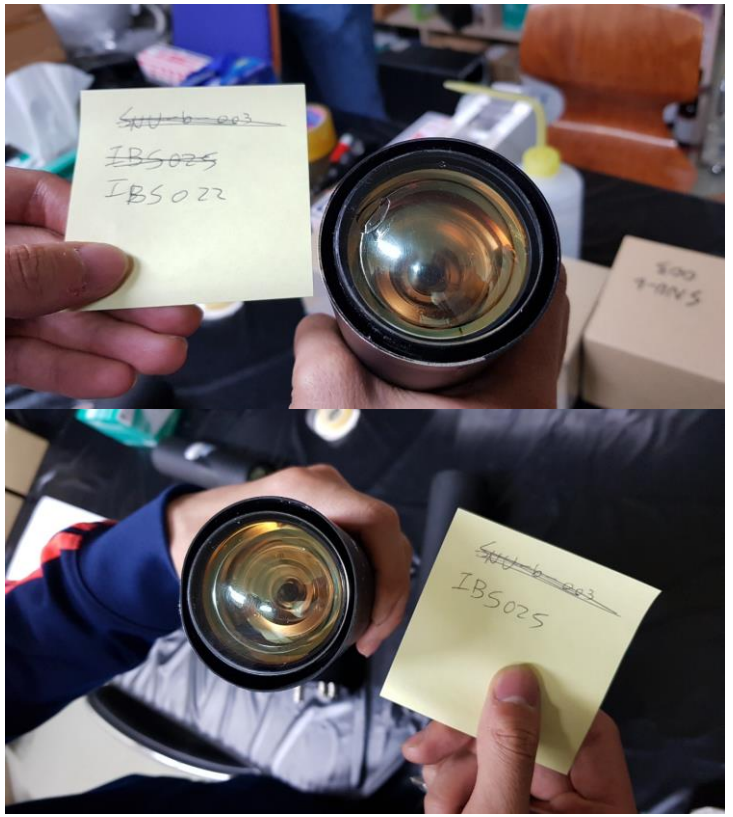
190716

ByungChan Lee

PMT TEST

- Unlabeled : need to check the model
- IBS022 / IBS025 : need to check if it works

Unlabeled



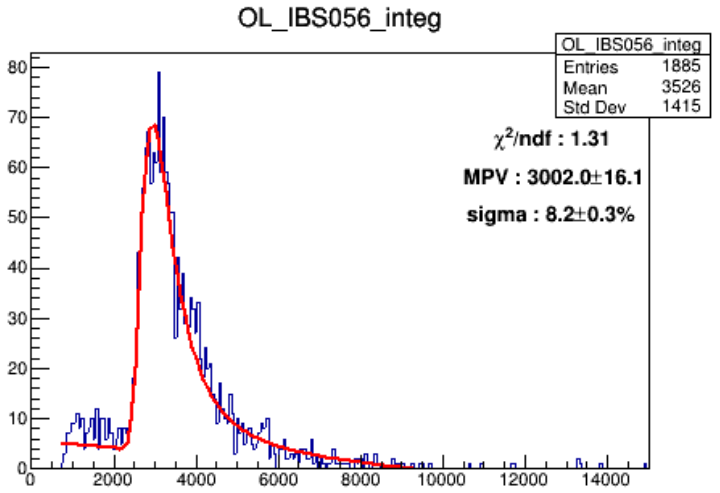
IBS022 / IBS025

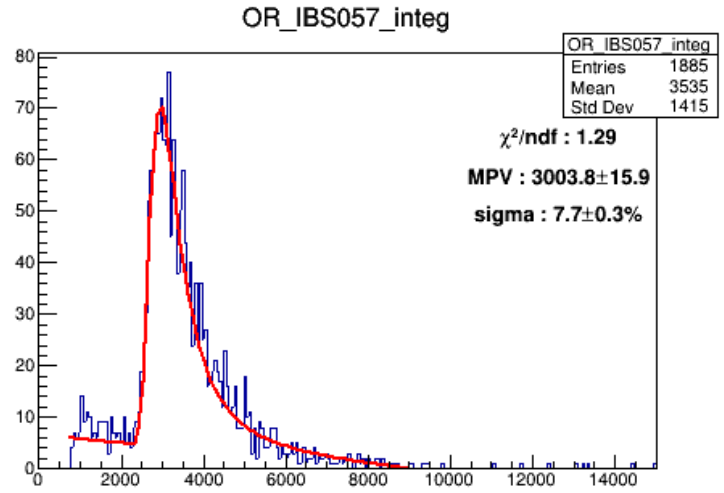
PMT TEST

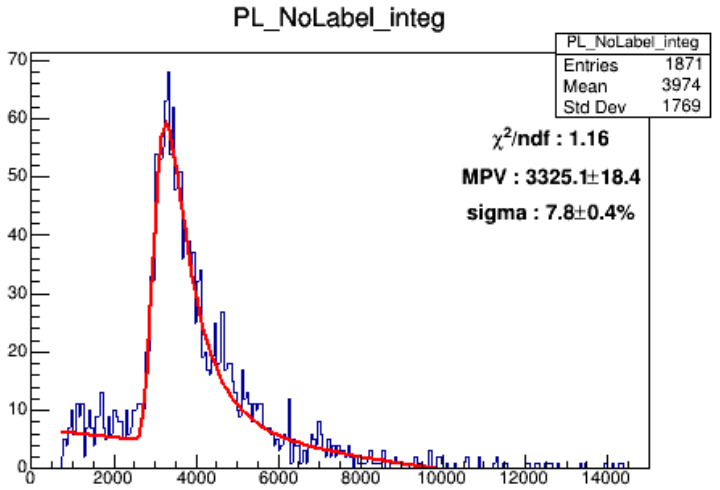
Integral

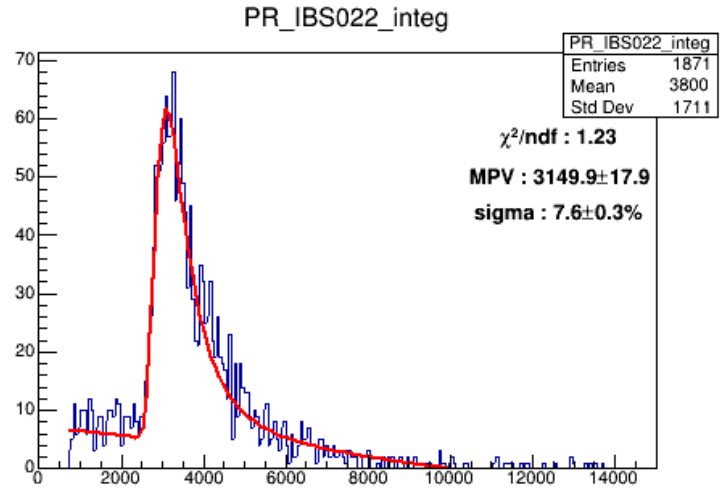
- # of events : 30,000
- Position : Center Cut (±5cm)
- Fitting : Landau + pol1

- Unlabeled, IBS022 show the same results with other PMTs







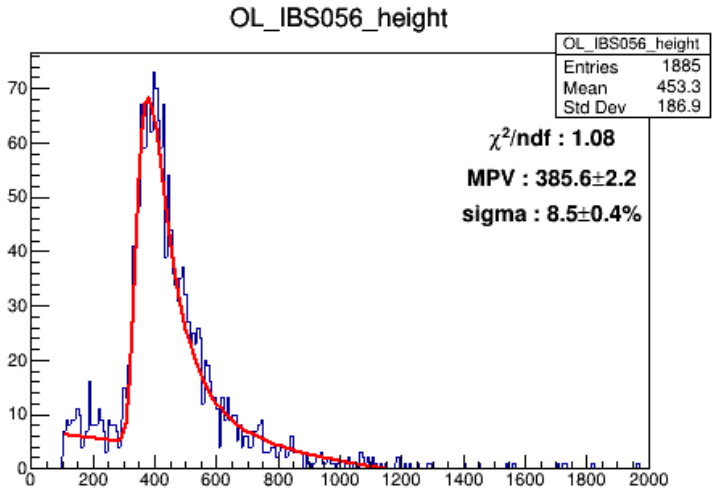


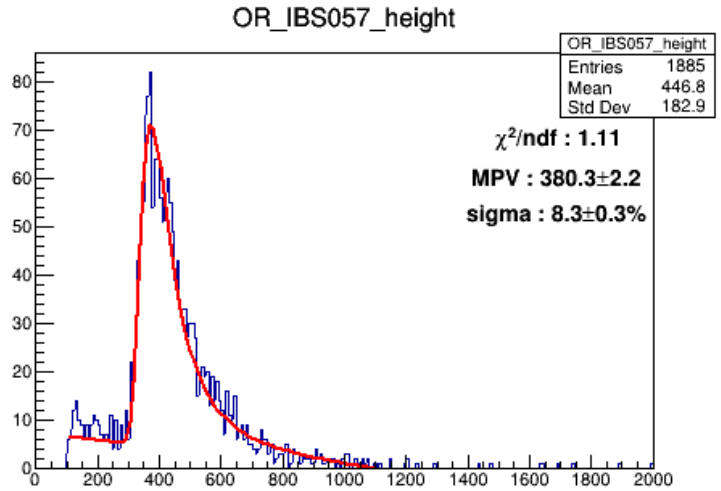
PMT TEST

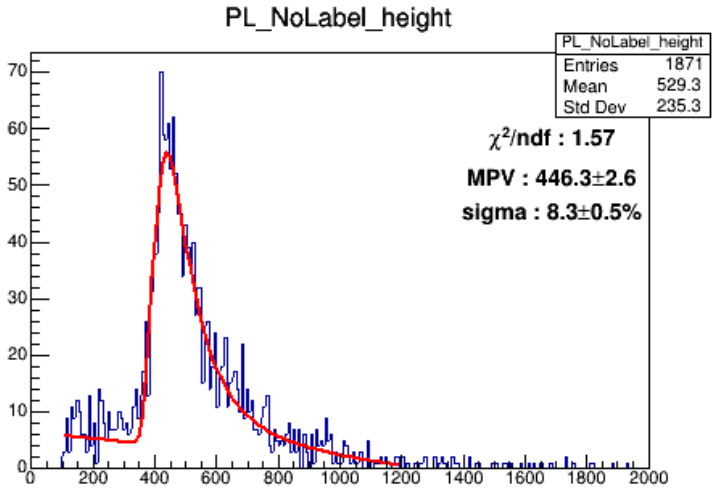
Height

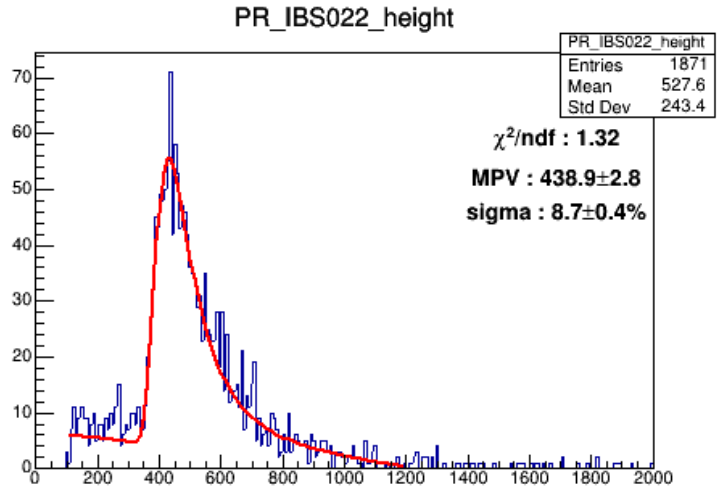
- # of events : 30,000
- Position : Center Cut (±5cm)
- Fitting : Landau + pol1

- Unlabeled, IBS022 show the same results with other PMTs







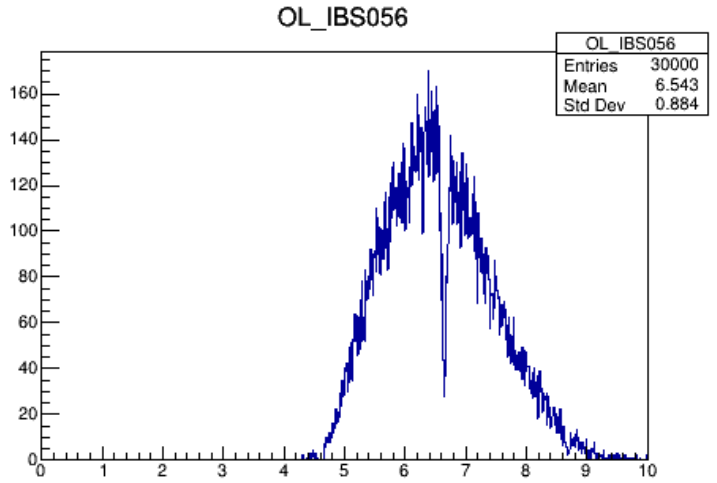


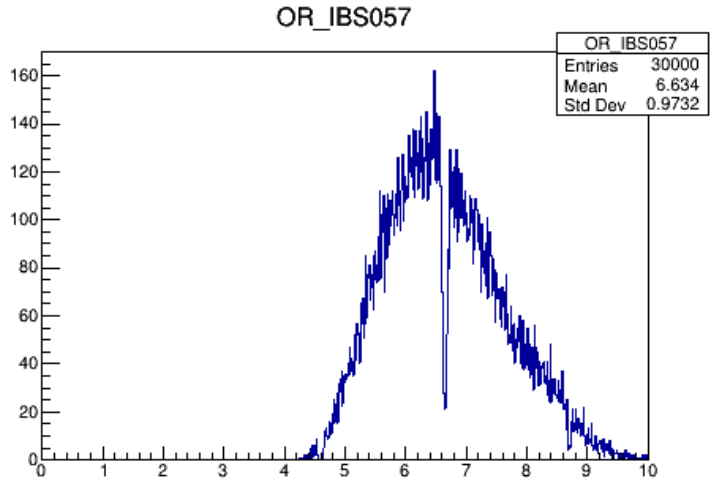
PMT TEST

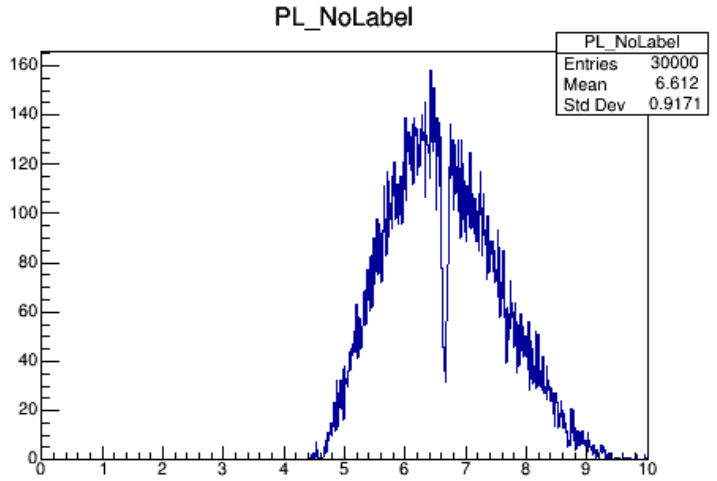
Rise Time

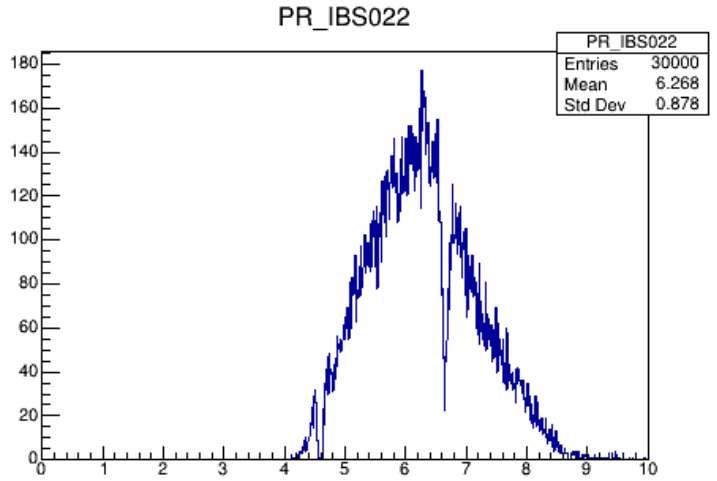
- # of events : 30,000
- Rise Time = tMax – t0

- Unlabeled, IBS022 show the same results with other PMTs







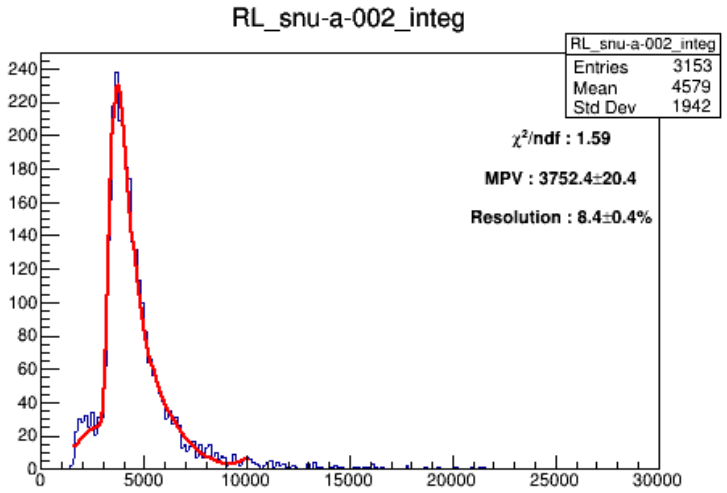


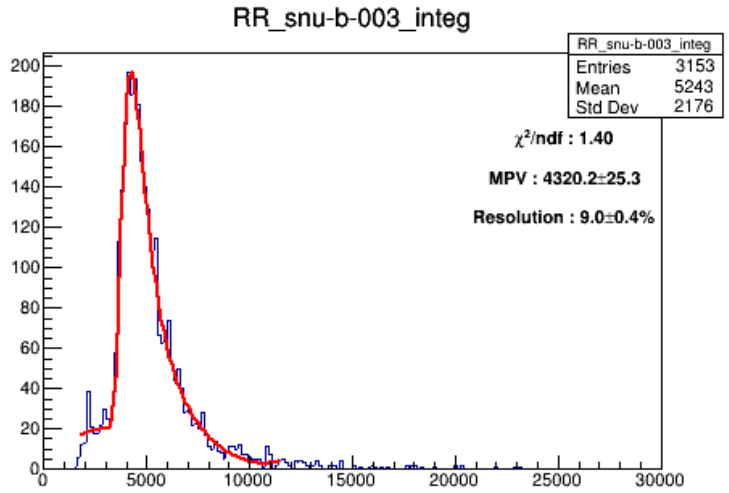
PMT TEST

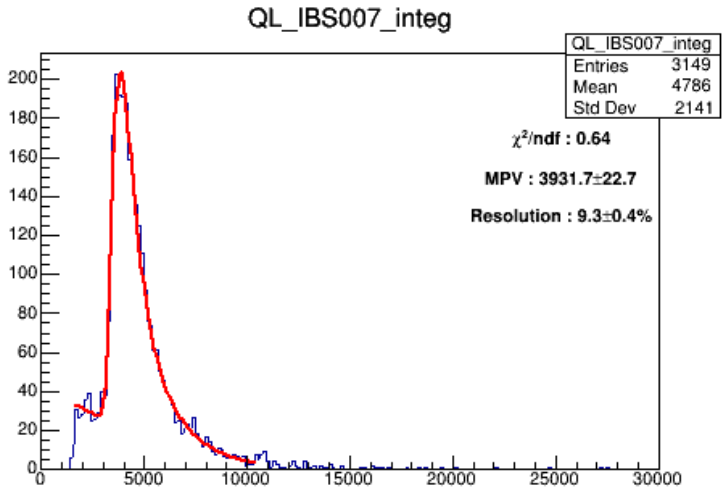
Bar 42 -> Bar Q
(Resin -> Grease)

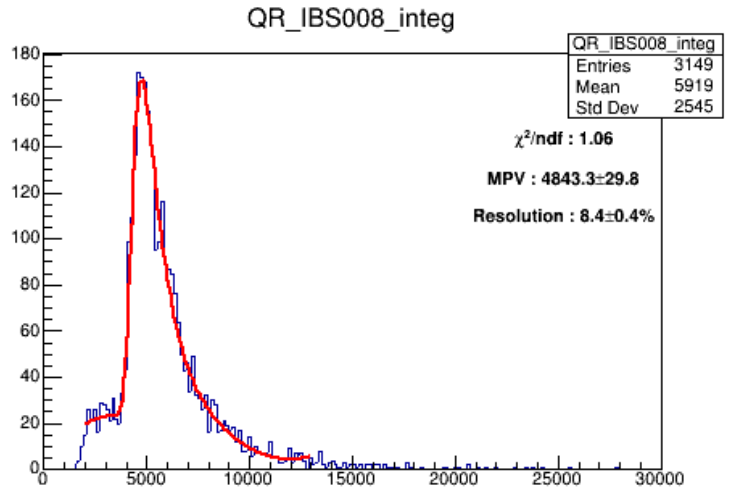
Integral

- # of events : 50,000
- Position : Center Cut (±5cm)
- Fitting : Landau + pol3





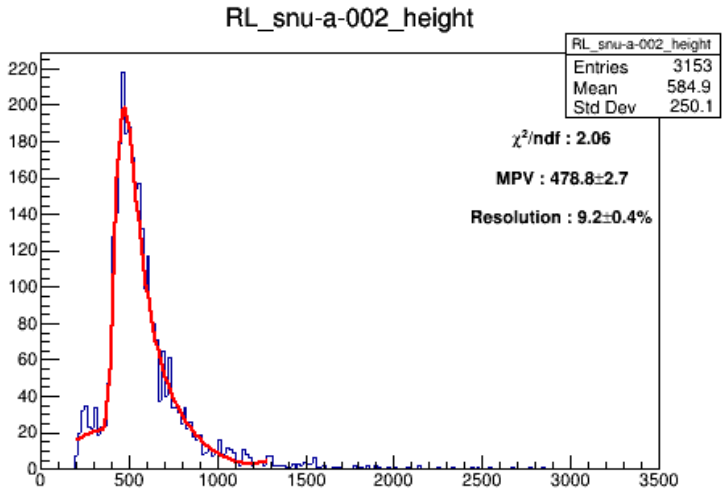


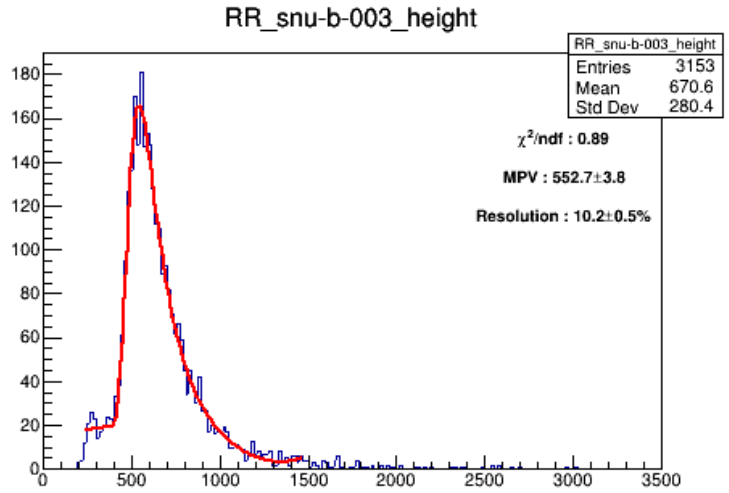


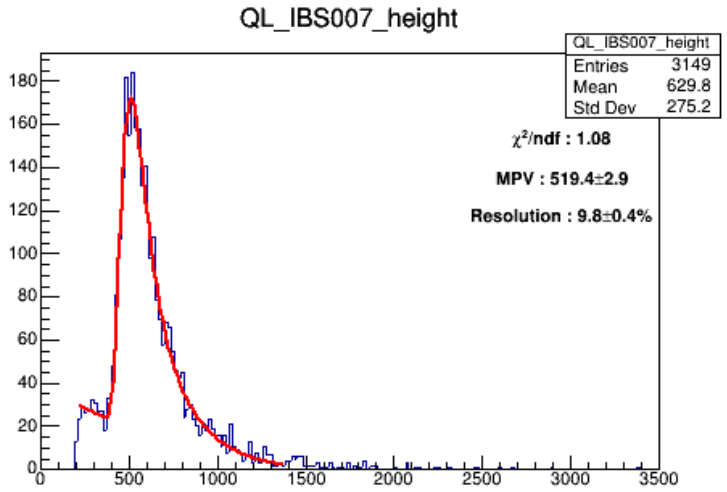
PMT TEST

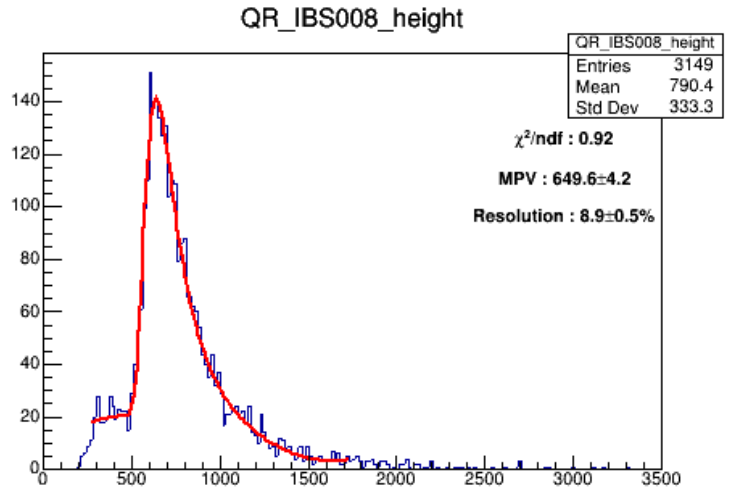
Height

- # of events : 50,000
- Position : Center Cut (±5cm)
- Fitting : Landau + pol3





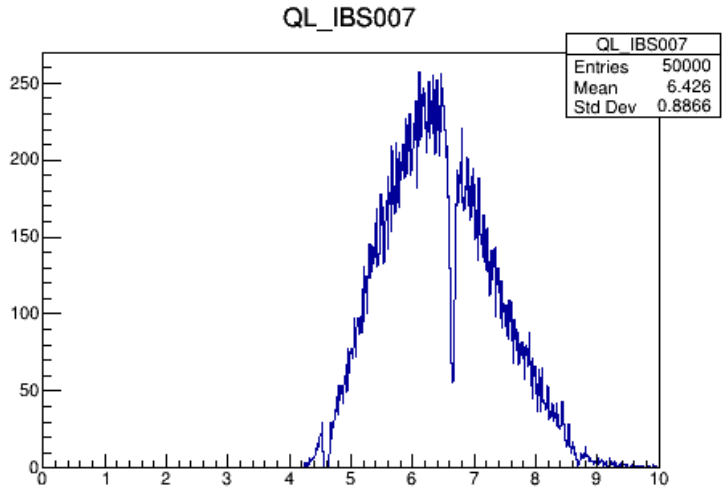


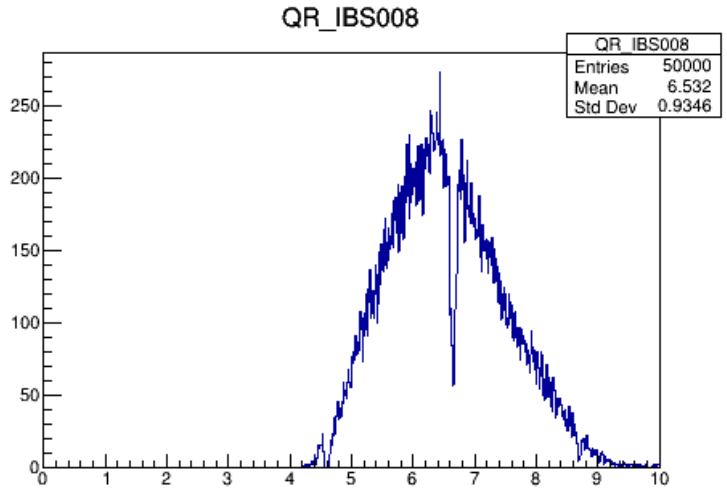


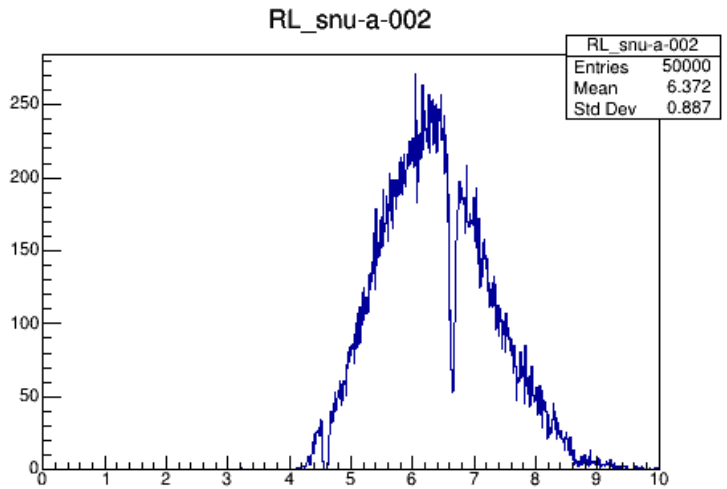
PMT TEST

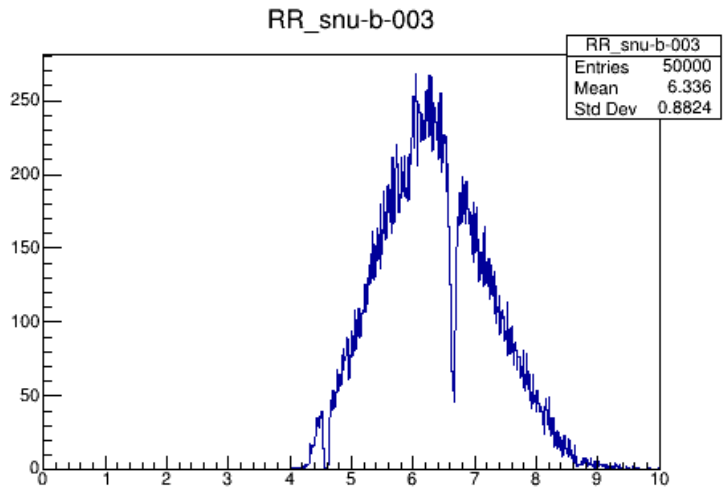
Rise Time

- # of events : 50,000
- Rise Time = tMax – t0









Position Dependence – with External trigger

PWO

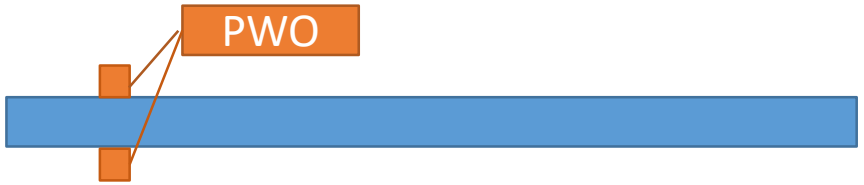
: 2 × 2 × 20 [cm]

PMT

Model : H10426 / ??

Voltage : 11.5~15.5V

Two Power Supplies



Position Dependence – with External trigger

Up PMT (H10426)

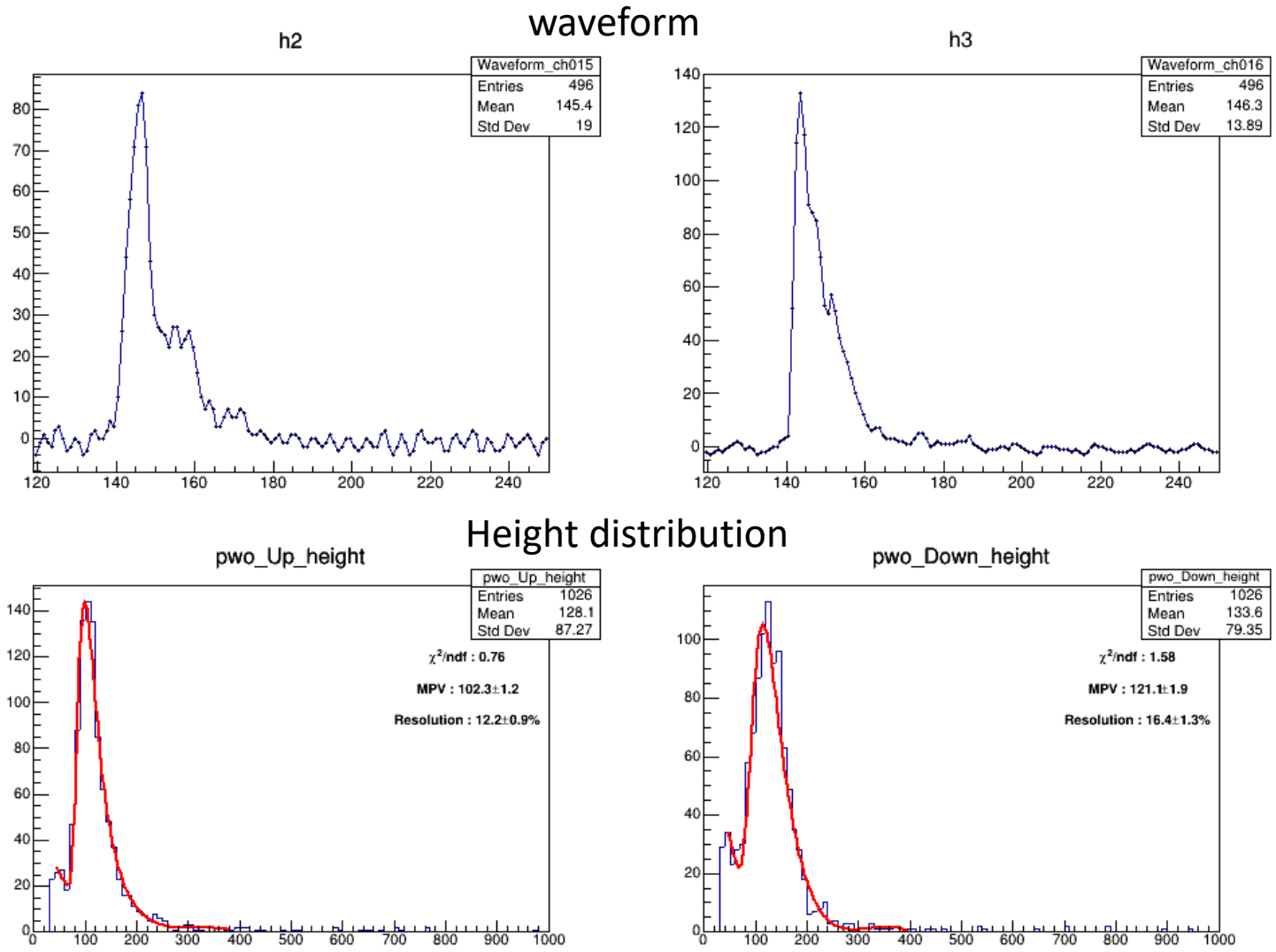
- MPV : 102.5 (15.3V)
- Resolution : 12.2%

Down PMT (??)

- MPV : 121.1 (15.0V)
- Resolution : 16.4%

*Resolution = 100×sigma/MPV

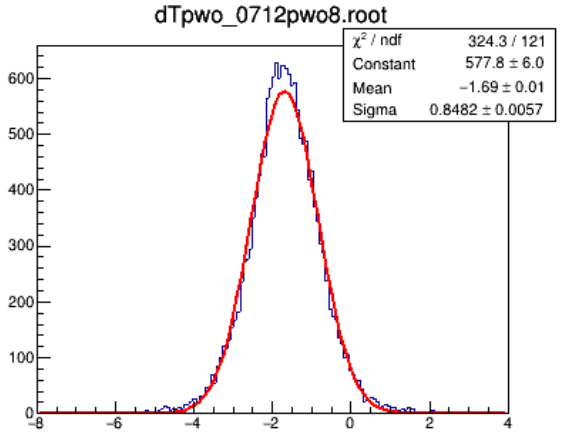
*Threshold = 30 count

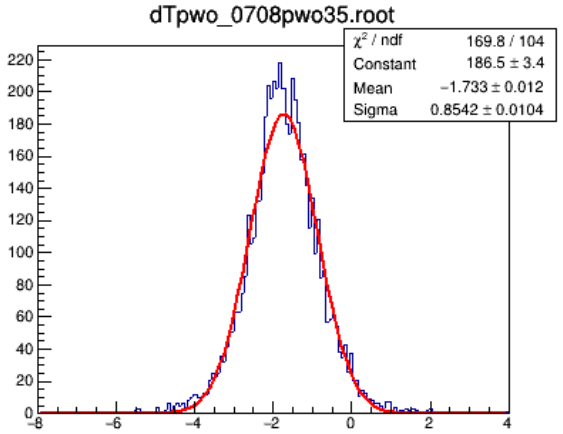


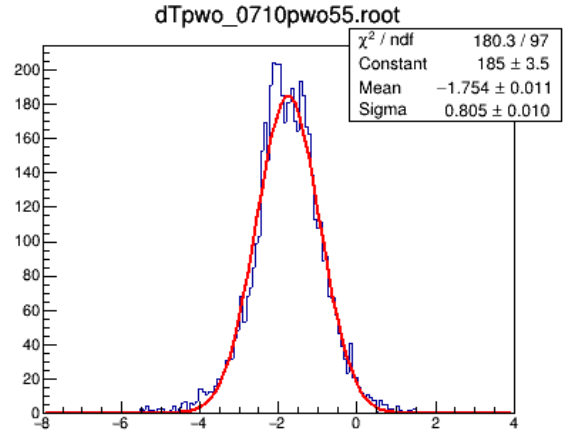
Position Dependence – with External trigger

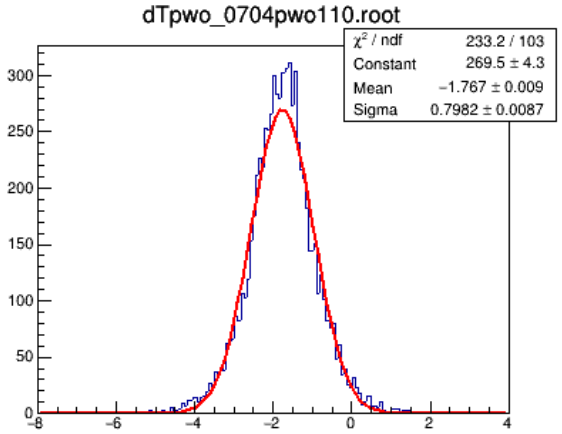
t0[Up] – t0[Down] distribution

- Gaussian fitting

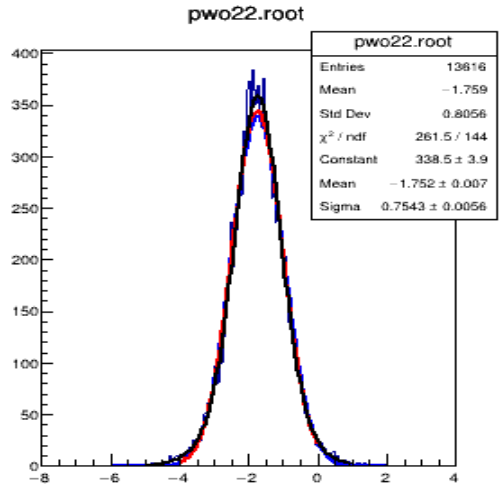


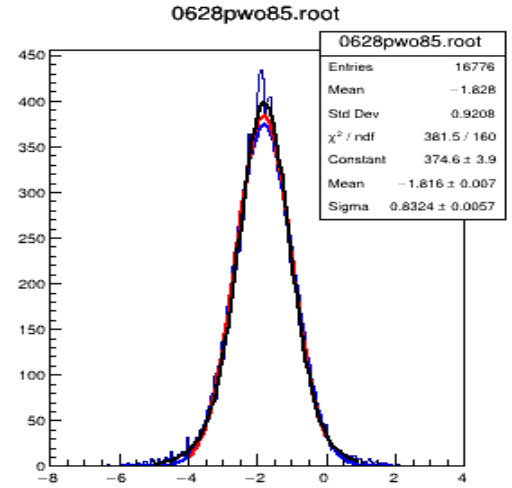






- Double gaussian fitting

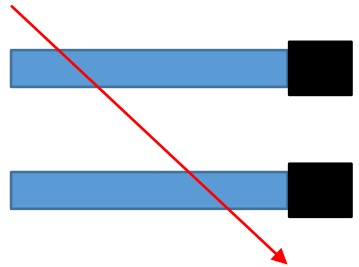




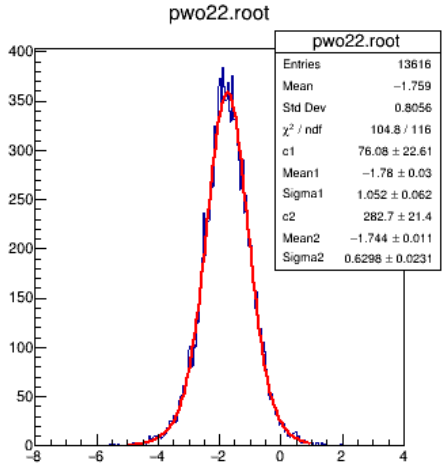
Position Dependence – with External trigger

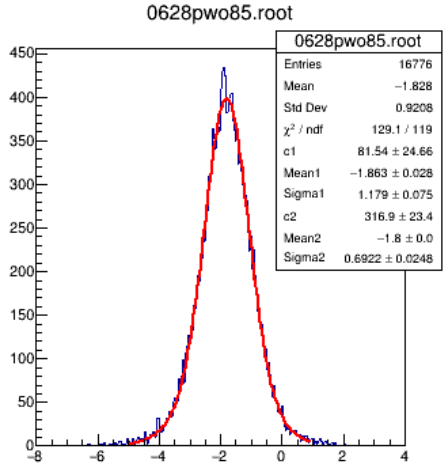
Time Resolution of PWO detector is too high

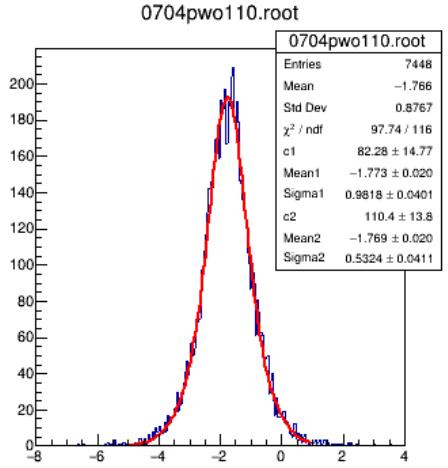
Cannot give Angle correction -> Uncertainty of dT(pwo) < 0.2ns

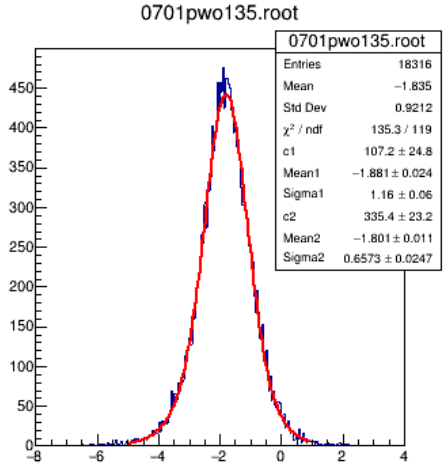


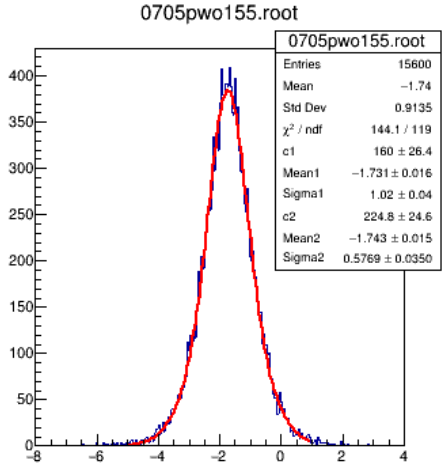
Fitting with double gaussian function











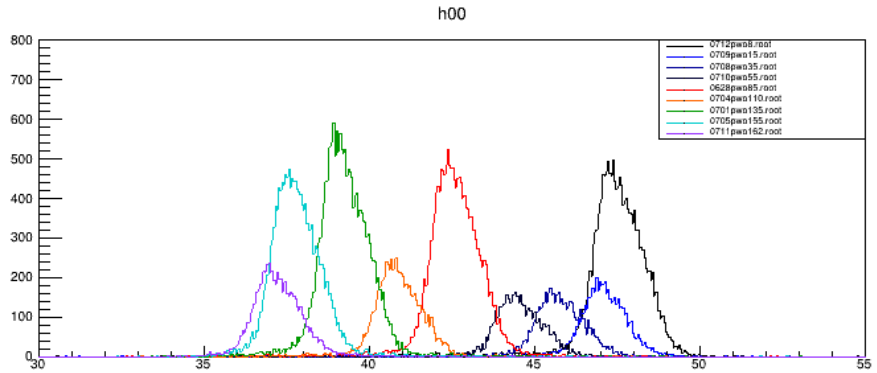
Position Dependence – with External trigger

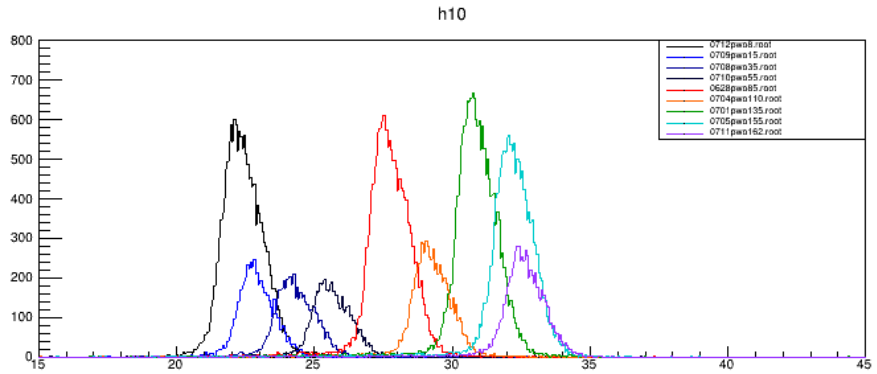
Calculate Reference time from PWO

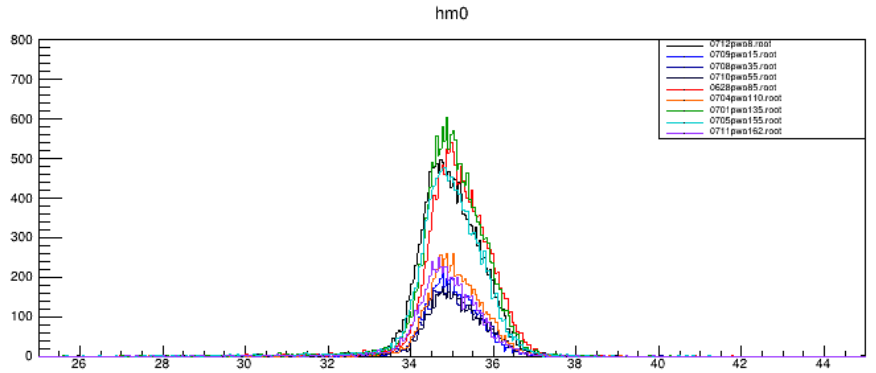
: T ref = (t0[up]+t0[down])/2

- t0[left] – T ref
- t0[right] – T ref
- t0 average – T ref

Difficult to define the Time resolution because of the asymmetry







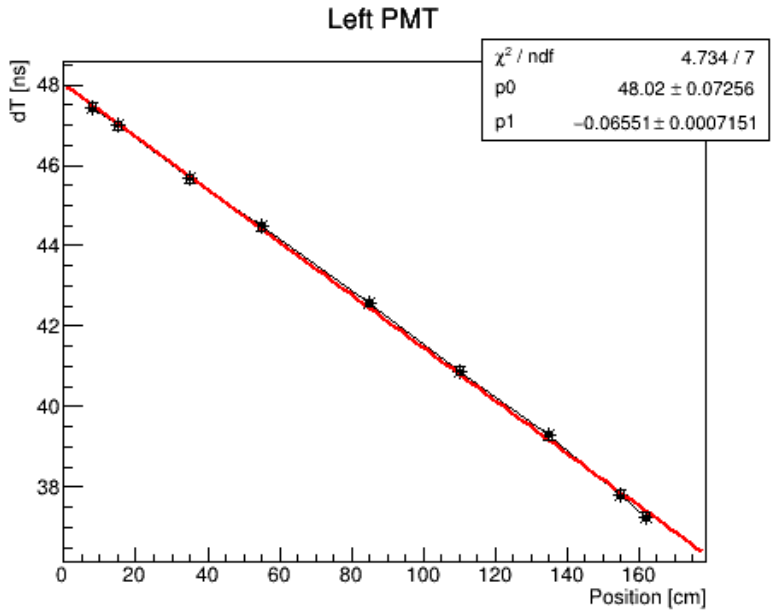
Position Dependence – with External trigger

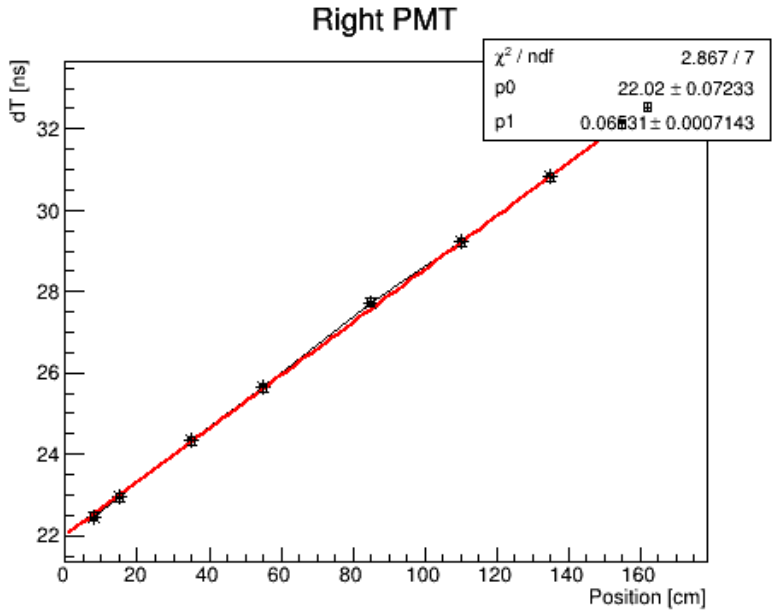
The position dependency of the speed of light is not observed

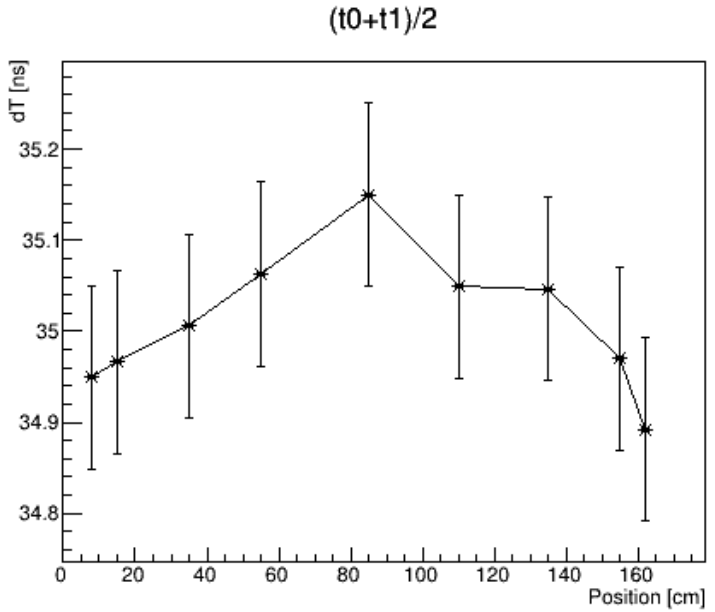
The time resolution of scintillator bar (100ps) is concerned

Speed of light (from left PMT) : 15.27 ±0.17 cm/ns

Speed of light (from right PMT) : 15.31 ±0.17 cm/ns





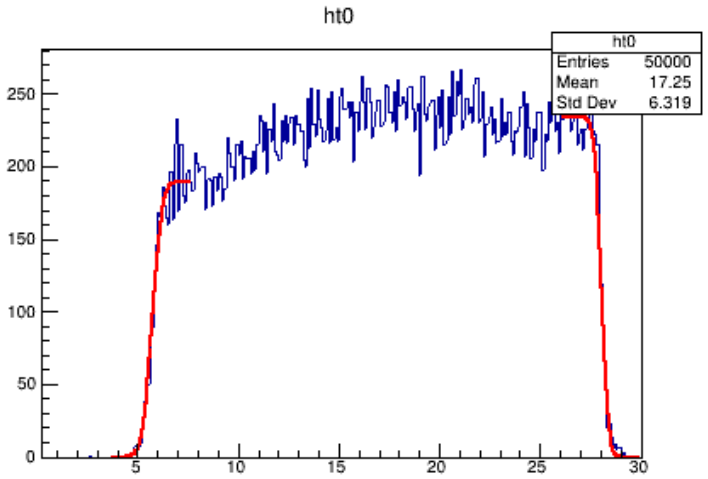


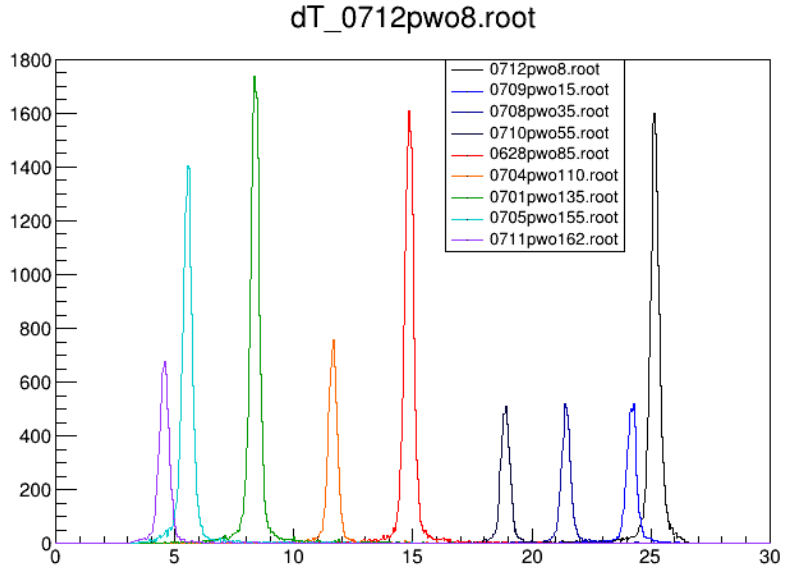
Position Dependence – with External trigger

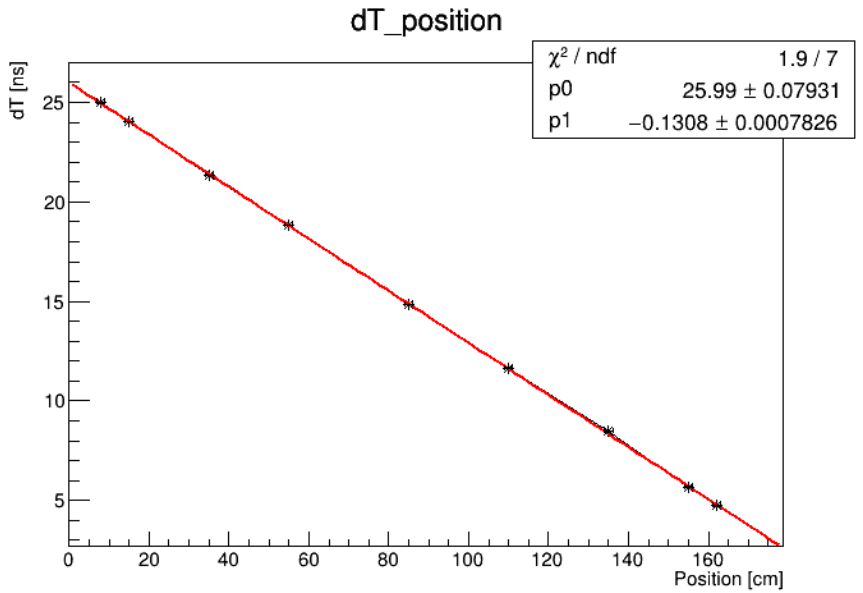
Speed of light : 15.29 ±0.09 cm/ns

(Error function method)

Speed of light : 15.236 ±0.014 cm/ns

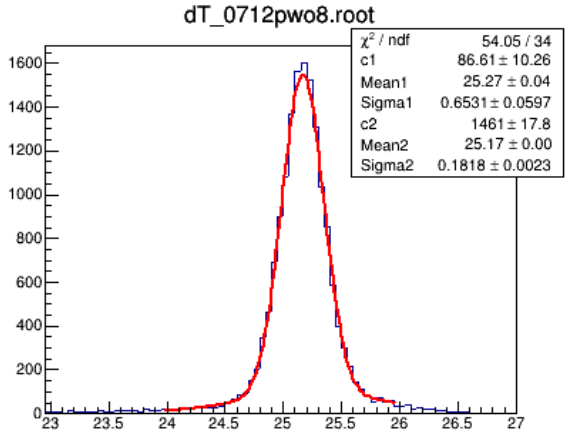


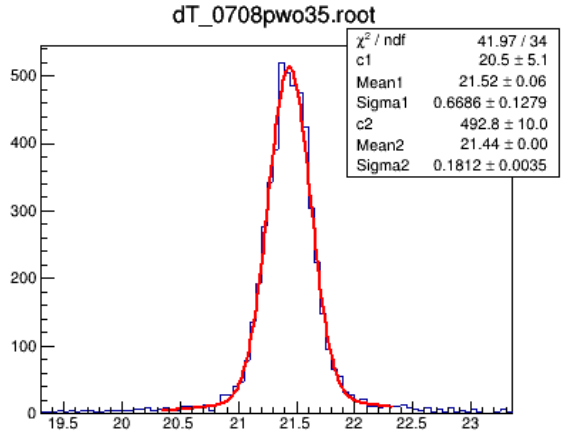


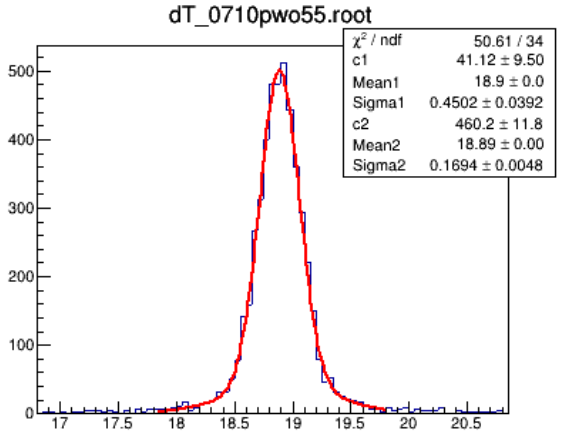


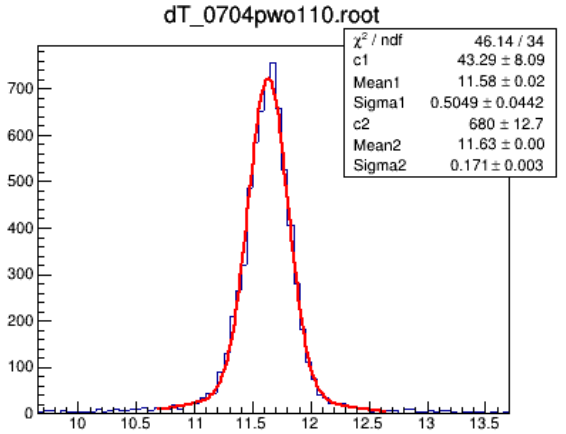
Position Dependence – with External trigger

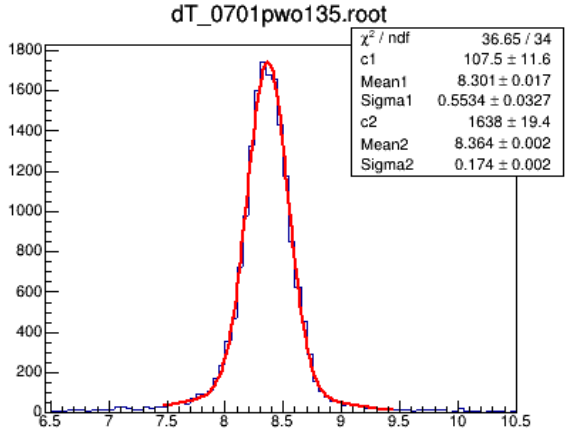
Double Gaussian Fitting

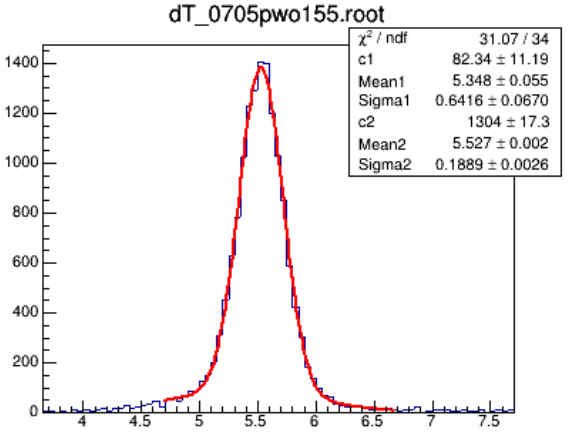


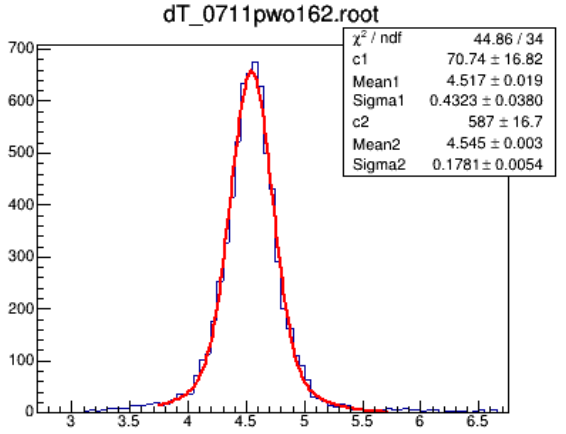






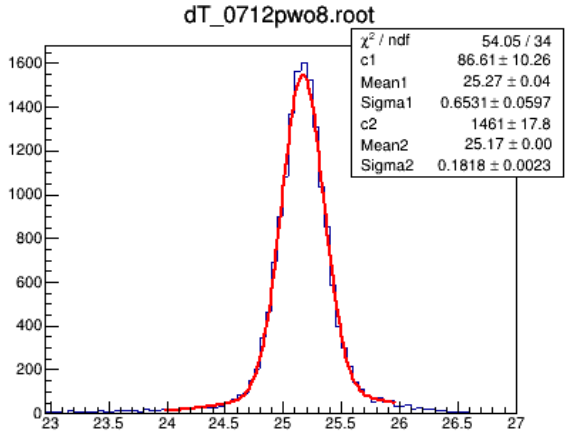


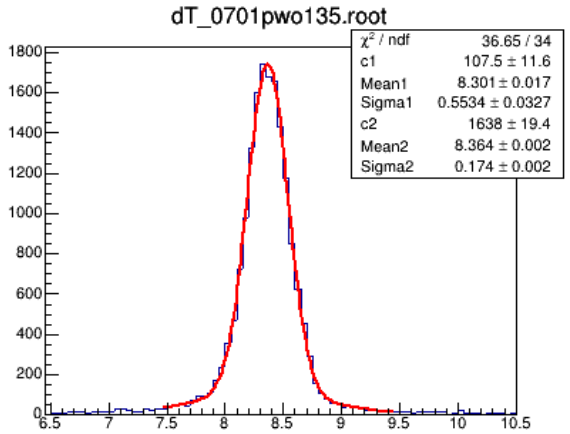


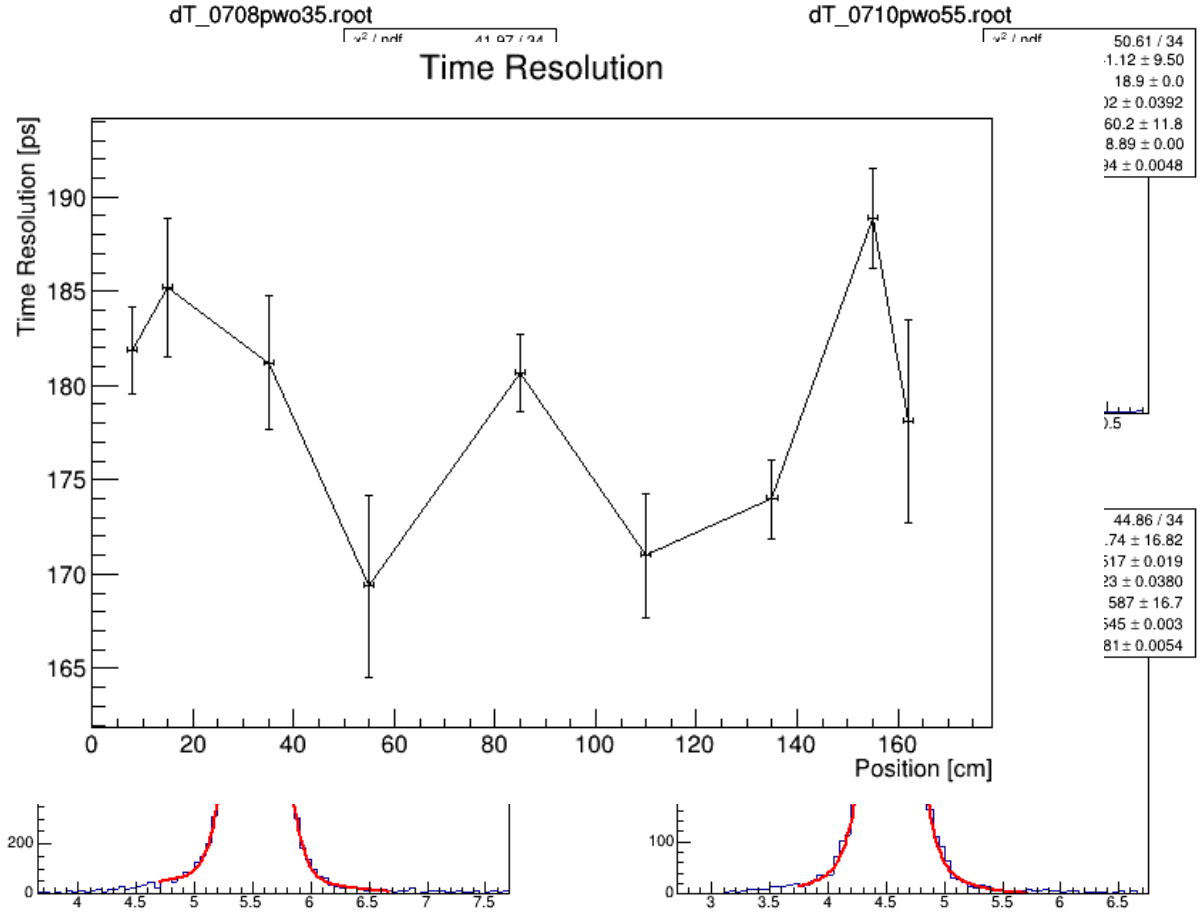


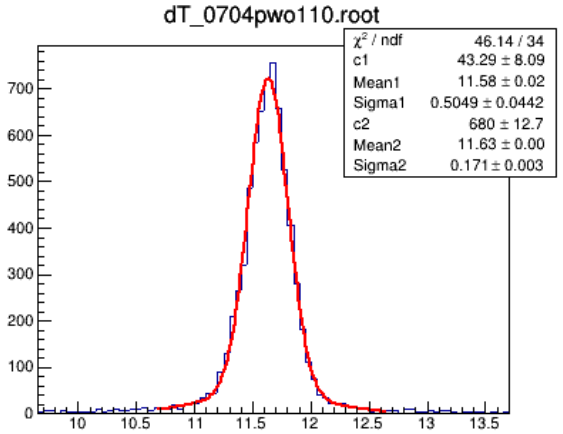
Position Dependence – with External trigger

Double Gaussian Fitting

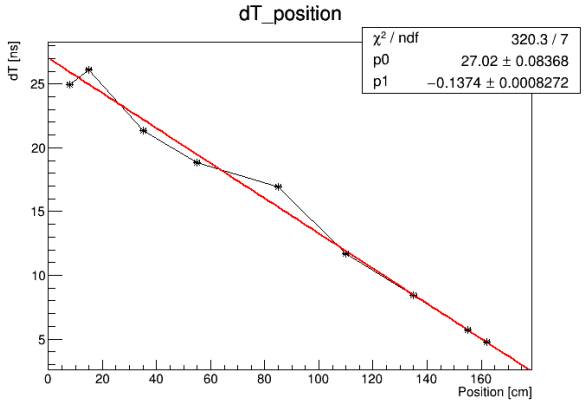




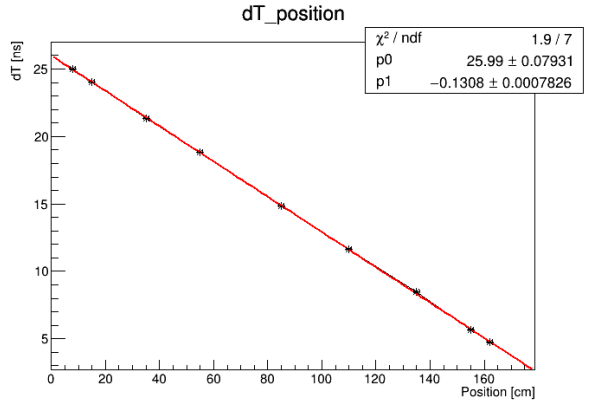


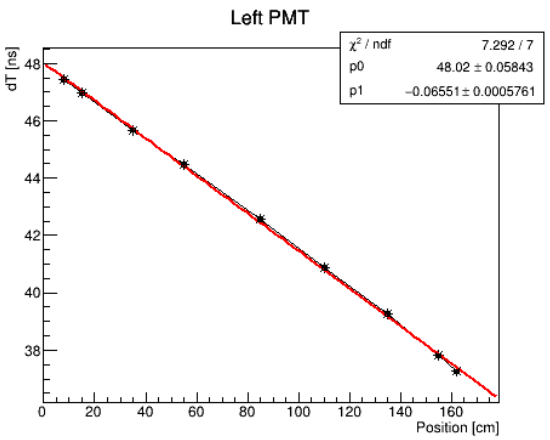


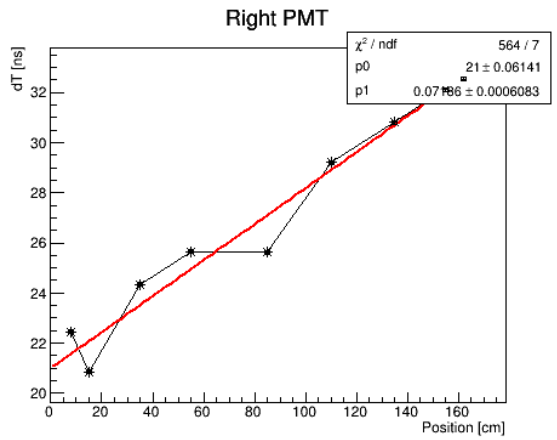
DAQ – calibration delay

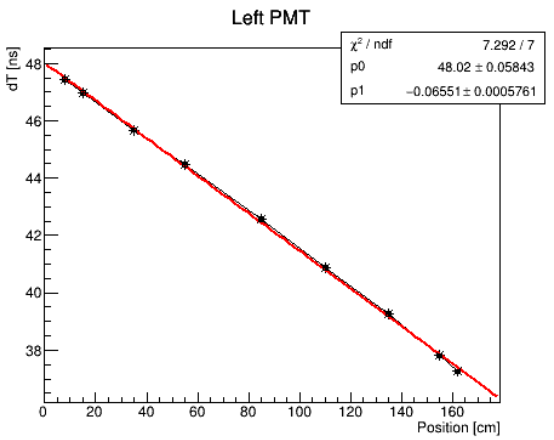


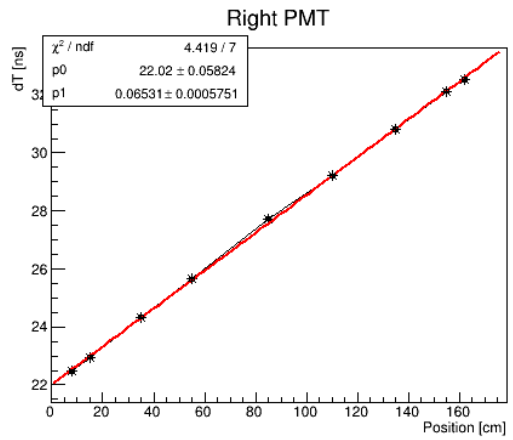
ch2 (Right PMT)
2.1 ns shift











DAQ – calibration delay

* TCB LOG

ch1 calibration delay = 2
ch2 calibration delay = 0
ch3 calibration delay = 17
ch4 calibration delay = 13

dT = t0[Left] – t0[Right]
dT mean : 16.7730 [ns]

ch1 calibration delay = 2
ch2 calibration delay = 21
ch3 calibration delay = 17
ch4 calibration delay = 13

dT = t0[Left] – t0[Right]
dT mean : 14.7646 [ns]

Calibration delay

1 = 100ps ?

21 = 2.1ns ?