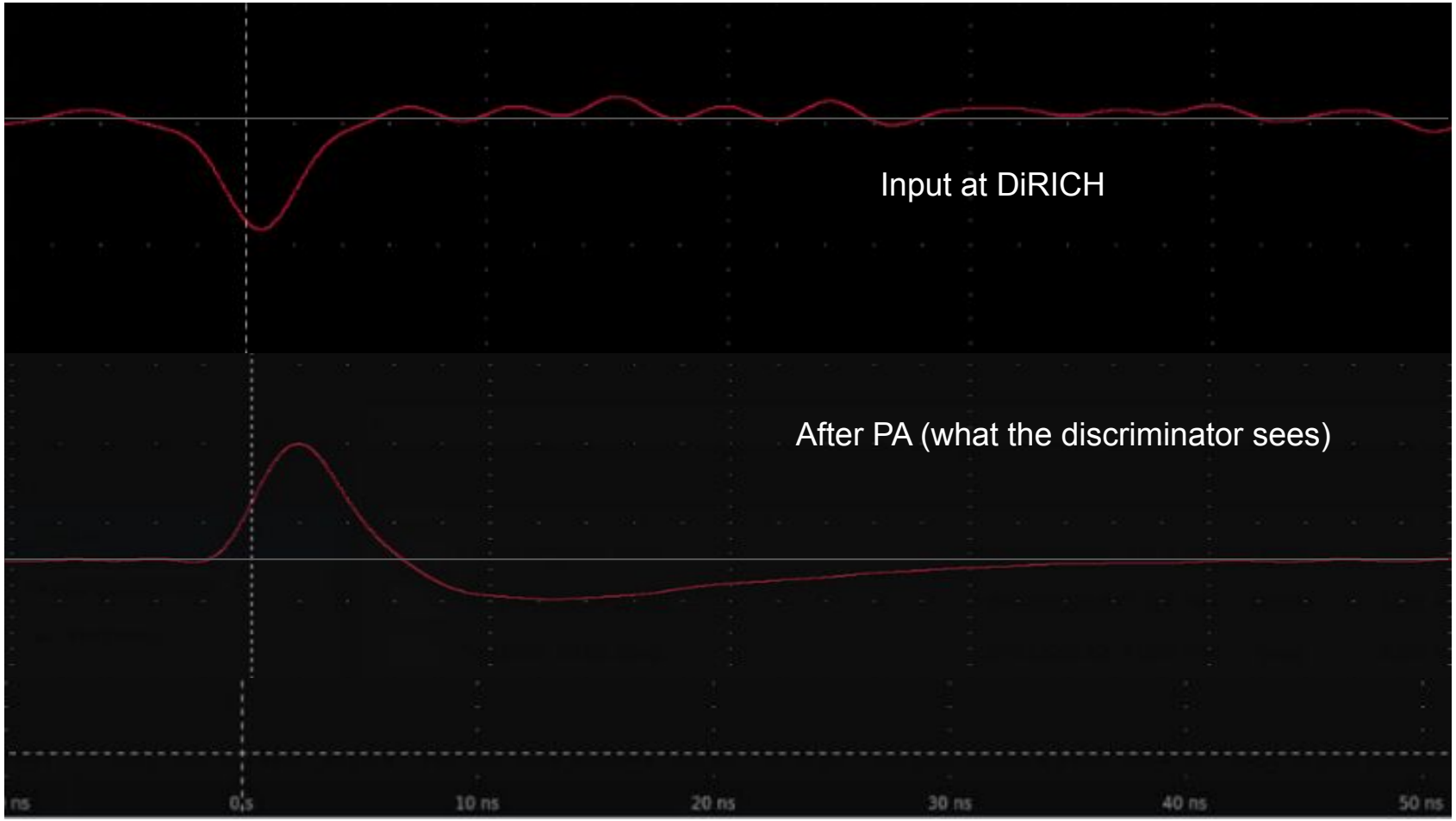
Status of Picosecond Measurements

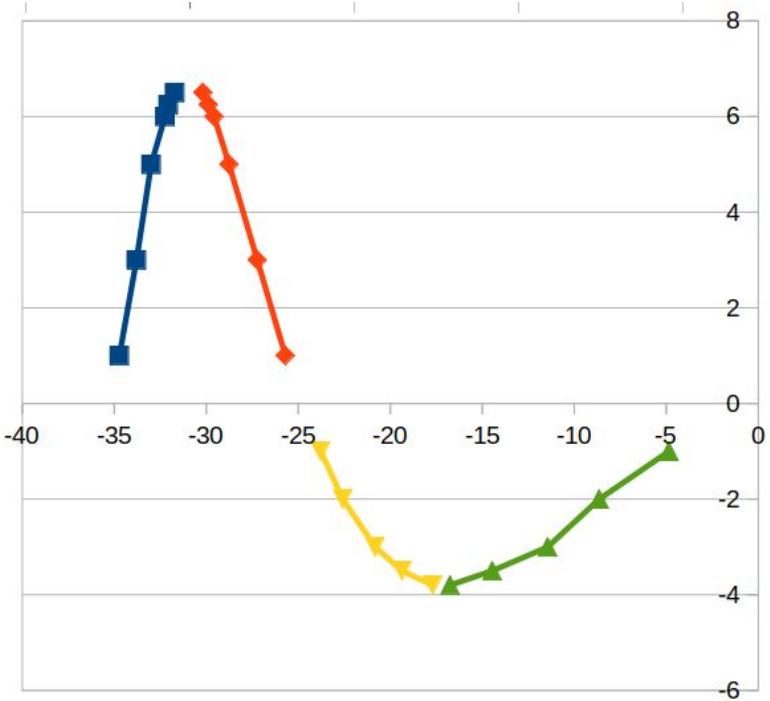
- Utkarsh Verma

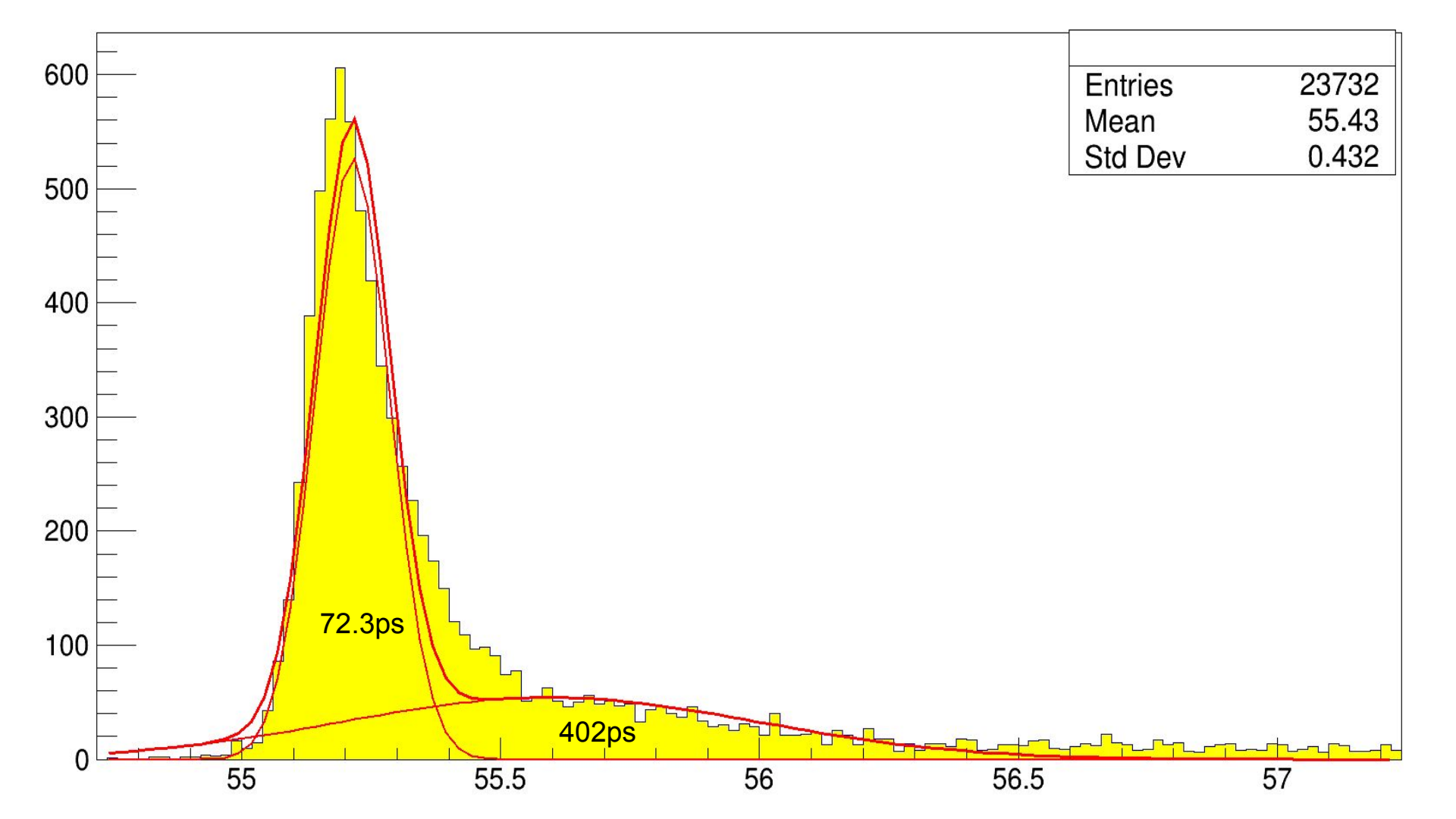


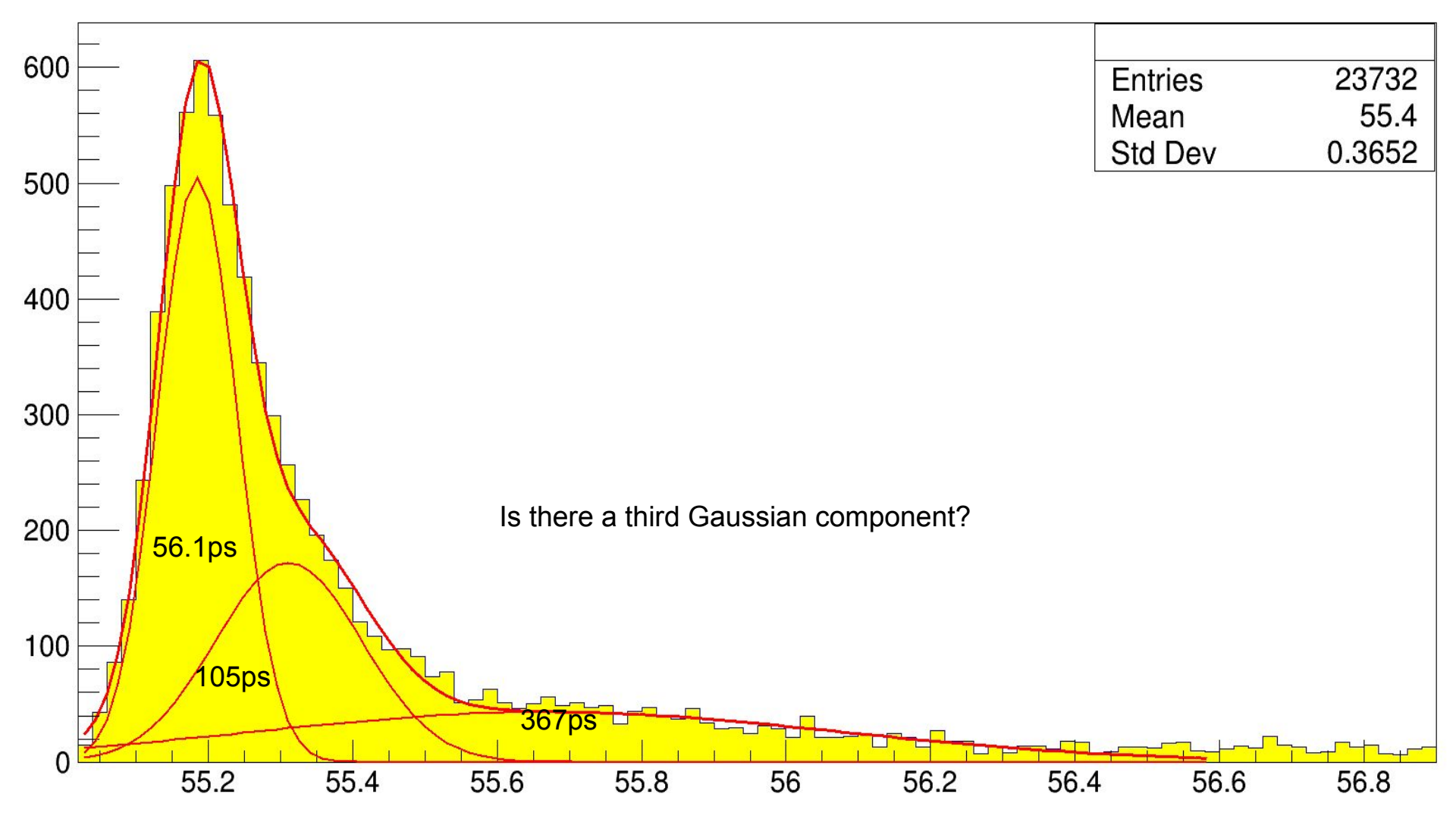
0ns 10ns 50ns

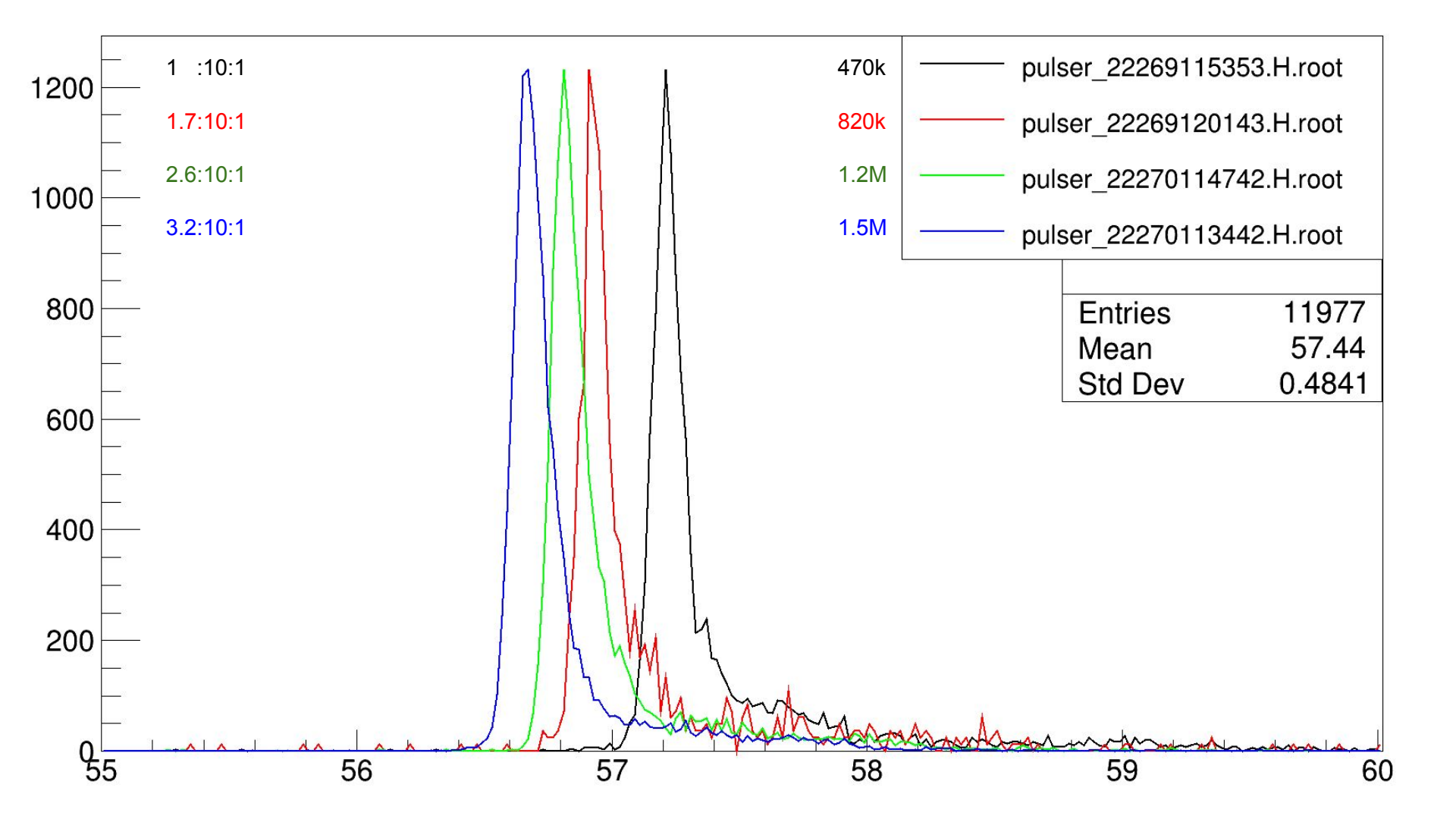
Scan with pocket pulser

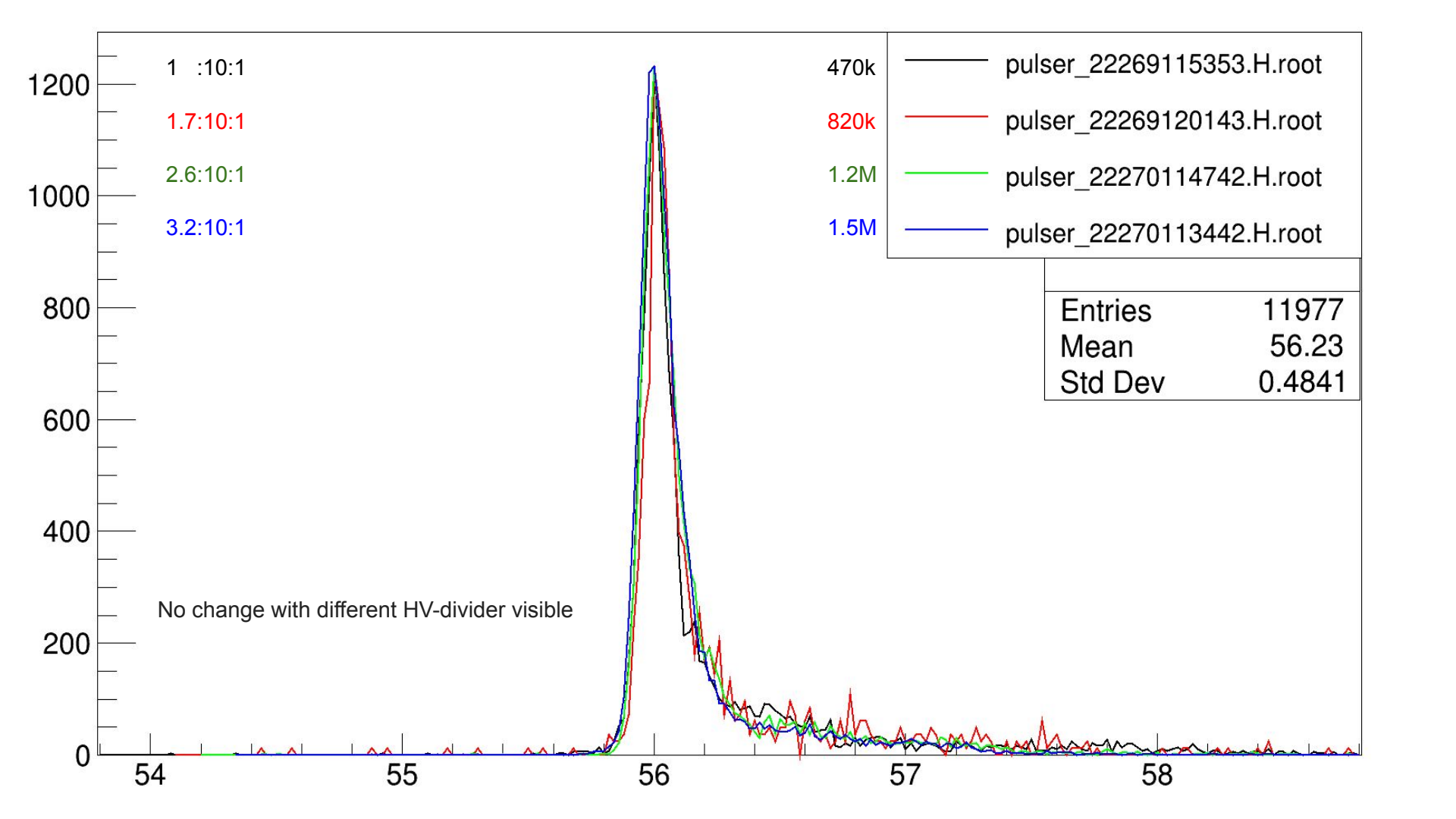
Threshold	Leading	Trailing corrected		Trailing
3	-27.18	-33.76	ninv, +i	2.47
1	-34.72	-25.7		10.53
3	-33.79	-27.228		9.002
5	-32.99	-28.761		7.469
6	-32.24	-29.569		6.661
6.25	-32.06	-29.885		6.345
6.5	-31.71	-30.177		6.053
7			0 counts	
-1	-23.78	-4.85		31.38
-2	-22.58	-8.64		27.59
-3	-20.83	-11.44		24.79
-3.5	-19.36	-14.45		21.78
-3.8	-17.69	-16.74		19.49
-5			0 counts	




Entries 23732
Mean 55.43
Std Dev 0.432
72.3ps
402ps
600
500
400
300
200
100
0
55
55.5
56
56.5
57


Entries 23732
Mean 55.4
Std Dev 0.3652
Is there a third Gaussian component?
56.1ps
105ps
367ps
600
500
400
300
200
100
0
55.2
55.4
55.6
55.8
56
56.2
56.4
56.6
56.8

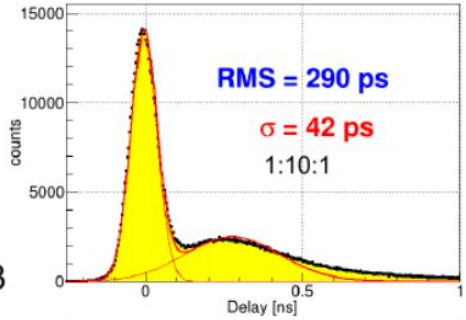

1 :10:1
1.7:10:1
2.6:10:1
3.2:10:1
470k
820k
1.2M
1.5M
pulser_22269115353.H.root
pulser_22269120143.H.root
pulser_22270114742.H.root
pulser_22270113442.H.root
Entries 11977
Mean 57.44
Std Dev 0.4841
0
200
400
600
800
1000
1200
55
56
57
58
59
60

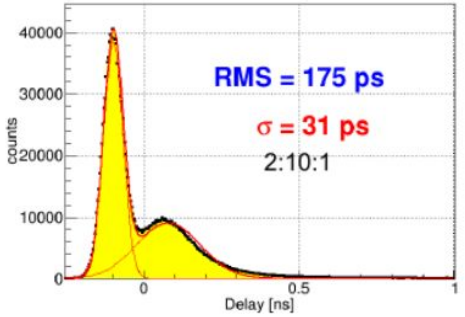

1 :10:1
1.7:10:1
2.6:10:1
3.2:10:1
470k
820k
1.2M
1.5M
pulser_22269115353.H.root
pulser_22269120143.H.root
pulser_22270114742.H.root
pulser_22270113442.H.root
Entries 11977
Mean 56.23
Std Dev 0.4841
No change with different HV-divider visible
1200
1000
800
600
400
200
0
54
55
56
57
58

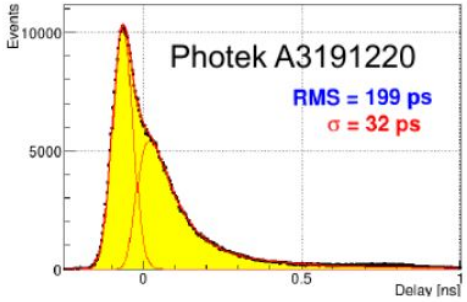
Time resolution

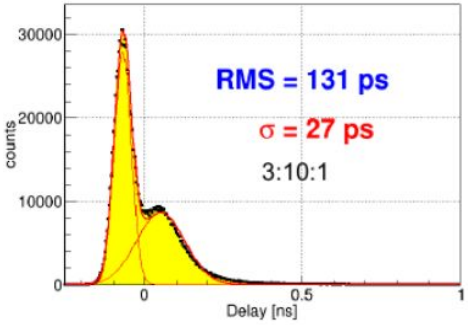
- Higher CE of Photonis comes with a price: more collected recoil electrons → worse time resolution (especially RMS!)
- Solution: increase of HV between PC and MCPin → shift of recoil peak into the main peak → better TTS (σ) and RMS (-0.5…2 ns)
- RMS timing improves by a factor 2 – 3

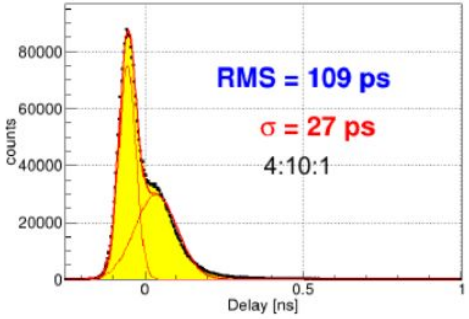
Photonis 9002193 with different voltage dividers, from 1:10:1 (PC-MCPin:MCPin-MCPout:MCPout-Anode) to 4:10:1



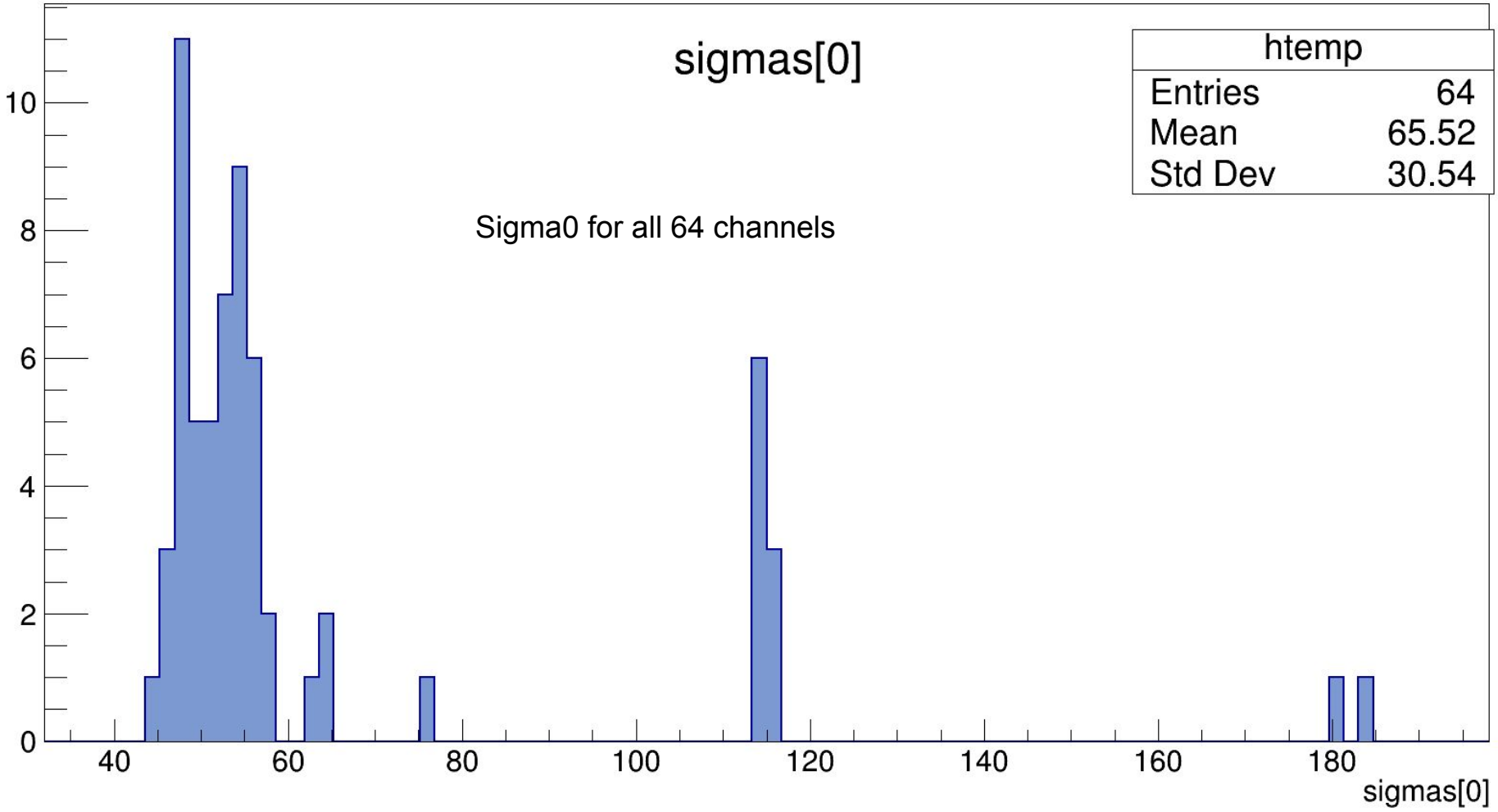


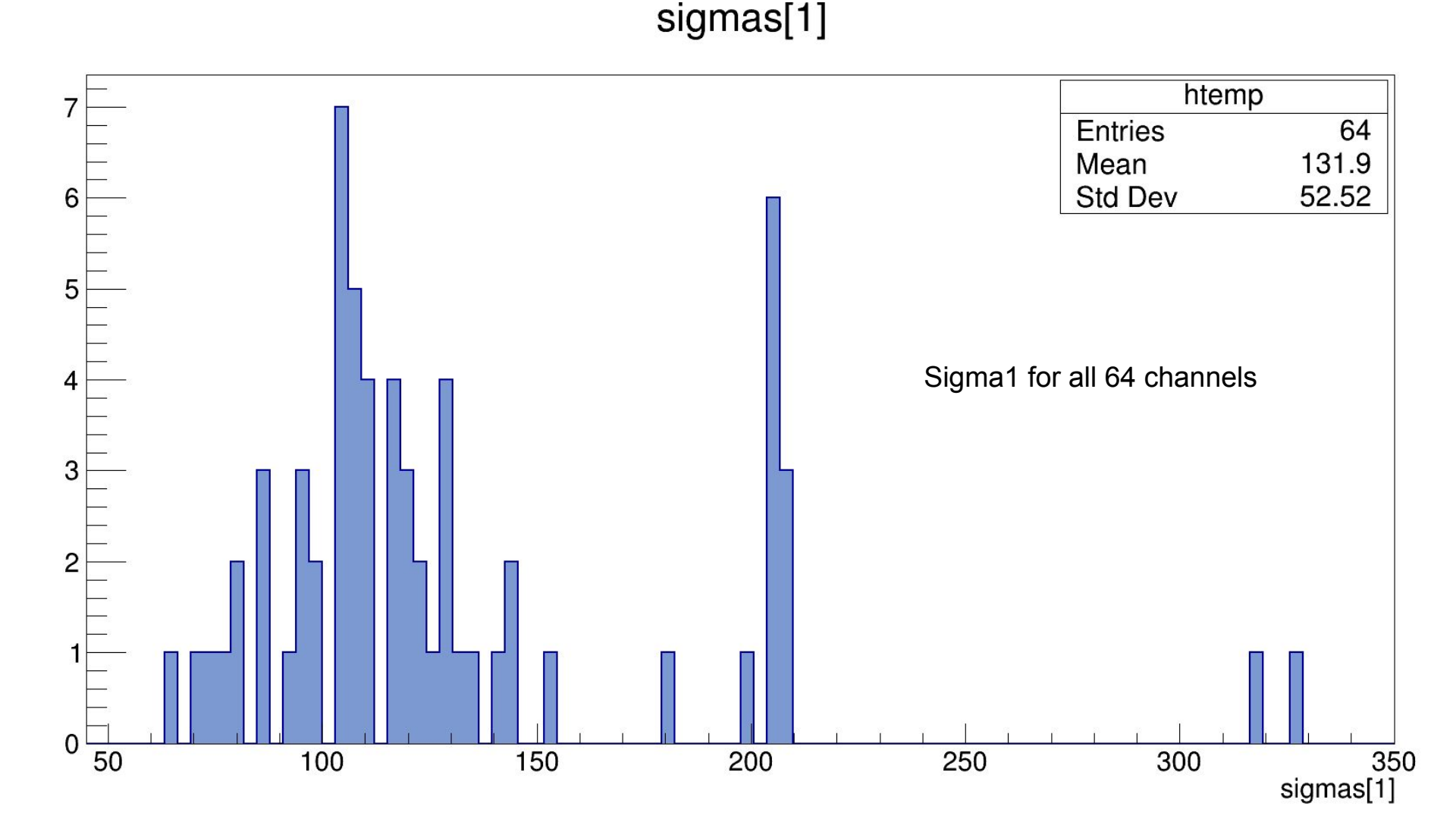


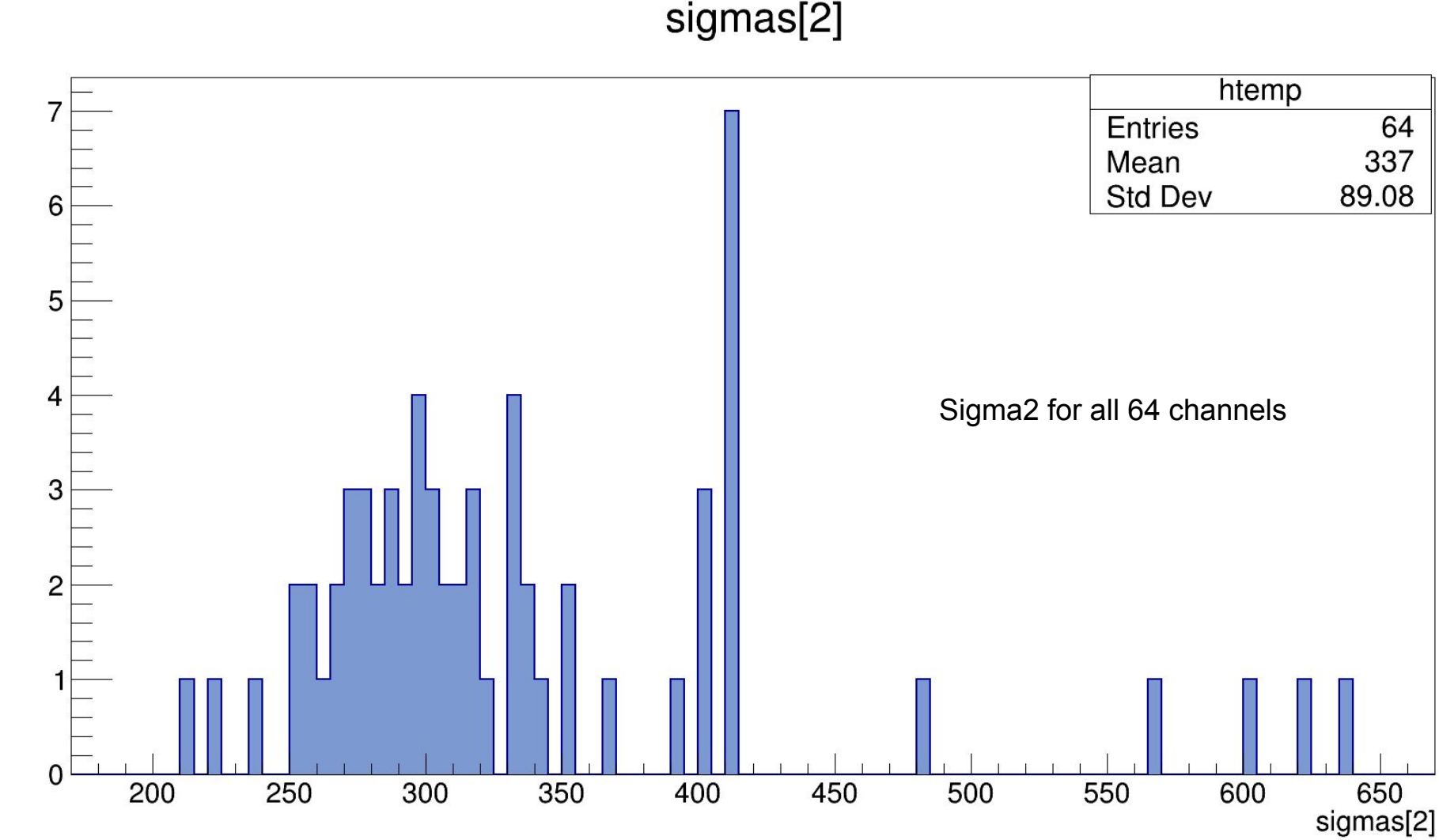




Results from Erlangen


sigmas[0]
htemp
Entries 64
Mean 65.52
Std Dev 30.54
Sigma0 for all 64 channels
0
2
4
6
8
10
40
60
80
100
120
140
160
180
sigmas[0]


sigmas[1]
htemp
Entries 64
Mean 131.9
Std Dev 52.52
Sigma1 for all 64 channels
0
1
2
3
4
5
6
7
50
100
150
200
250
300
350
sigmas[1]


sigmas[2]
htemp
Entries 64
Mean 337
Std Dev 89.08
Sigma2 for all 64 channels
0
1
2
3
4
5
6
7
200
250
300
350
400
450
500
550
600
650
sigmas[2]

Next

- Further measurements
- Oscilloscope plot