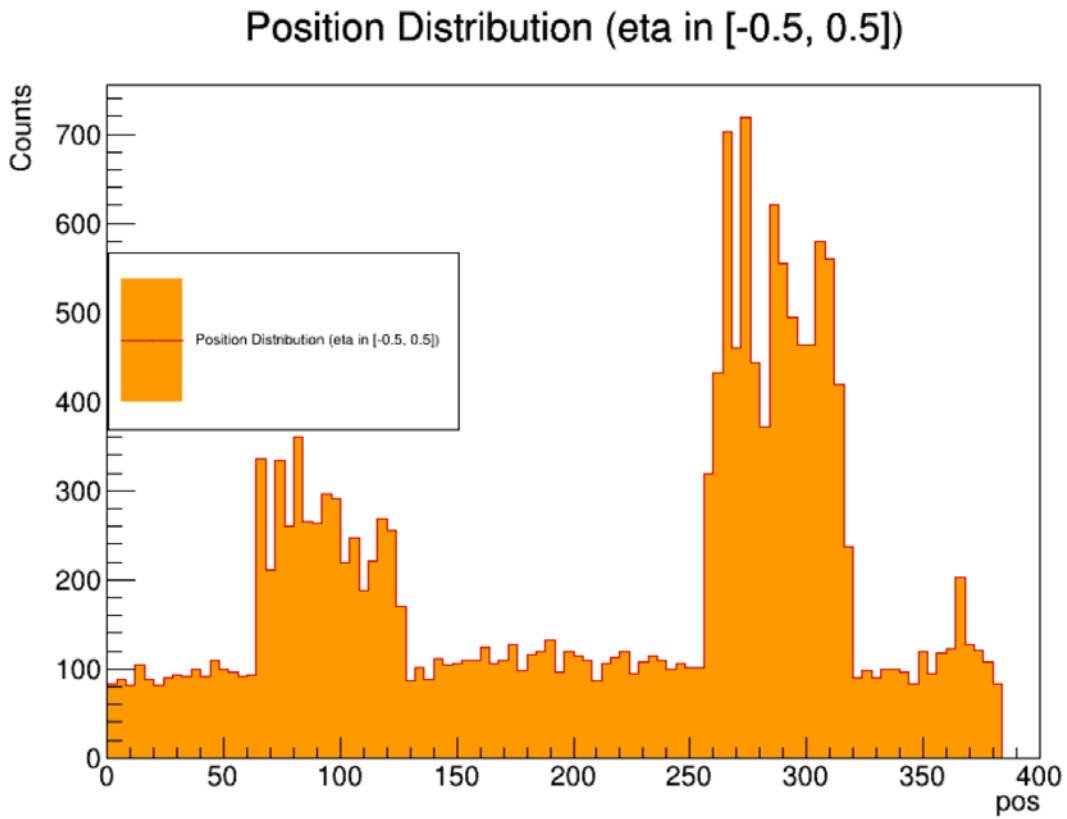


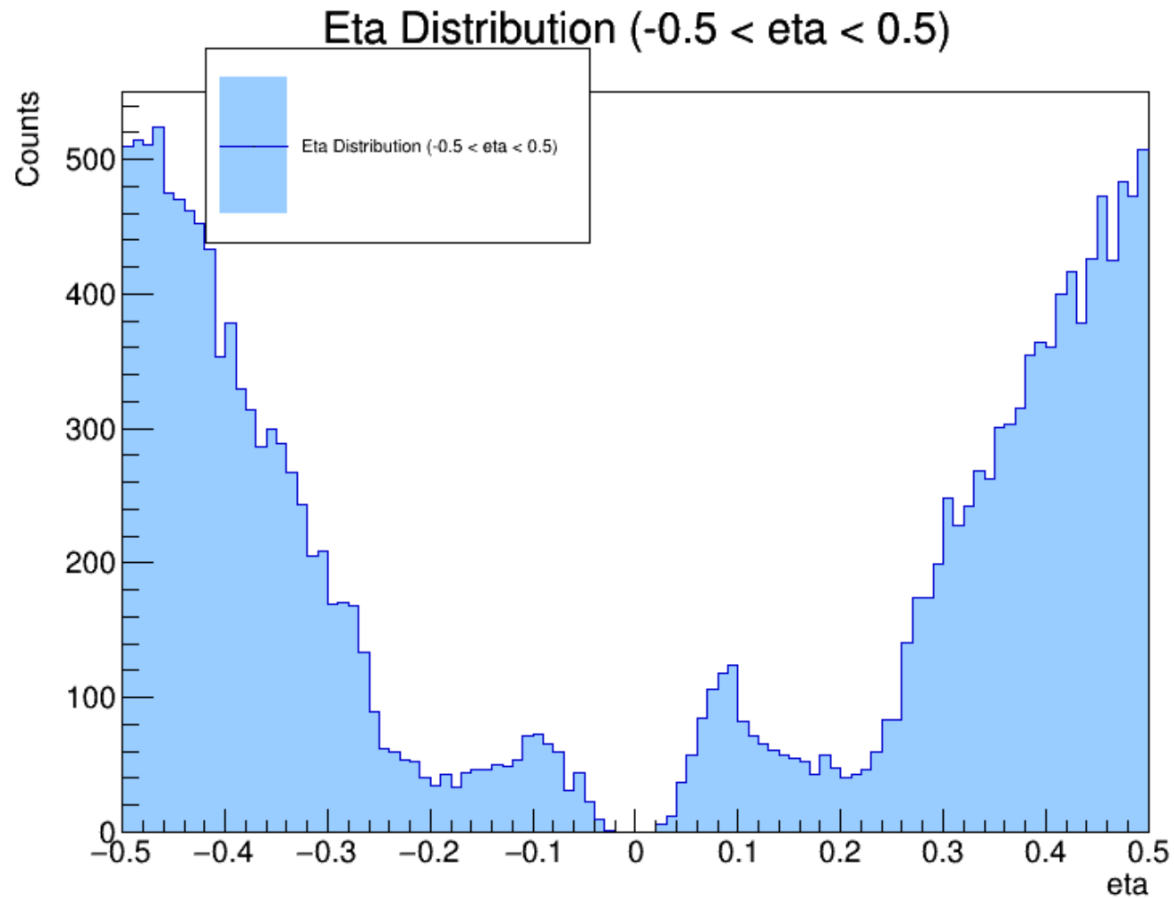









Position Distribution (eta in [-0.5, 0.5])
Counts
Position Distribution (eta in [-0.5, 0.5])
0
100
200
300
400
500
600
700
0
50
100
150
200
250
300
350
400
pos


Eta Distribution (-0.5 < eta < 0.5)
Counts
Eta Distribution (-0.5 < eta < 0.5)
0
100
200
300
400
500
−0.5
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
0.5
eta

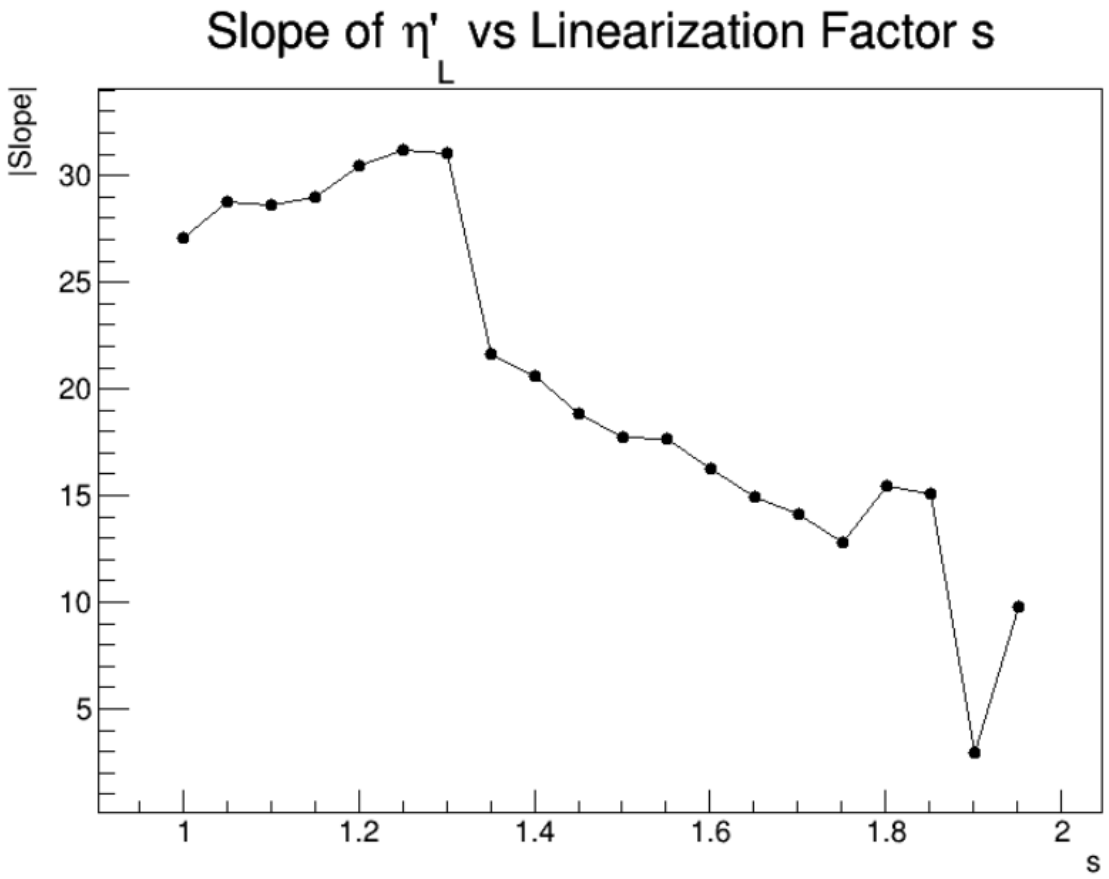
Eta修正

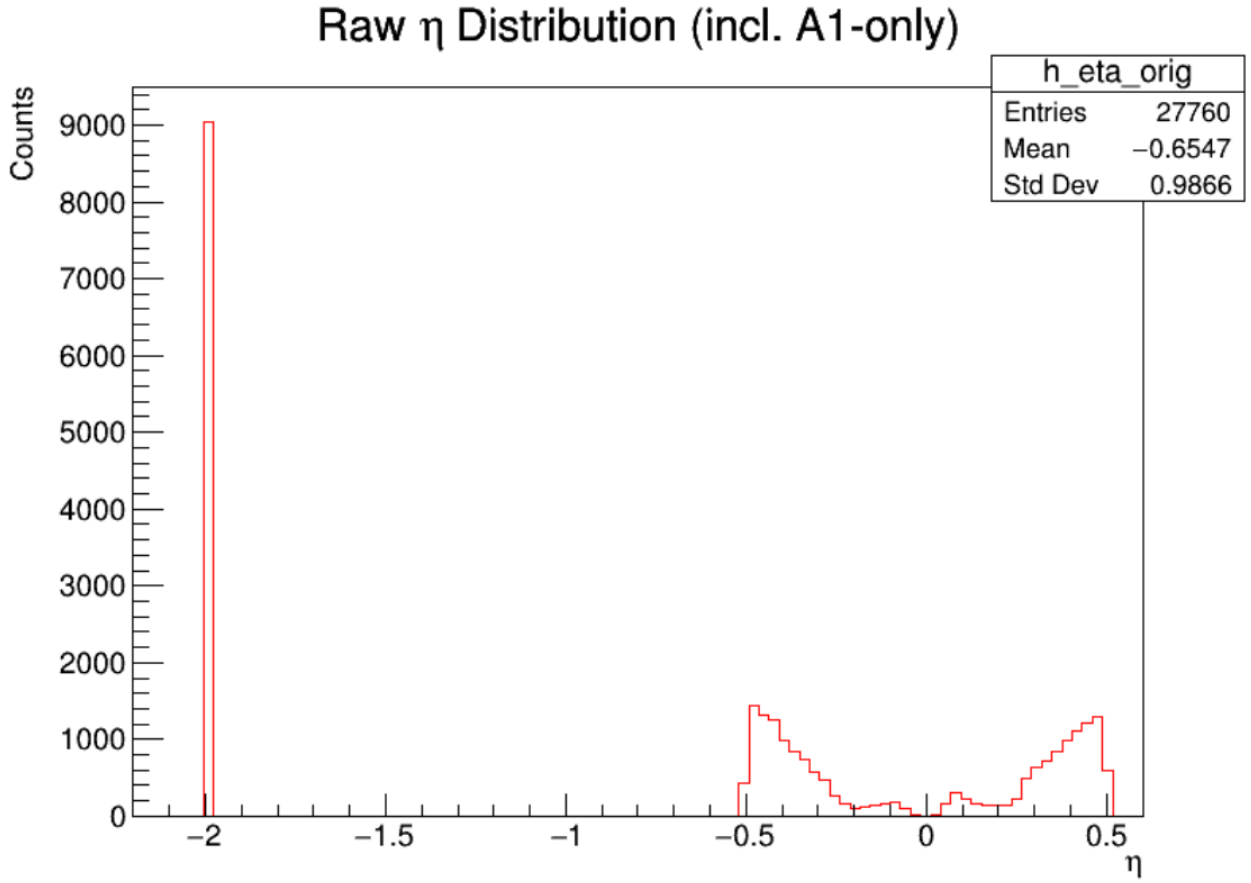
$$X_{\mathrm{LIN}} = \eta' = \hat{s}\frac{A_2}{A_1 + A_2}.$$

$$X_{\mathrm{L}} = \eta'_L = \hat{s}\frac{A_2^m}{A_1^m + (s-1)(1-2|x|)A_1^m + A_2^m}$$

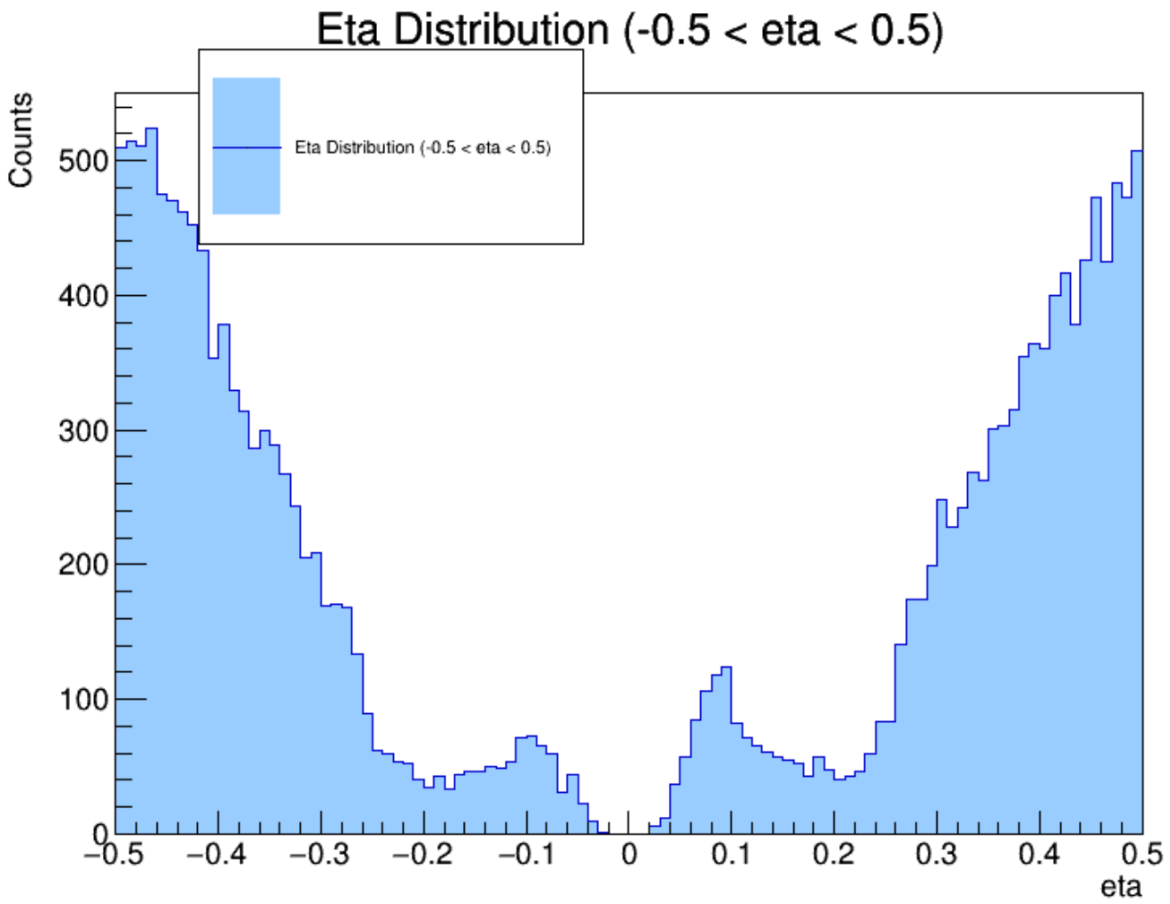
- S is the constant saturation scaling parameter, s>0

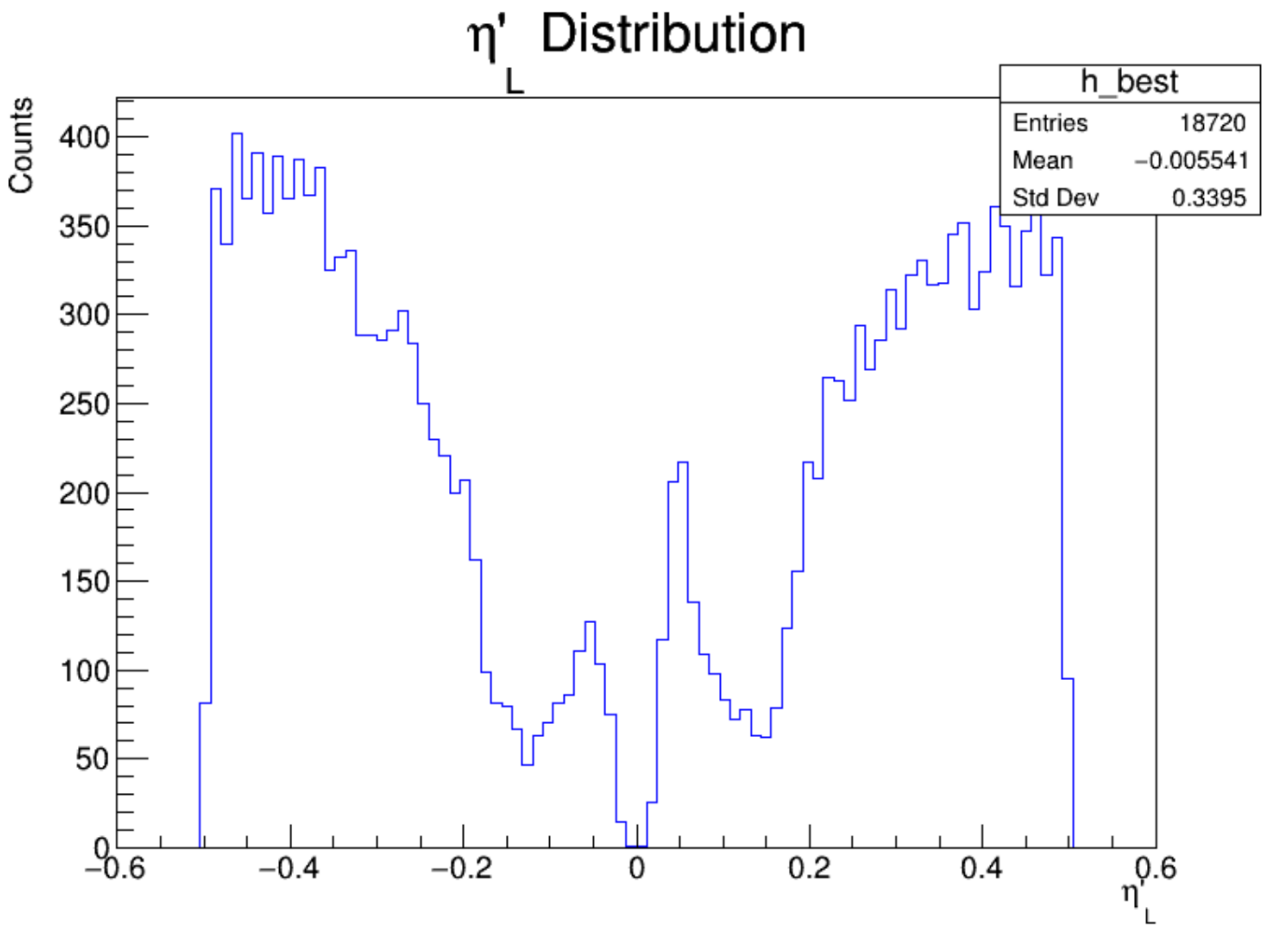
Eta修正

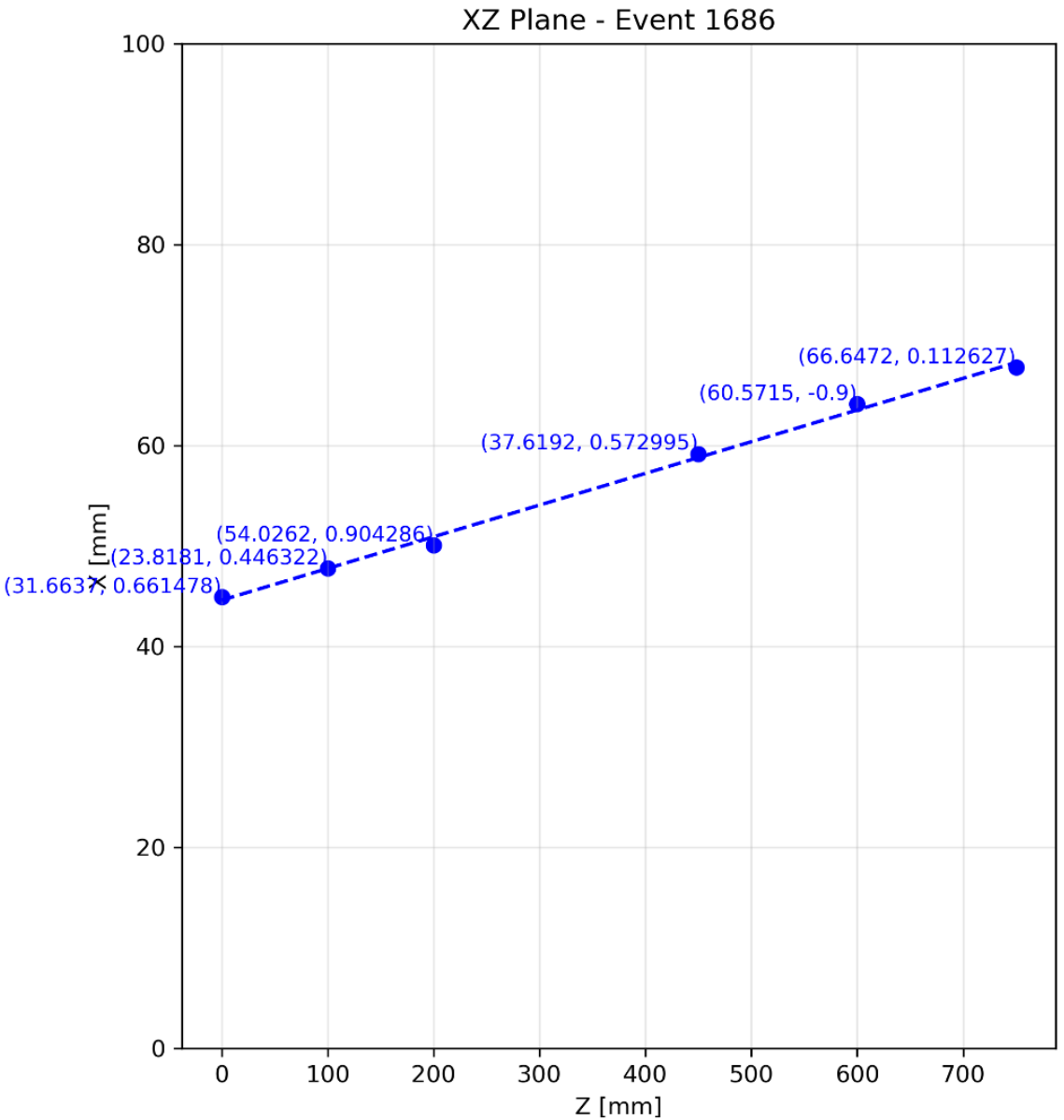

Slope of η'L vs Linearization Factor s
|Slope|
30
25
20
15
10
5
1
1.2
1.4
1.6
1.8
2
s

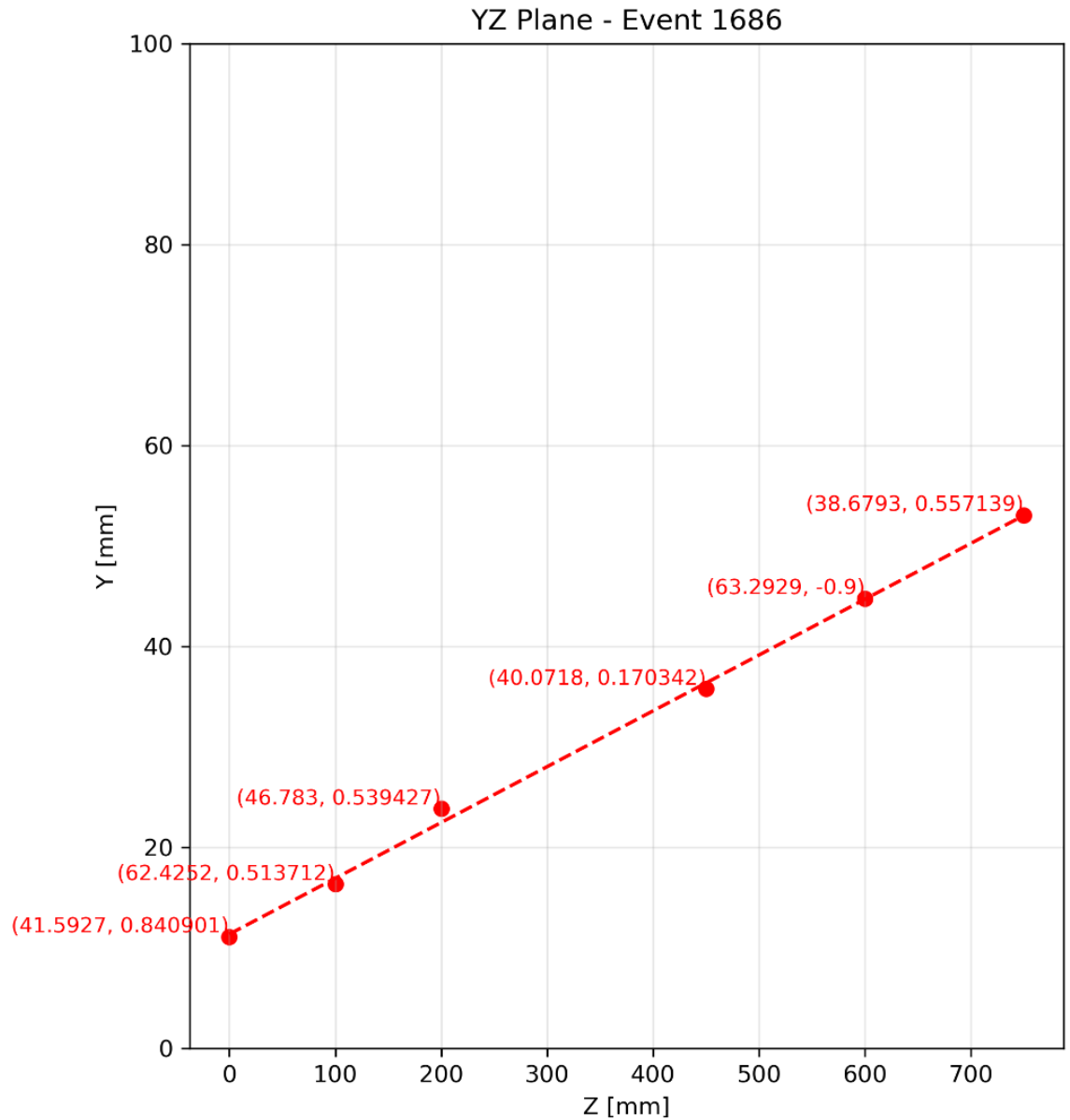

Raw η Distribution (incl. A1-only)
h_eta_orig
Entries 27760
Mean −0.6547
Std Dev 0.9866
Counts
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
−2
−1.5
−1
−0.5
0
0.5
η

Eta修正


Eta Distribution (-0.5 < eta < 0.5)
Eta Distribution (-0.5 < eta < 0.5)
Counts
500
400
300
200
100
0
−0.5
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
0.5
eta

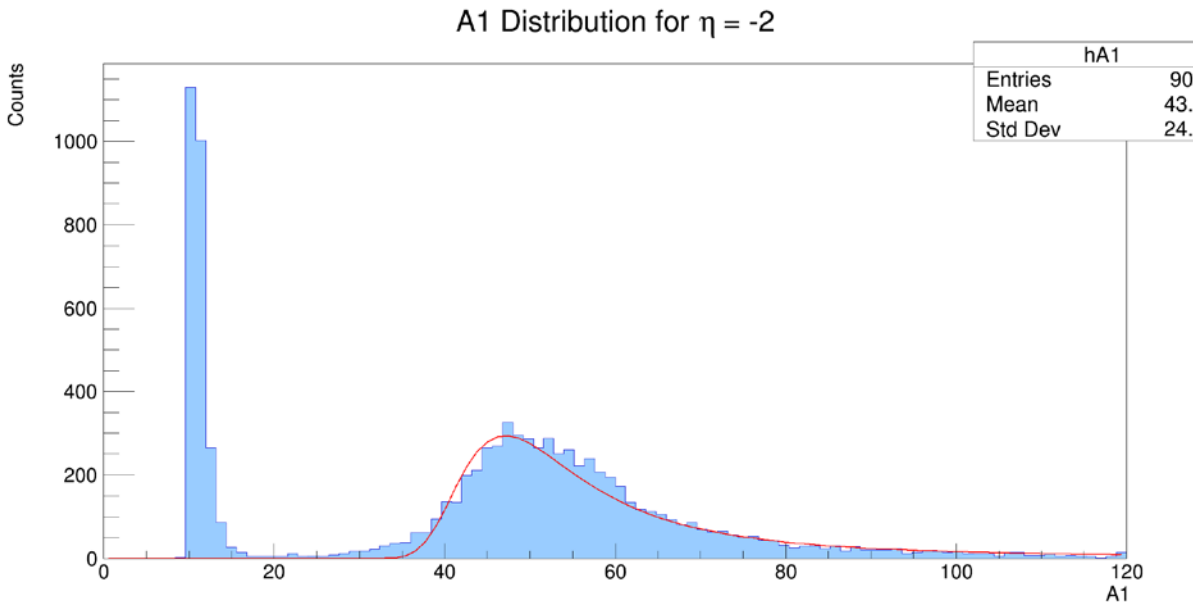

η' L Distribution
h_best
Entries 18720
Mean −0.005541
Std Dev 0.3395
Counts
400
350
300
250
200
150
100
50
0
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
η' L

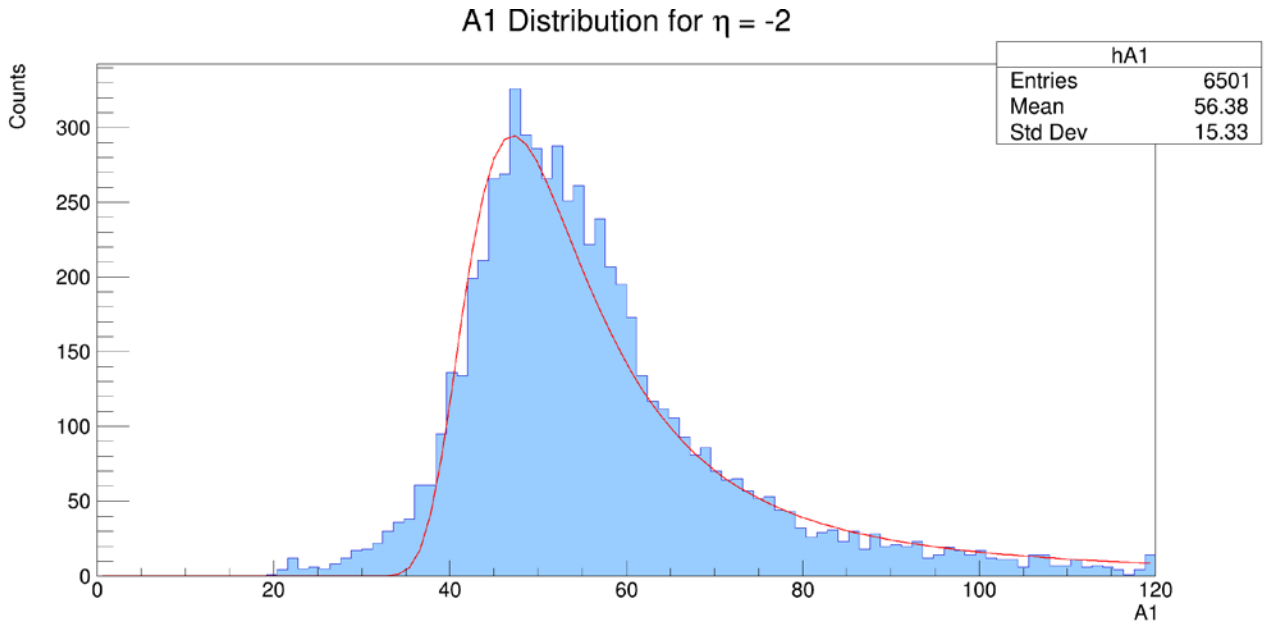

XZ Plane - Event 1686
X [mm]
Z [mm]
(66.6472, 0.112627)
(60.5715, -0.9)
(37.6192, 0.572995)
(54.0262, 0.904286)
(23.8181, 0.446322)
(31.6637, 0.661478)


YZ Plane - Event 1686
Y [mm]
Z [mm]
(38.6793, 0.557139)
(63.2929, -0.9)
(40.0718, 0.170342)
(46.783, 0.539427)
(62.4252, 0.513712)
(41.5927, 0.840901)

A1 only

- Calibrate VA gain
- flatter η and better linearity



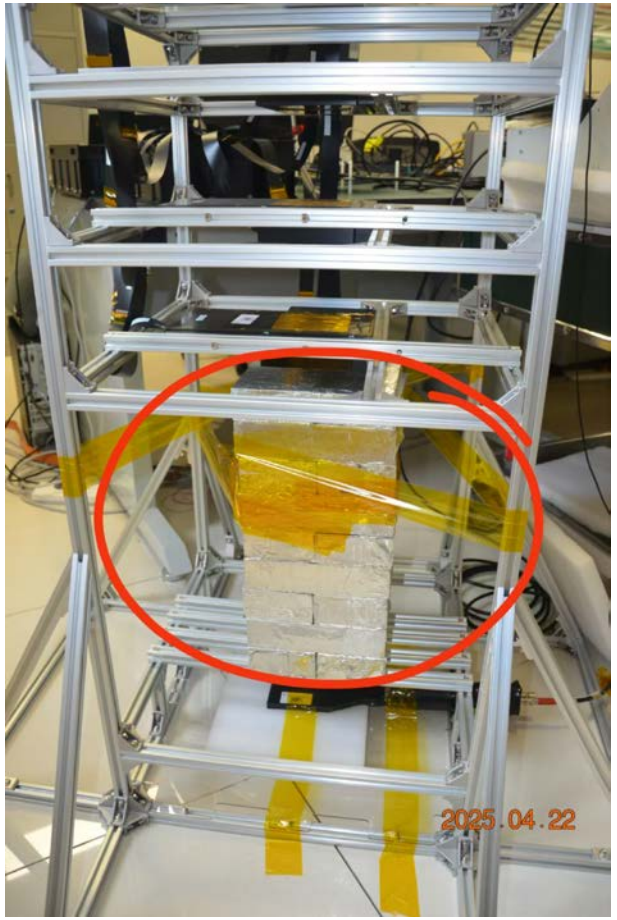


紫台架子结构讨论

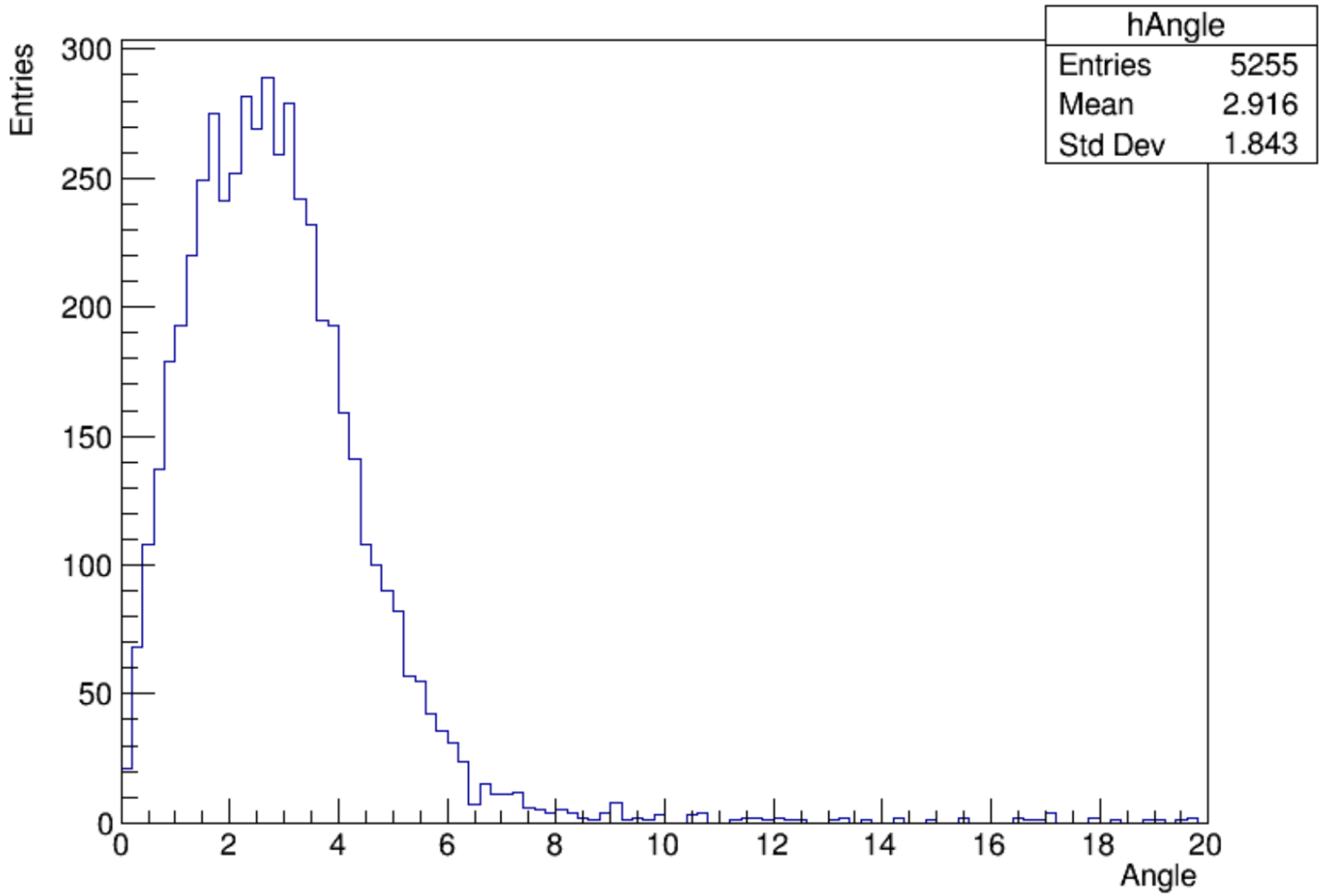
1.热膨胀, 采样记录的温度：https://www.kdocs.cn/l/csdqp2YOjuhL
20-26° 波动
铝合金，2020铝型材，热膨胀系数：23.8 x 10^{-6} /C°
总1.5m高左右，高度形变：23.8×6×1.5=214.2um

2.底部塑性形变，金属疲劳，螺栓连接形变

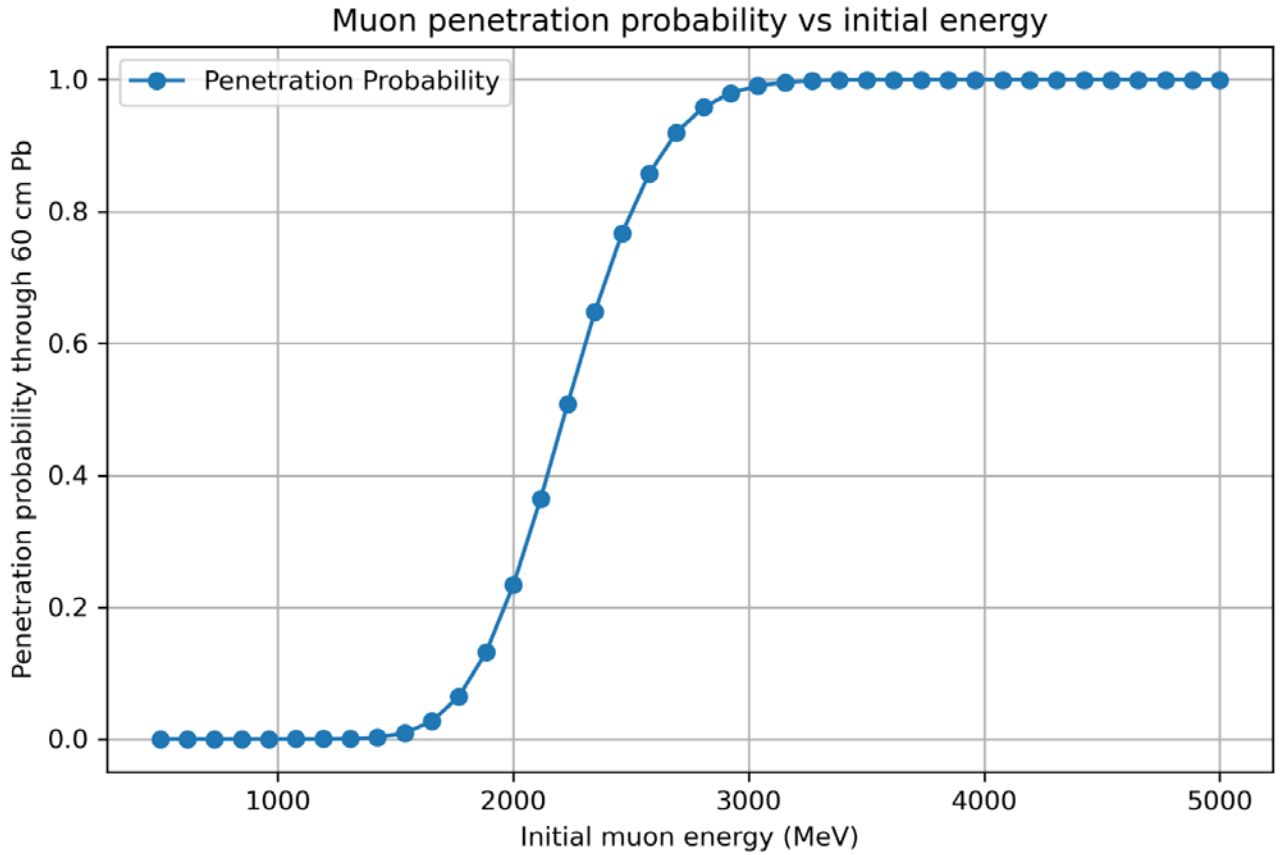
改进思路:
1.千斤顶垫住低端
2.贴应变片，测每个点位的位移



Distribution angle of incoming tracks



probability of penetrating 60 cm's Pb

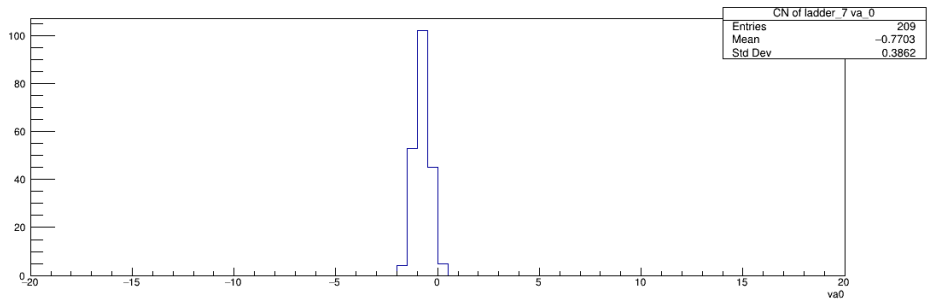


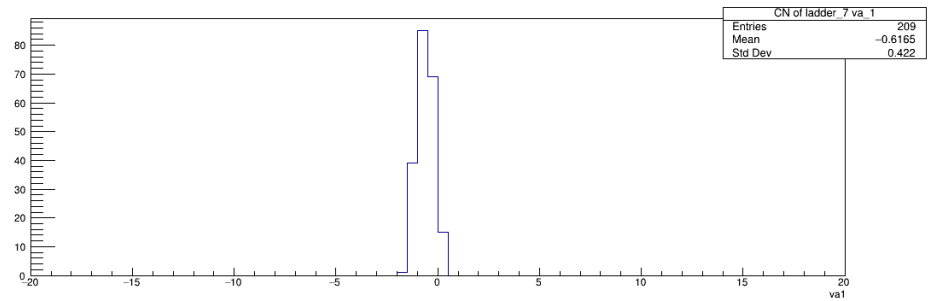
Discussion

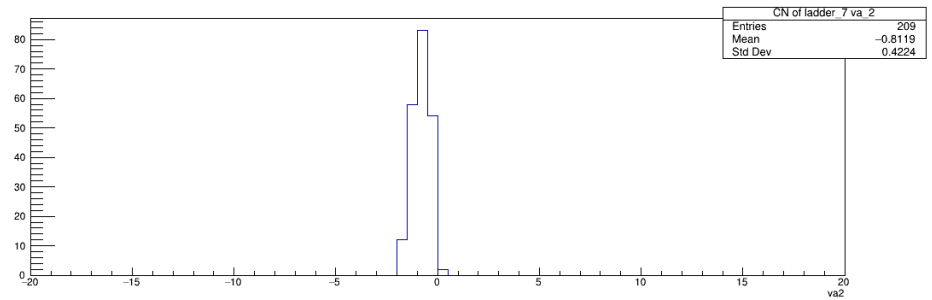
- More precise processing of raw data to reduce residuals (though possibly very limited), achieving more accurate alignment and refraction angles.

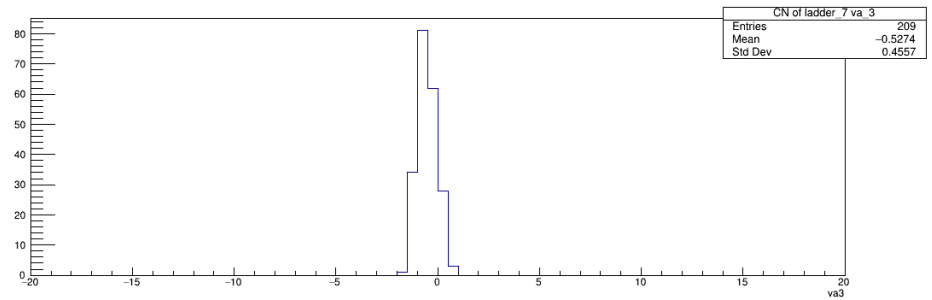
- Or place more focus on the refraction angle in the Geant4 simulation.

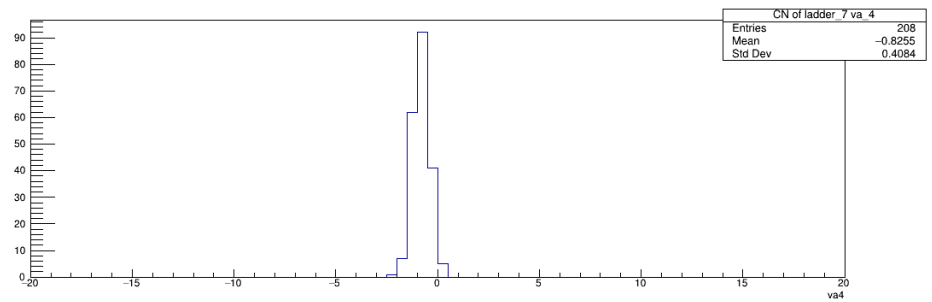
- BACKUP

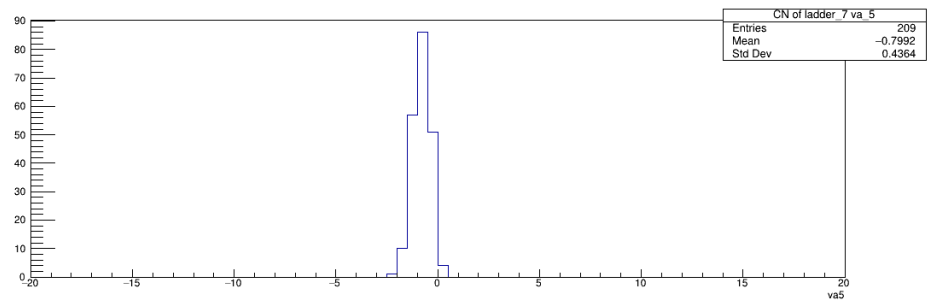

CN of ladder_7 va_0
Entries 209
Mean −0.7703
Std Dev 0.3862
va0

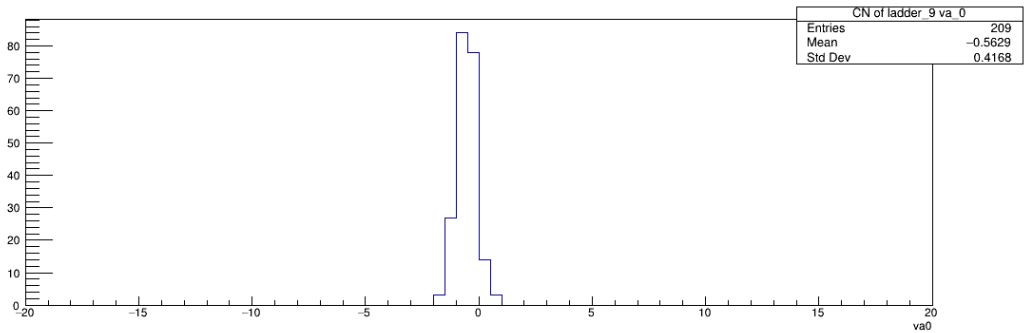

CN of ladder_7 va_1
Entries 209
Mean −0.6165
Std Dev 0.422
va1

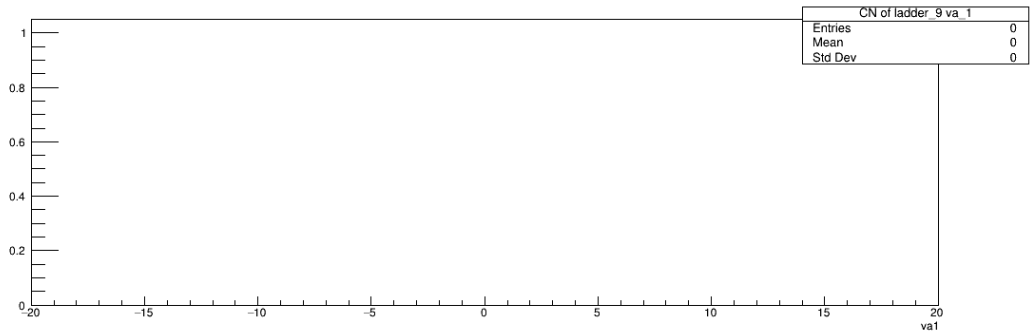

CN of ladder_7 va_2
Entries 209
Mean −0.8119
Std Dev 0.4224
va2

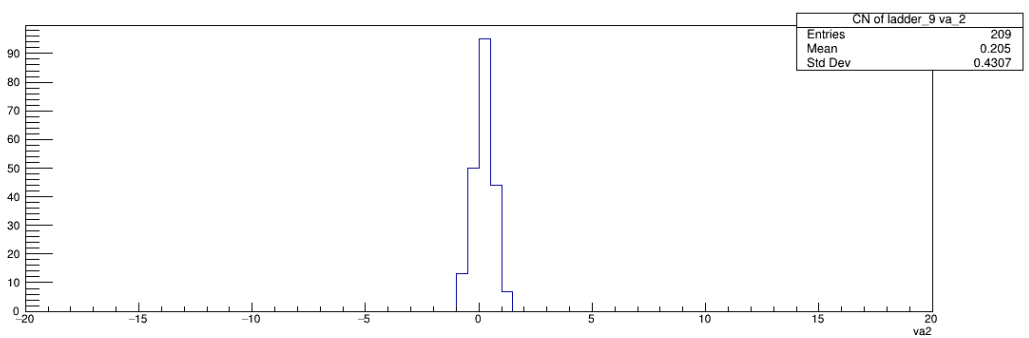

CN of ladder_7 va_3
Entries 209
Mean −0.5274
Std Dev 0.4557
va3

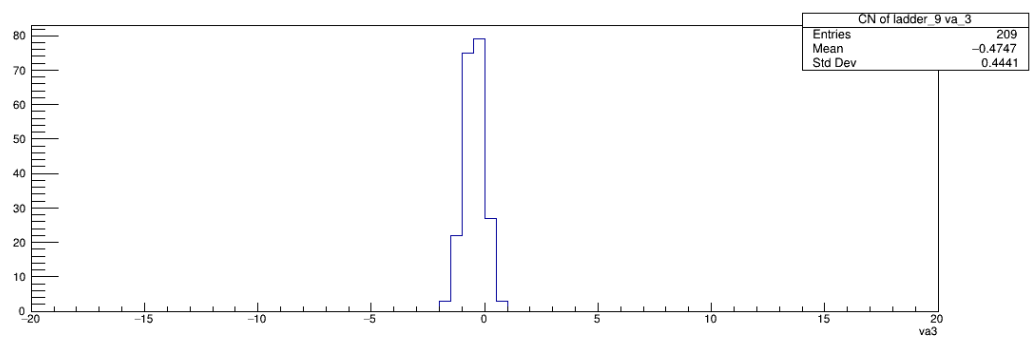

CN of ladder_7 va_4
Entries 208
Mean −0.8255
Std Dev 0.4084
va4

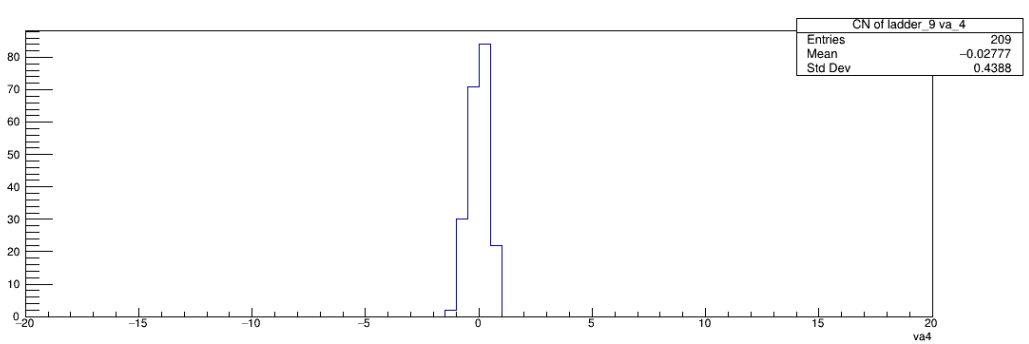

CN of ladder_7 va_5
Entries 209
Mean −0.7992
Std Dev 0.4364
va5

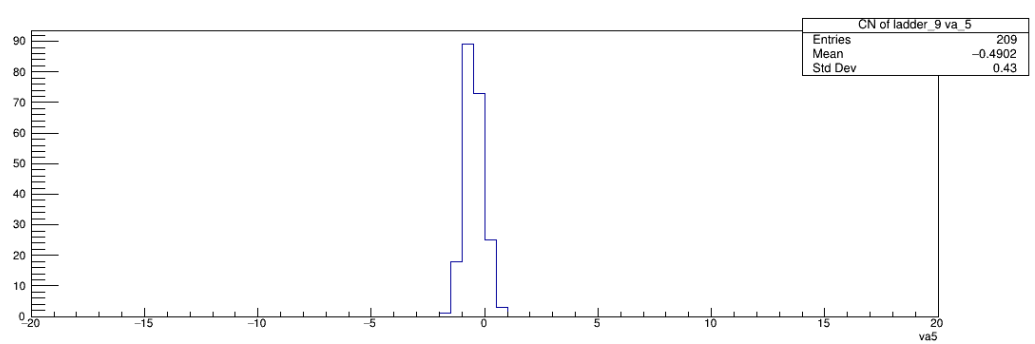

CN of ladder_9 va_0
Entries 209
Mean −0.5629
Std Dev 0.4168
va0


CN of ladder_9 va_1
Entries 0
Mean 0
Std Dev 0
va1

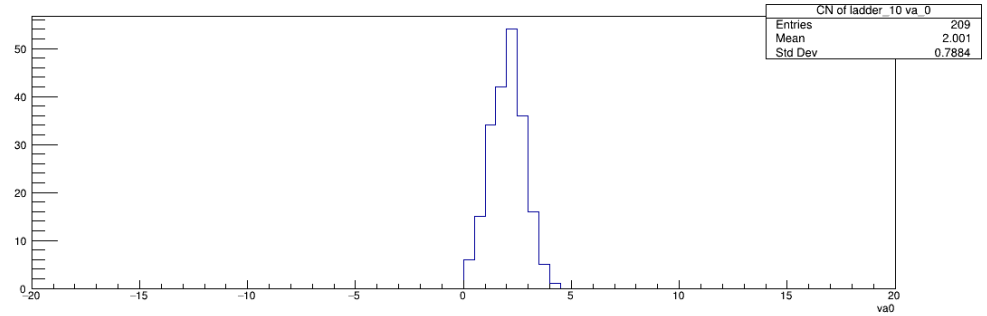

CN of ladder_9 va_2
Entries 209
Mean 0.205
Std Dev 0.4307
va2

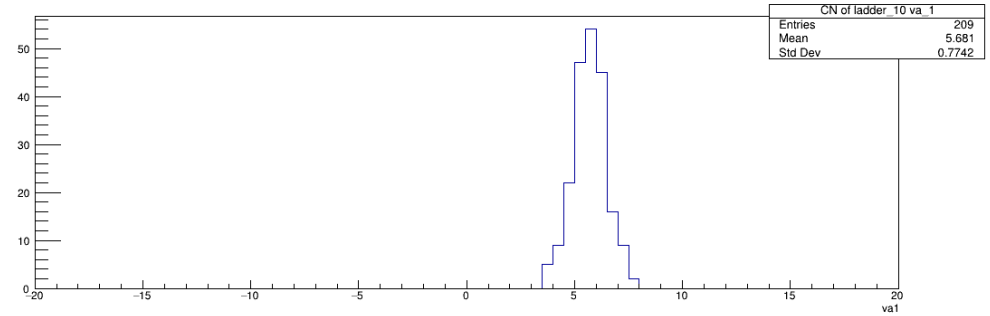

CN of ladder_9 va_3
Entries 209
Mean −0.4747
Std Dev 0.4441
va3

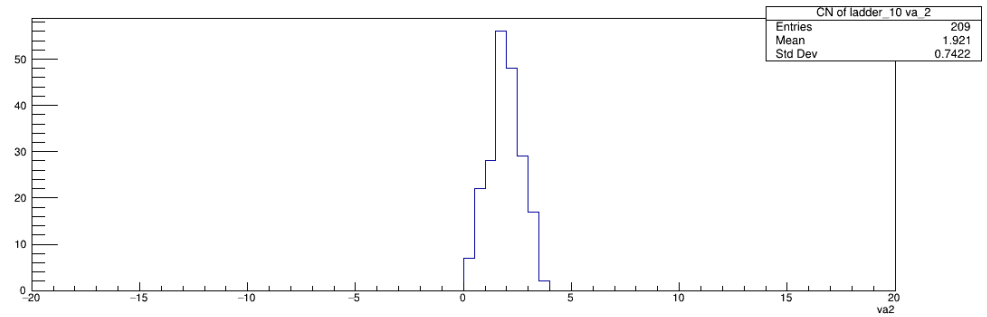

CN of ladder_9 va_4
Entries 209
Mean −0.02777
Std Dev 0.4388
va4

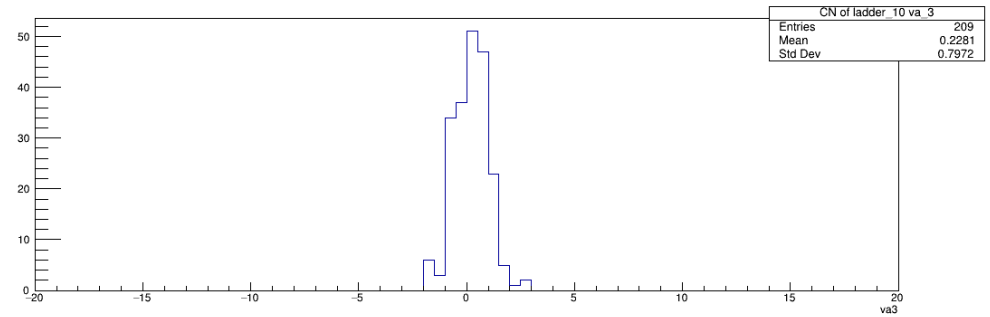

CN of ladder_9 va_5
Entries 209
Mean −0.4902
Std Dev 0.43
va5

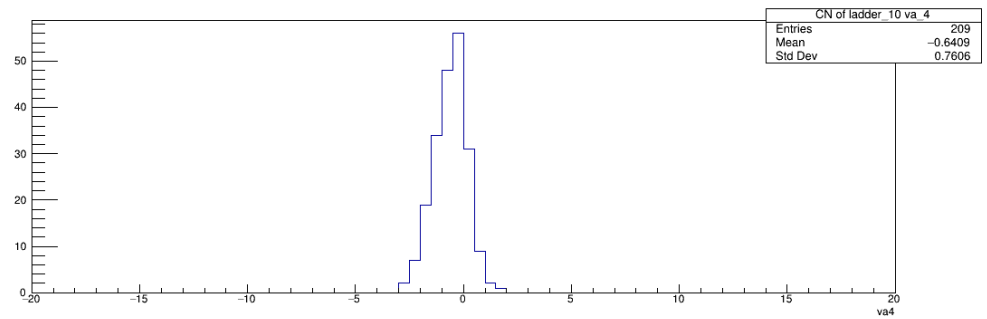
```
if(fabs(ADC[i][j] - pedestal[i][j]) < 20){//1.5*noise
```

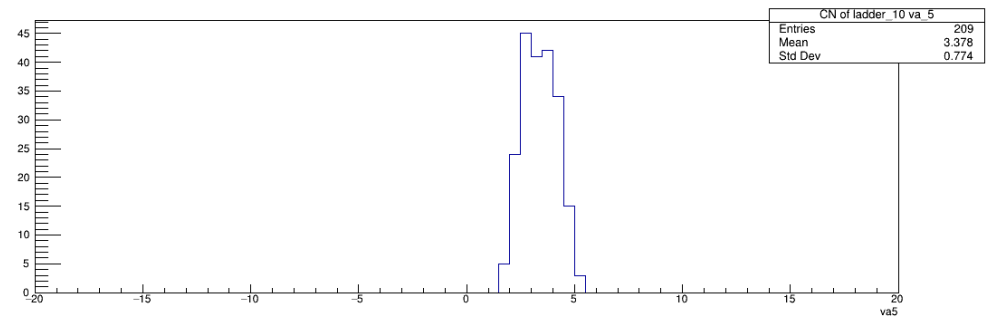




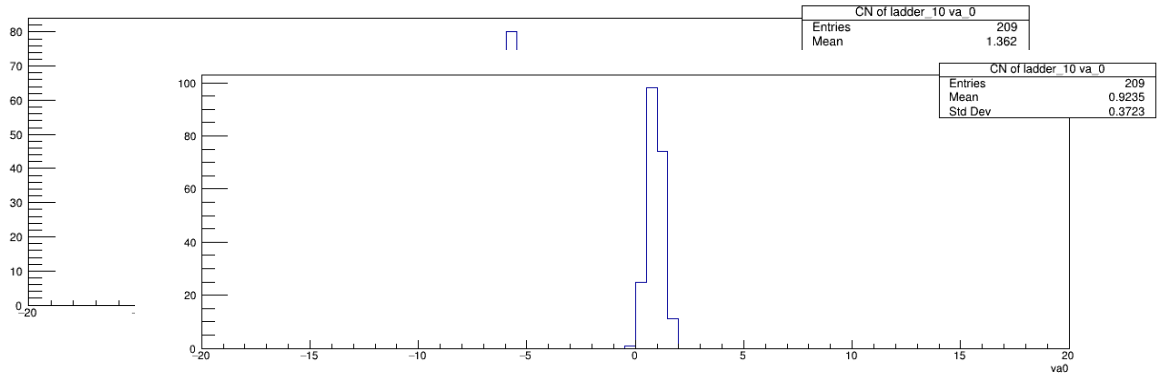


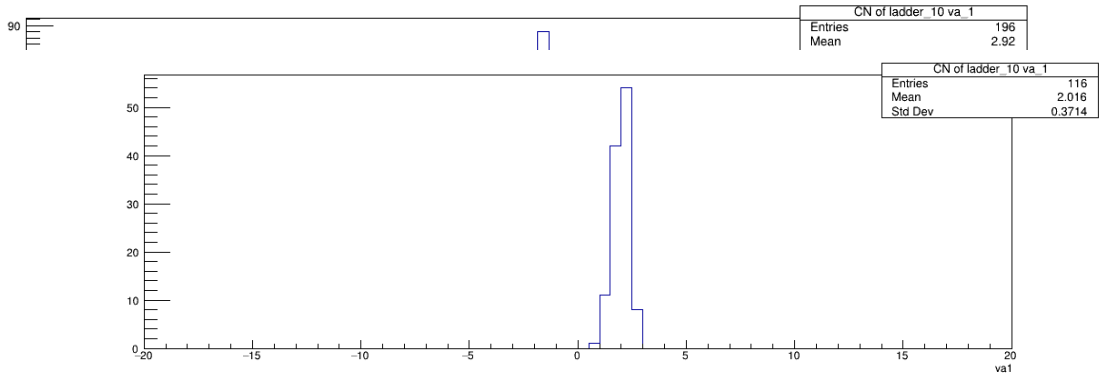


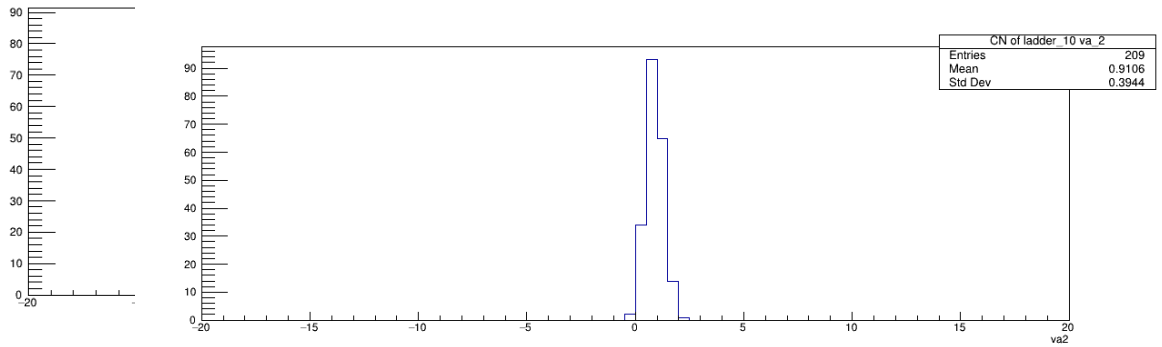


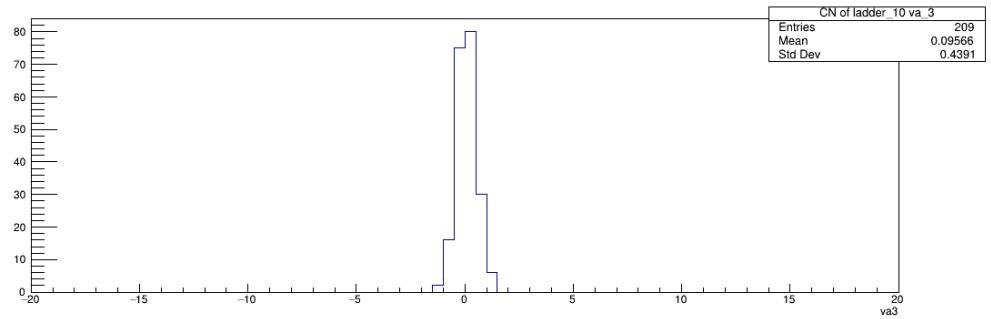


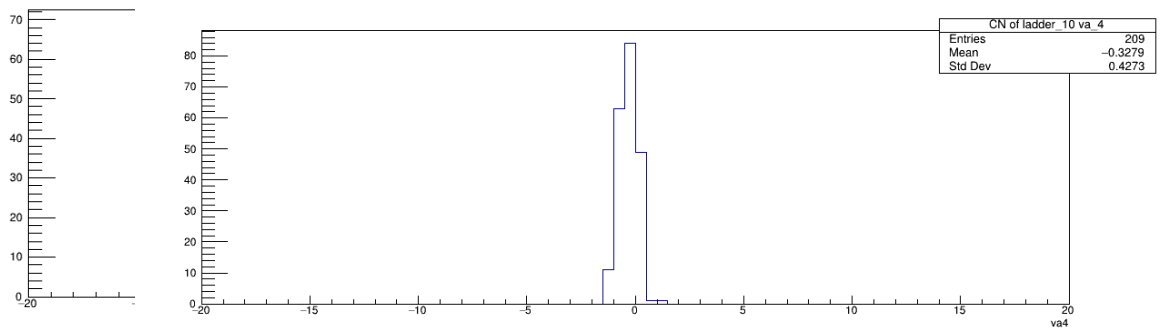
```
if(fabs(ADC[i][j] - pedestal[i][j]) < 2*noise[i][j])
```

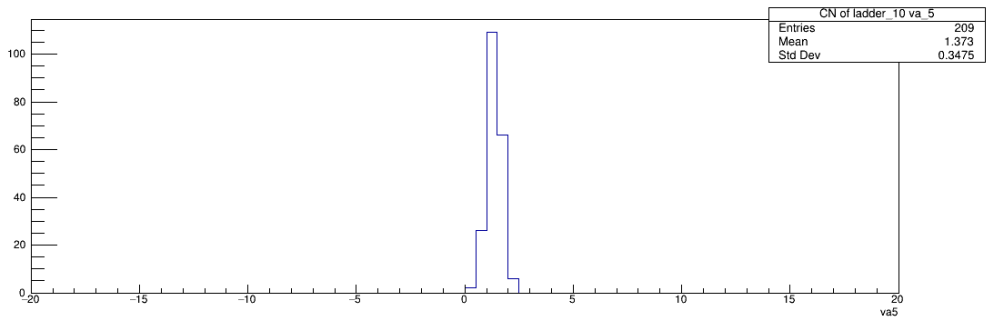


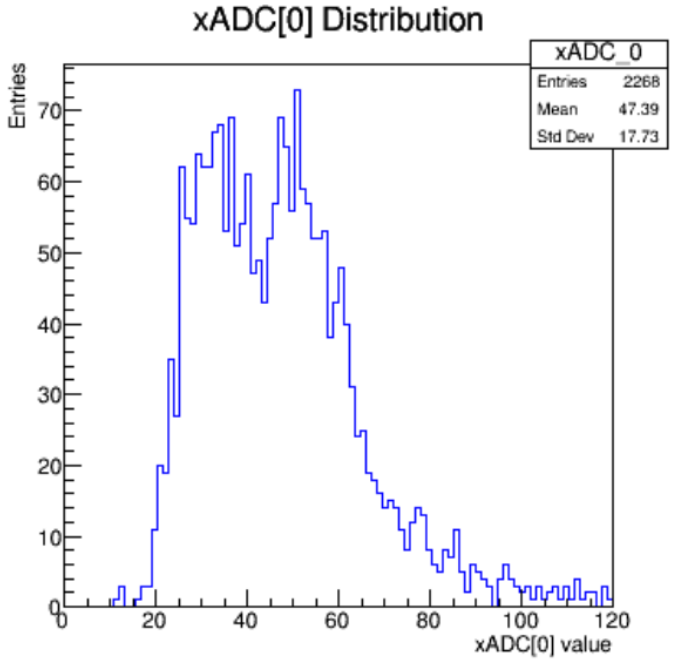


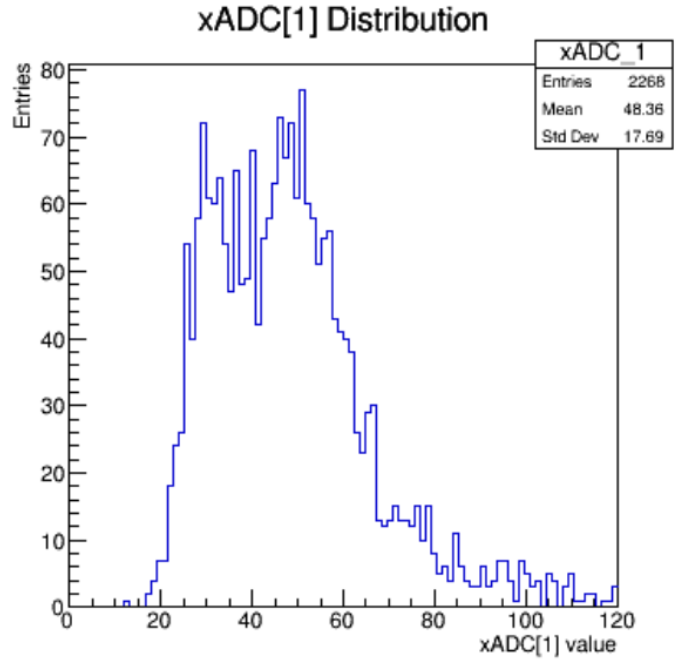


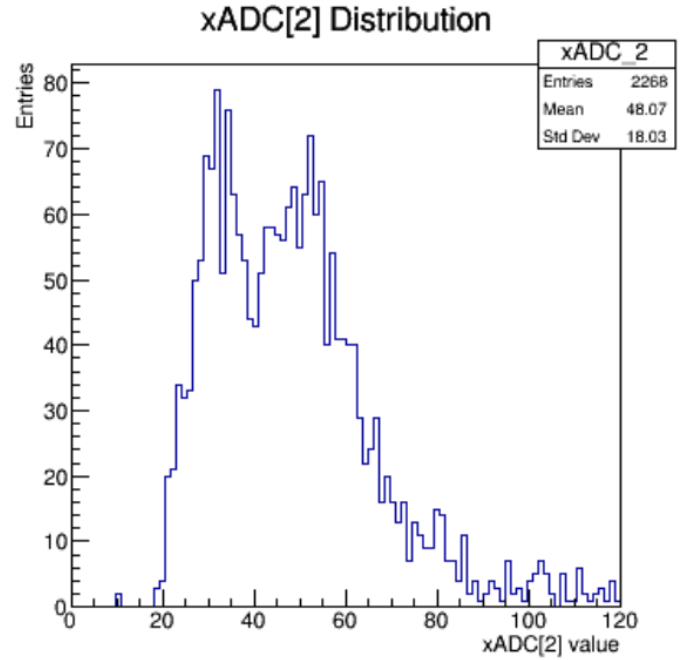


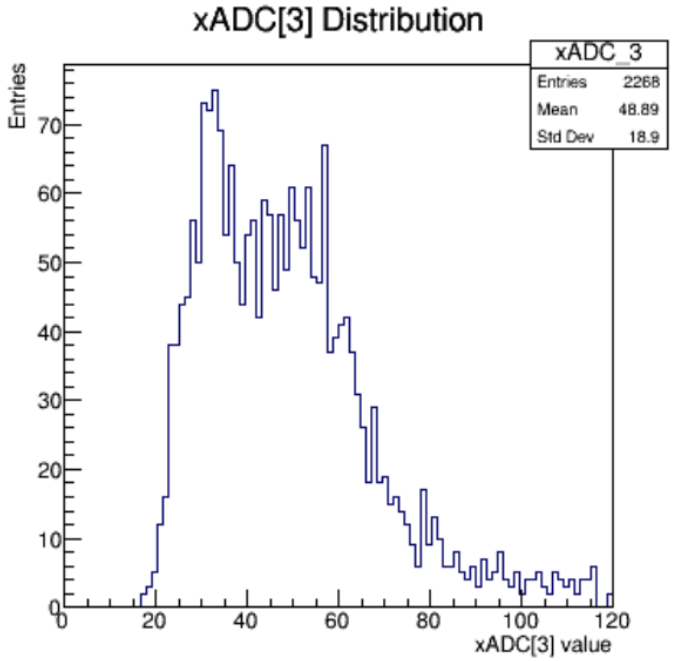


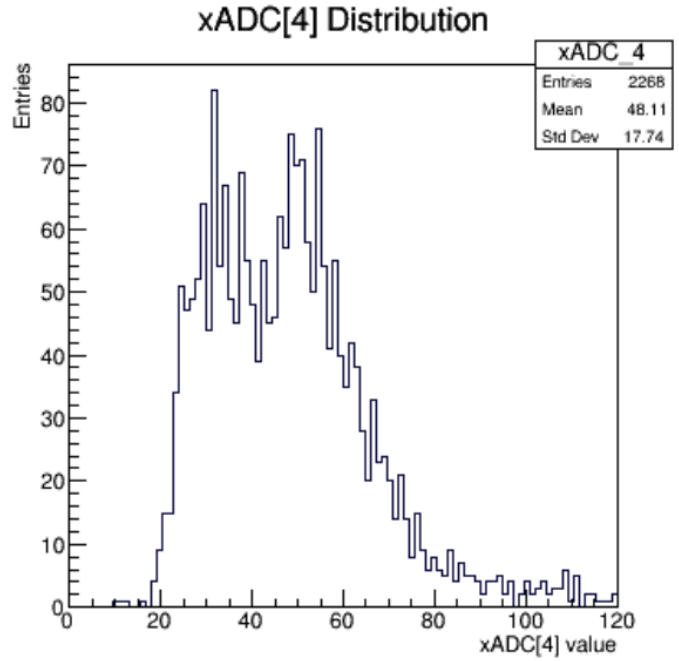


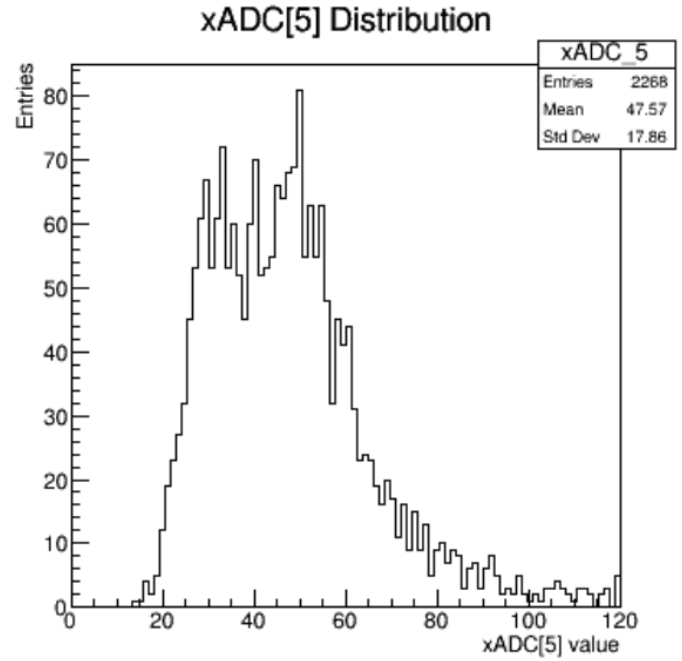

xADC[0] Distribution
xADC_0
Entries 2268
Mean 47.39
Std Dev 17.73
Entries
xADC[0] value

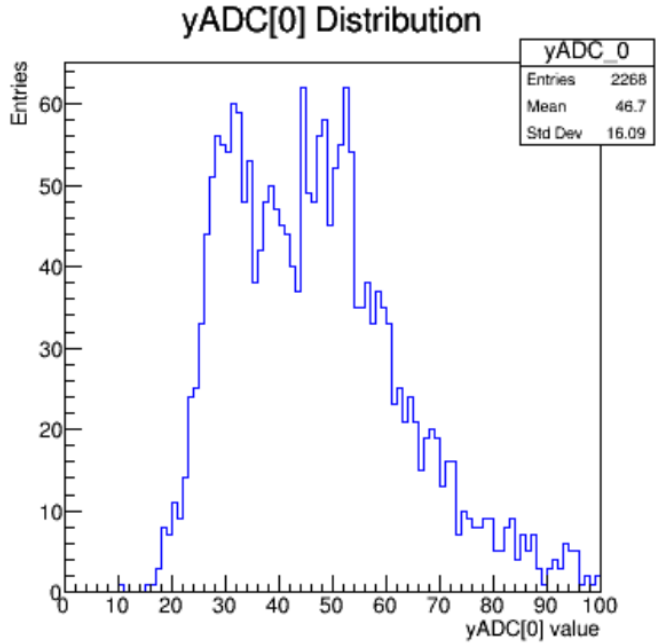

xADC[1] Distribution
xADC_1
Entries 2268
Mean 48.36
Std Dev 17.69
Entries
xADC[1] value

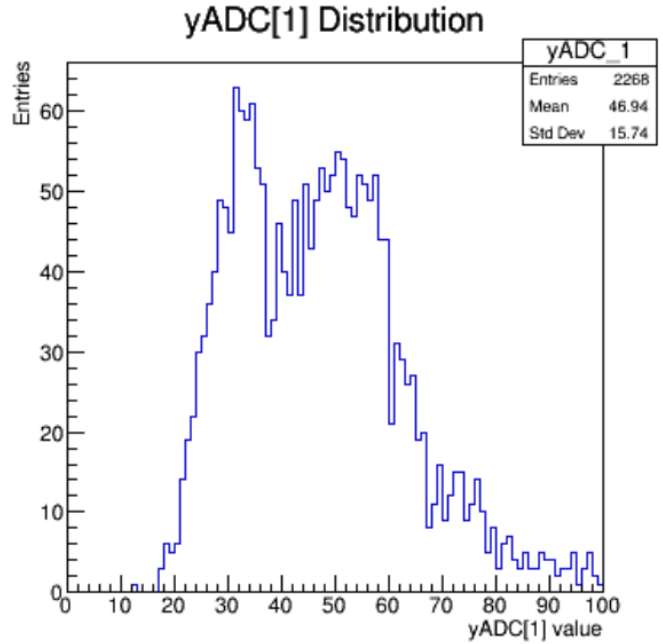

xADC[2] Distribution
xADC_2
Entries 2268
Mean 48.07
Std Dev 18.03
Entries
xADC[2] value

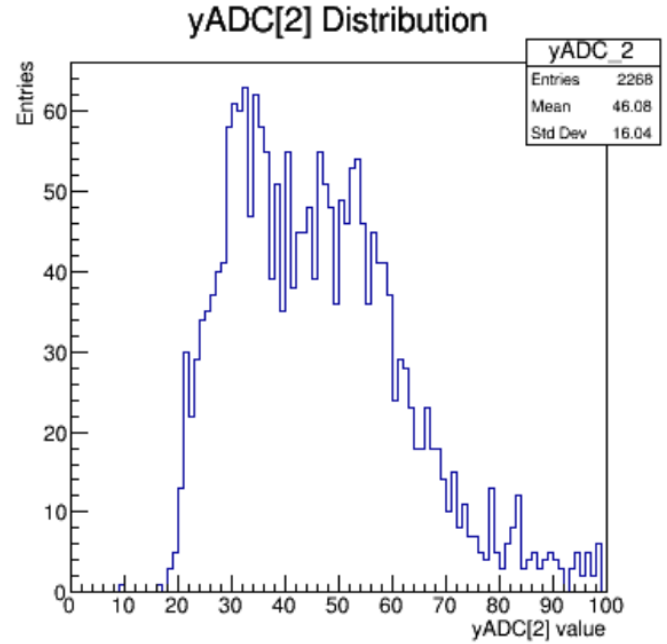

xADC[3] Distribution
xADC_3
Entries 2268
Mean 48.89
Std Dev 18.9
Entries
xADC[3] value

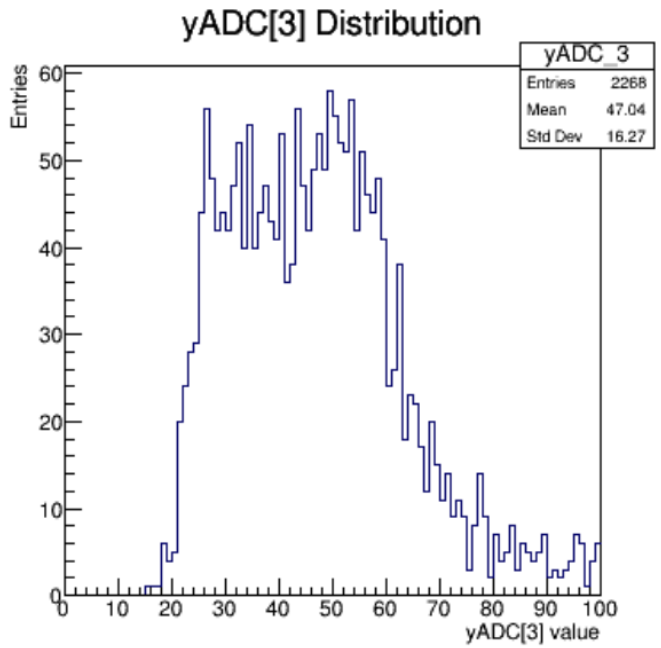

xADC[4] Distribution
xADC_4
Entries 2268
Mean 48.11
Std Dev 17.74
Entries
xADC[4] value


xADC[5] Distribution
xADC_5
Entries 2268
Mean 47.57
Std Dev 17.86
Entries
xADC[5] value


yADC[0] Distribution
yADC_0
Entries 2268
Mean 46.7
Std Dev 16.09
Entries
yADC[0] value


yADC[1] Distribution
yADC_1
Entries 2268
Mean 46.94
Std Dev 15.74
Entries
yADC[1] value


yADC[2] Distribution
yADC_2
Entries 2268
Mean 46.08
Std Dev 16.04
Entries
yADC[2] value


yADC[3] Distribution
yADC_3
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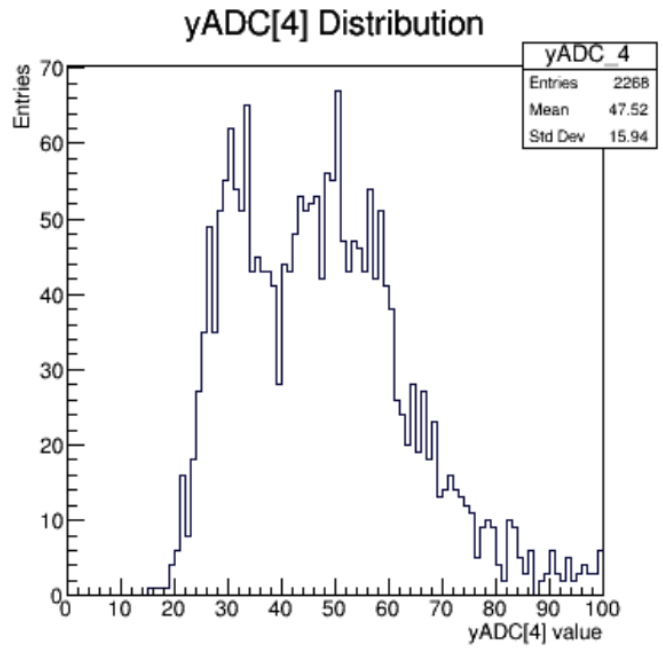
Mean 47.04
Std Dev 16.27
Entries
yADC[3] value


yADC[4] Distribution
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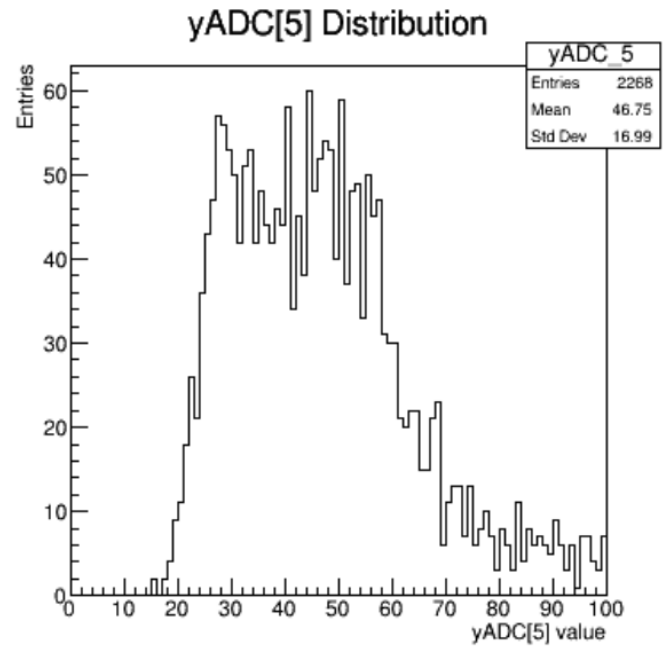
Entries 2268
Mean 47.52
Std Dev 15.94
Entries
yADC[4] value


yADC[5] Distribution
yADC_5
Entries 2268
Mean 46.75
Std Dev 16.99
Entries
yADC[5] value