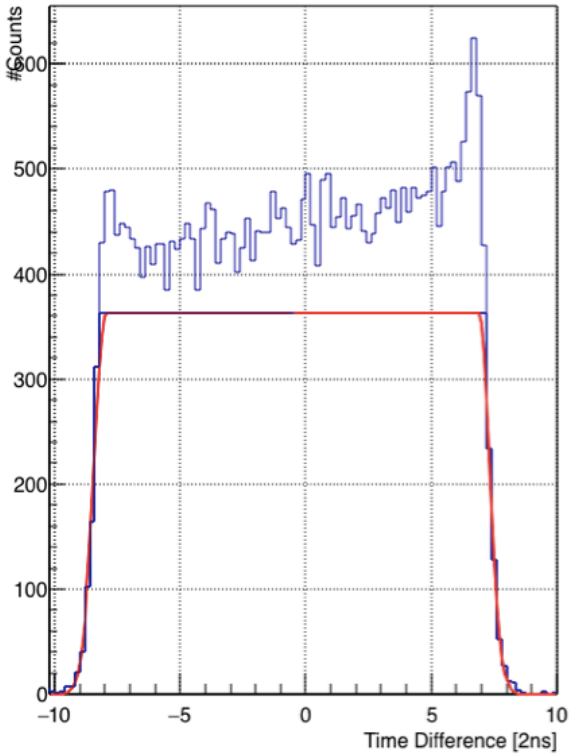
Modification of Calibration

Calibration mechanism

- Evaluation of boundary of Hit Position



Upstream

$f(x) = p_0 e^{-\frac{(\min(x,p_1)-p_1)^2}{2p_2^2}}$

Entries	1000
Mean	−0.5596
RMS	4.887
χ^2 / ndf	36.24 / 53
Prob	0.9619
p0	362.8 ± 0.0
p1	−7.96 ± 0.04
p2	0.4647 ± 0.0256

Downstream

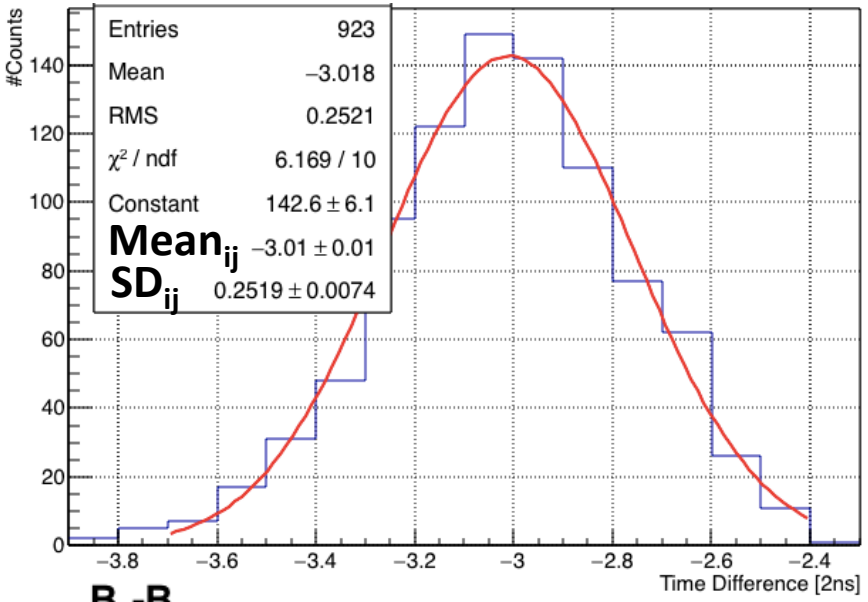
$f(x) = p_0 e^{-\frac{(p_1-\max(x,p_1))^2}{2p_2^2}}$

Entries	1000
Mean	−0.5596
RMS	4.887
χ^2 / ndf	29.33 / 50
Prob	0.9913
p0	362.8 ± 0.0
p1	6.886 ± 0.043
p2	0.4387 ± 0.0281

B_u : Upstream side boundary
B_d : Downstream side boundary

- ToF Correction with

$$\chi^2 = \sum_{i \neq j} \frac{(Mean_{ij} - ToF_{ij} + Offset^i - Offset^j)^2}{SD_{ij}^2}$$



$$\frac{B_u - B_d}{2} = Offset_u^i - Offset_d^i$$

$$\frac{Offset_u^i + Offset_d^i}{2} = Offset^i$$

$$Offset_u^i = \frac{B_u - B_d}{4} + Offset^i$$

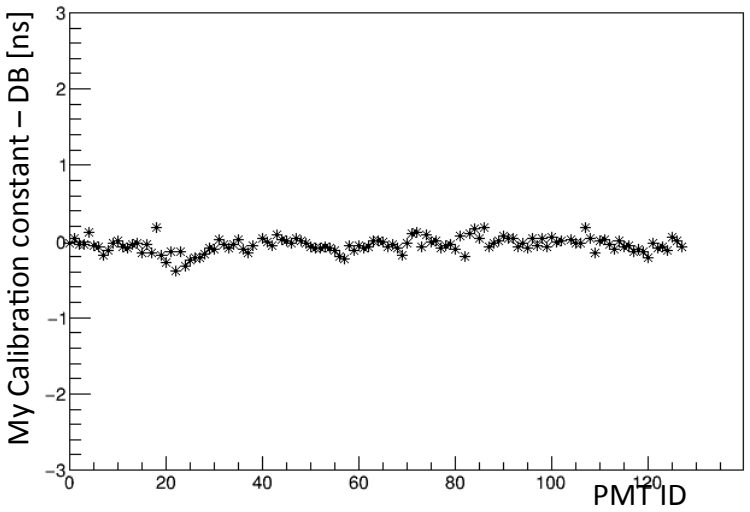
$$Offset_d^i = \frac{B_u - B_d}{4} - Offset^i$$

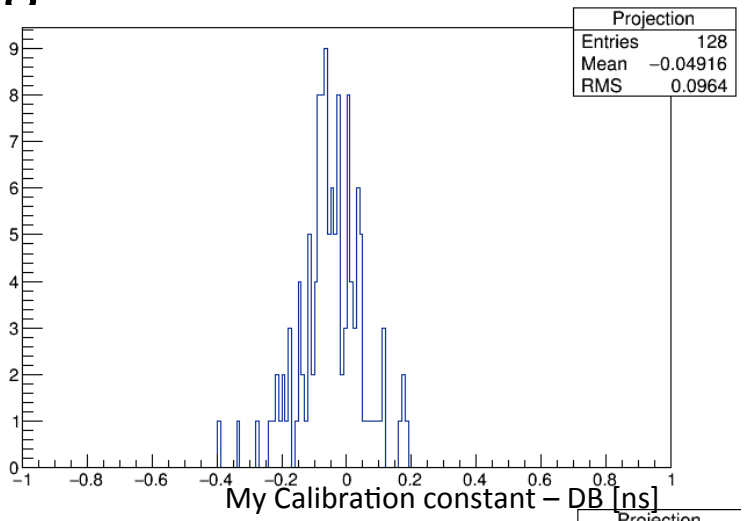
Calibration of Run62, Run64

- Check reproductibility from my code
  - Special treatment on ch39 is ignored

Run62

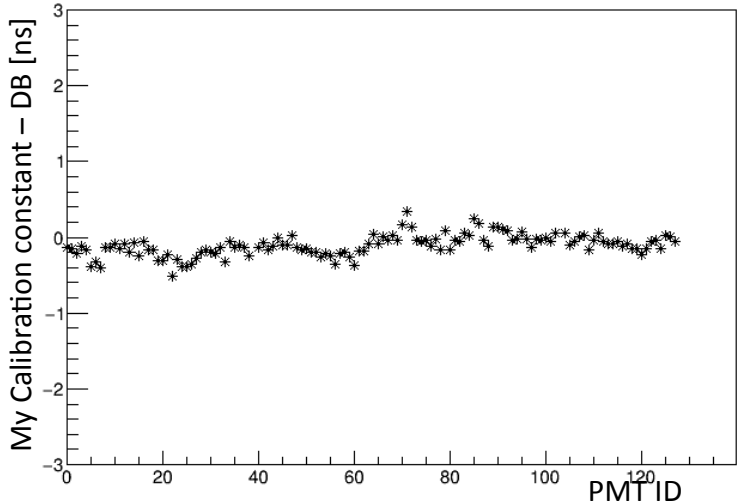
Used Run :
18405~18409

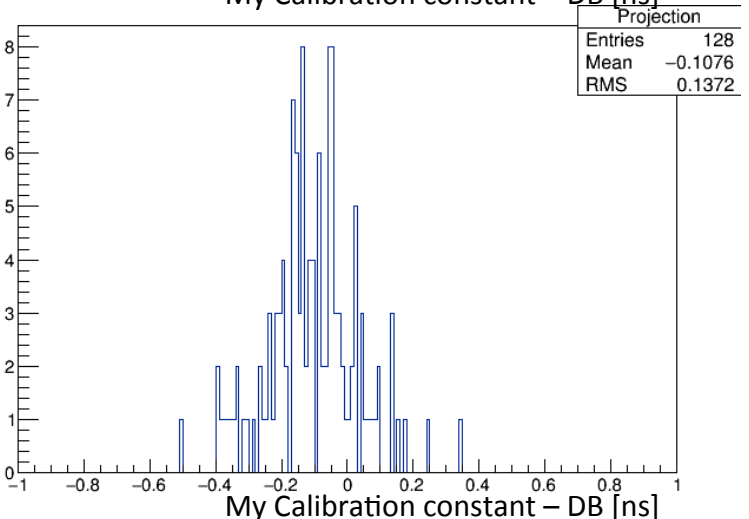




Run64

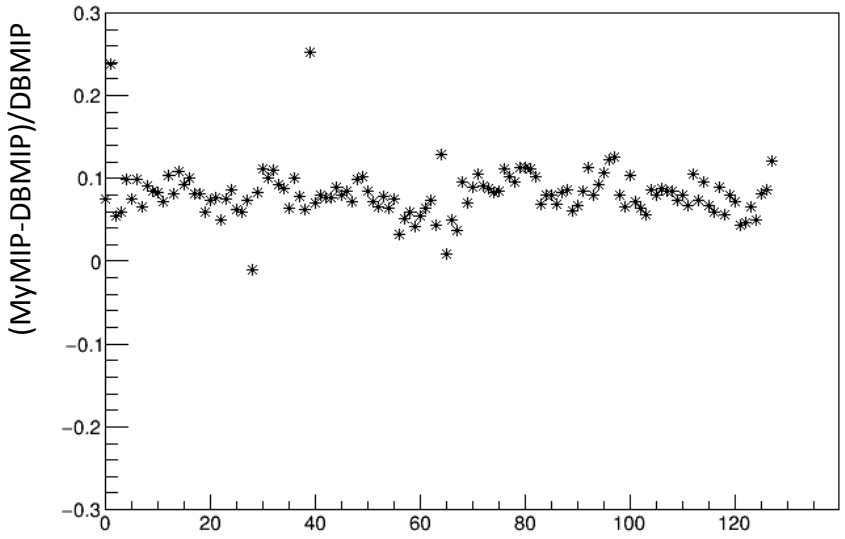
Used Run :
20570~20586

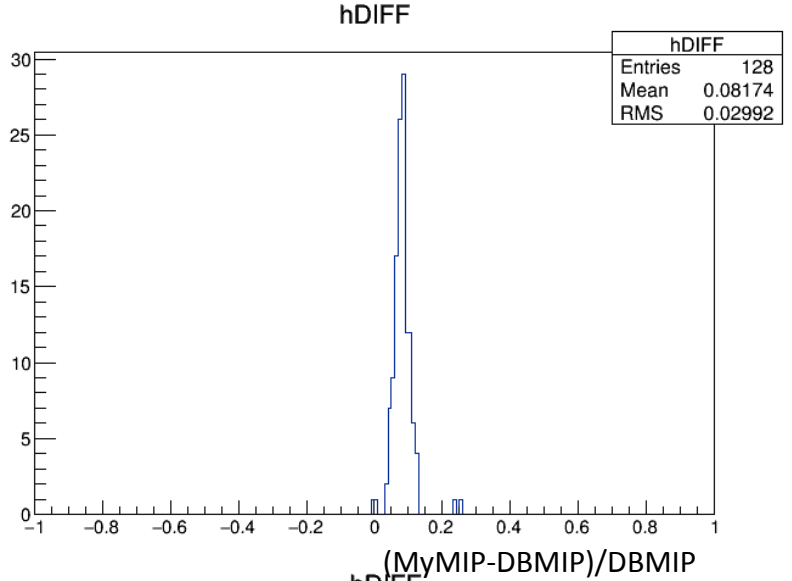




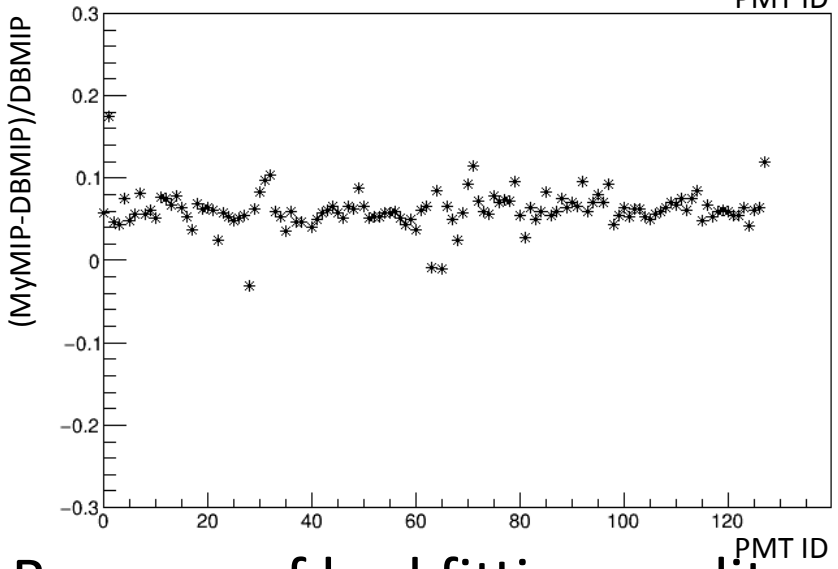
MIP calibration

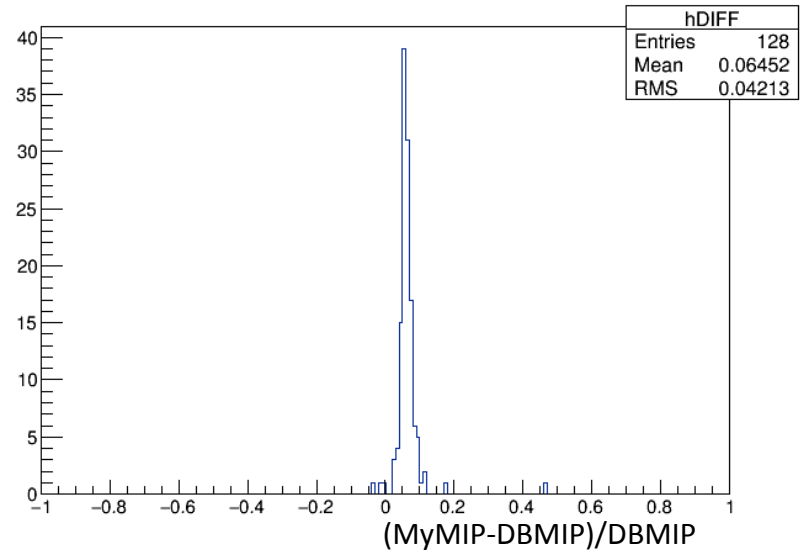
Run62





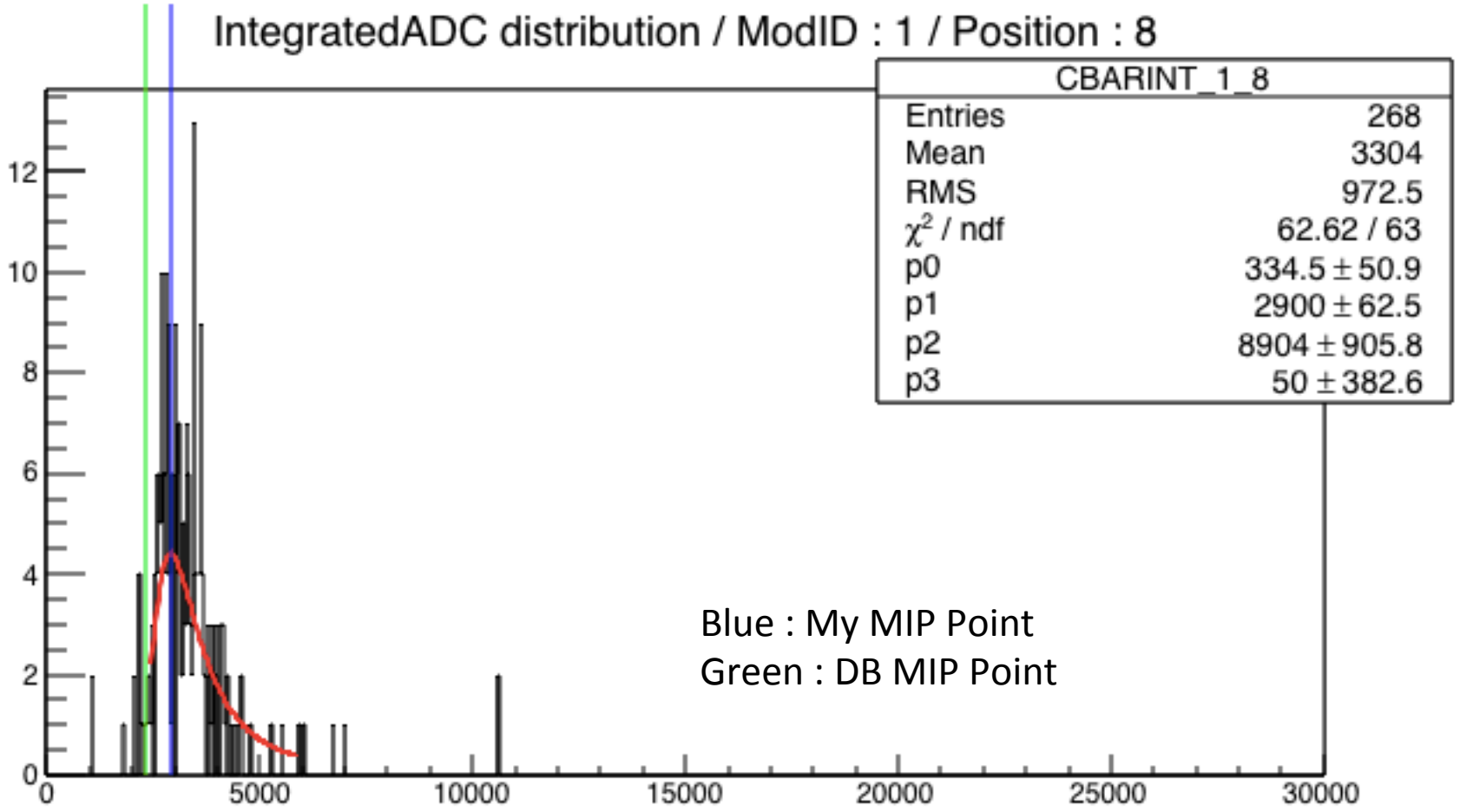
Run64

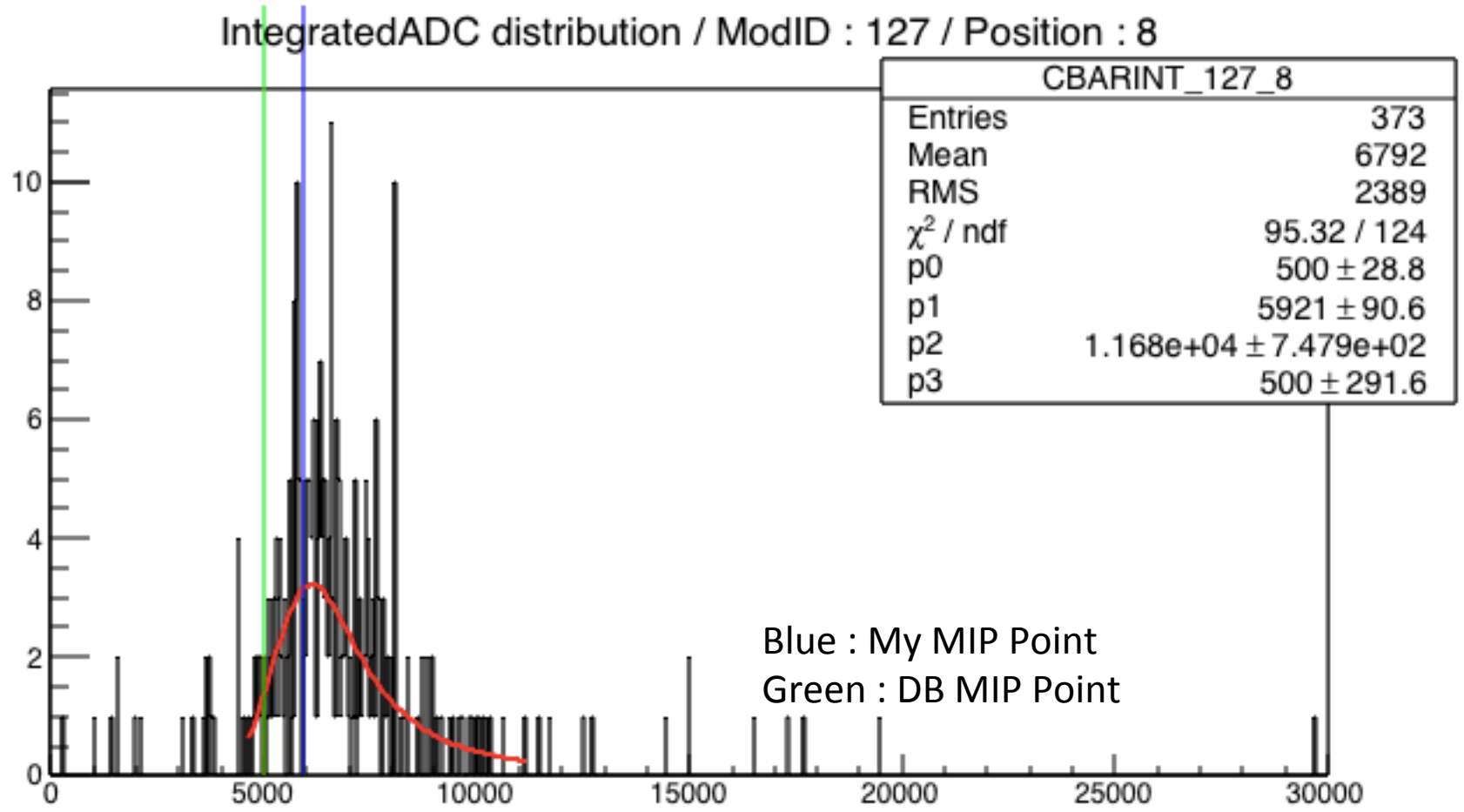




- Because of bad fitting quality, some channel have discrepancy

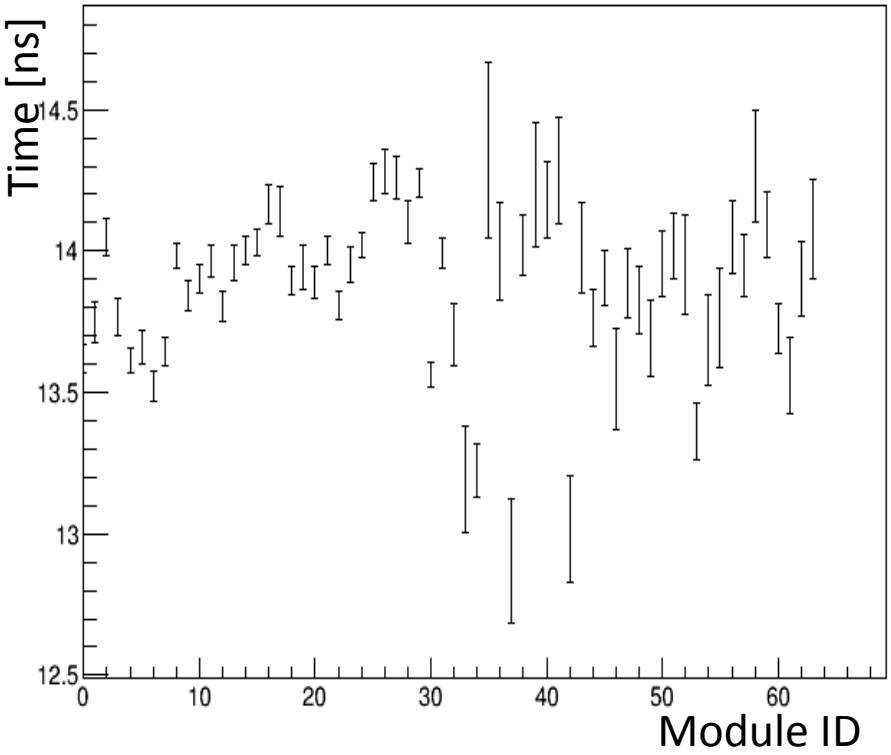
Bad Fitting Channels



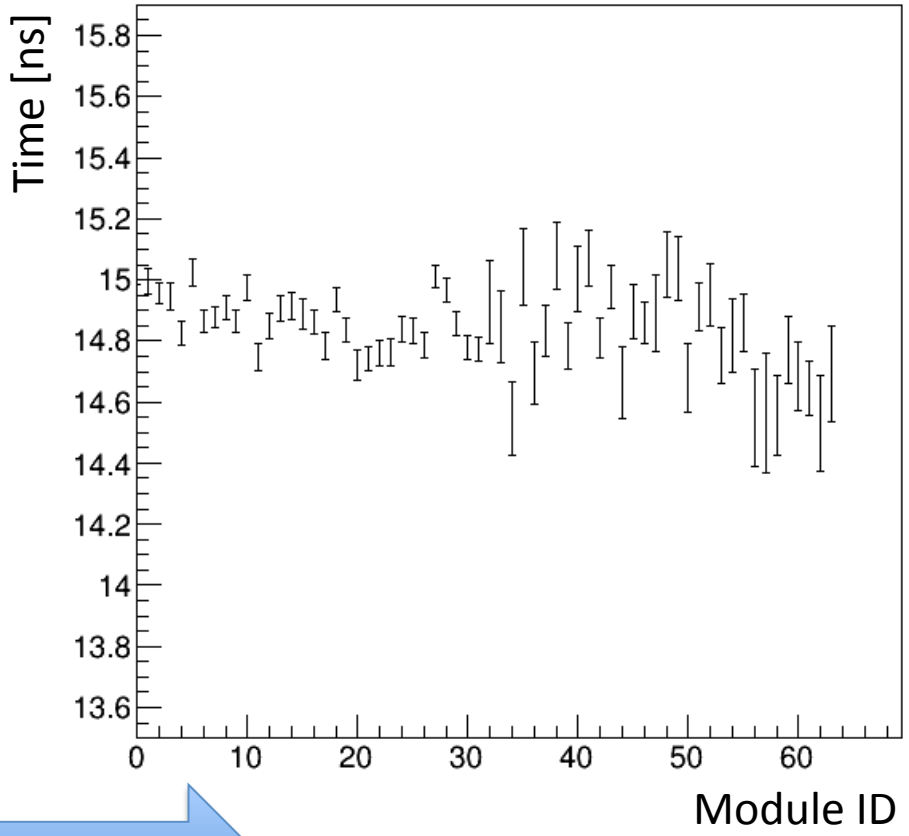

IntegratedADC distribution / ModID : 127 / Position : 8
CBARINT_127_8
Entries 373
Mean 6792
RMS 2389
χ² / ndf 95.32 / 124
p0 500 ± 28.8
p1 5921 ± 90.6
p2 1.168e+04 ± 7.479e+02
p3 500 ± 291.6
Blue : My MIP Point
Green : DB MIP Point
0
2
4
6
8
10
0
5000
10000
15000
20000
25000
30000

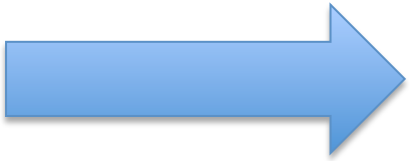
Calibration Quality

Vertex Time Difference from
Bad Calibration Constants



Vertex Time Difference from
Good Calibration Constants





Changed Calibration Constants