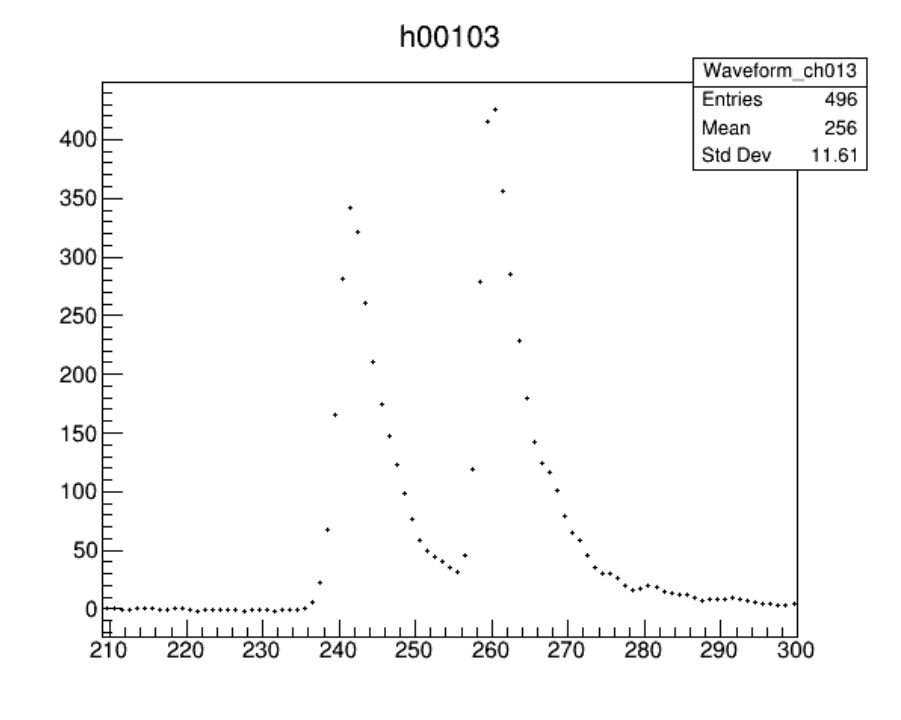
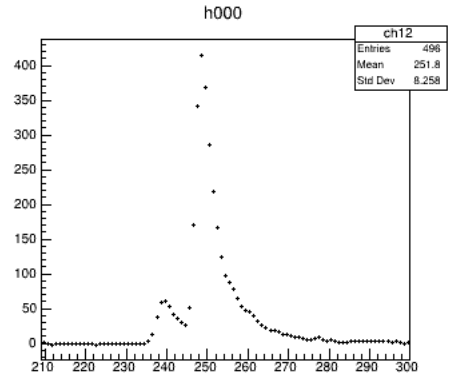
190304

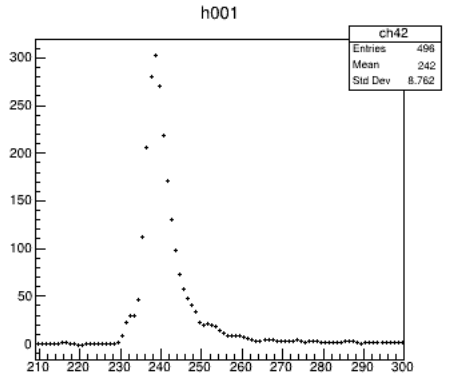
BYUNGCHAN LEE

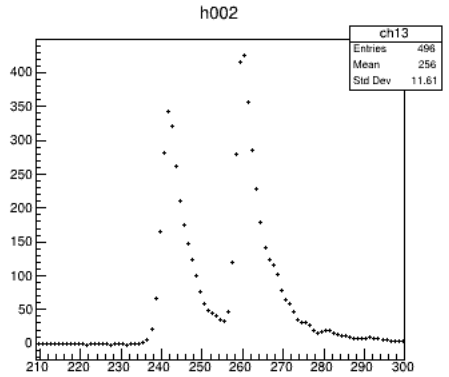


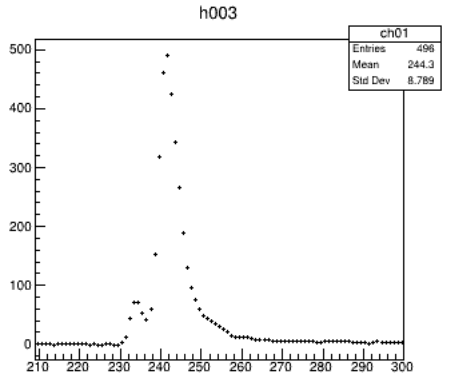
- 10 cosmic ray muons per 1sec
- Coincidence width = 200ns

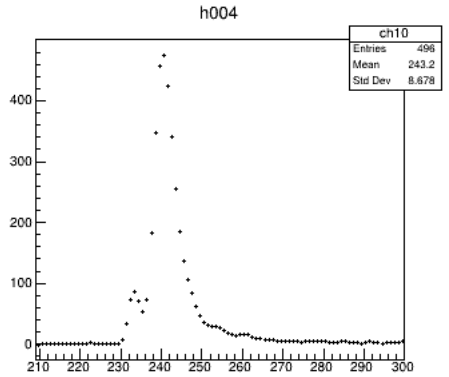
- Probability of simultaneous hit = 10 × 100ns / 1s = 10^{-6}

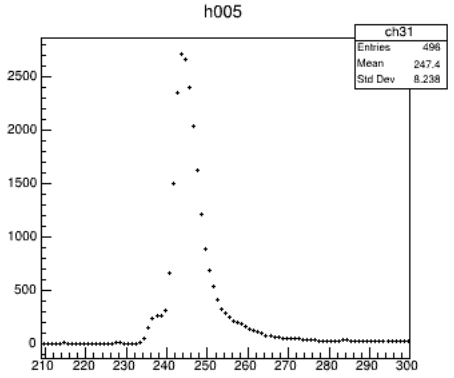

h000
ch12
Entries 496
Mean 251.8
Std Dev 8.258

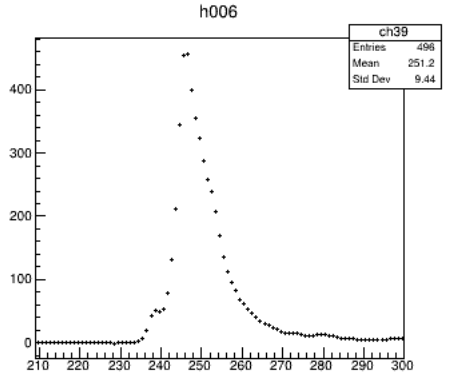

h001
ch42
Entries 496
Mean 242
Std Dev 8.762

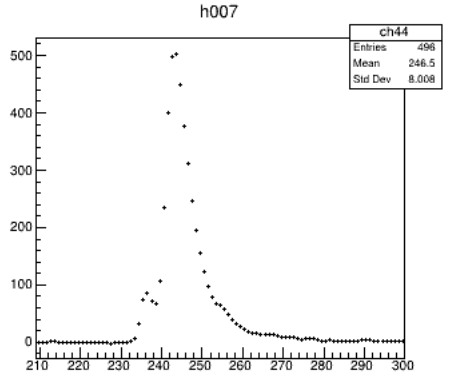

h002
ch13
Entries 496
Mean 256
Std Dev 11.61

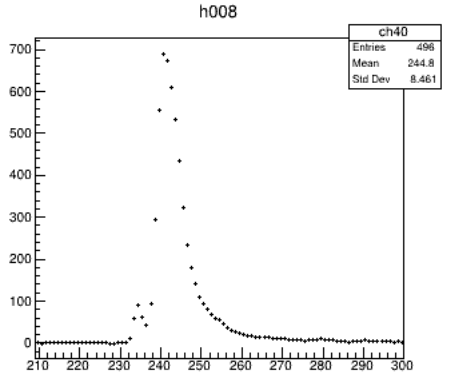

h003
ch01
Entries 496
Mean 244.3
Std Dev 8.789

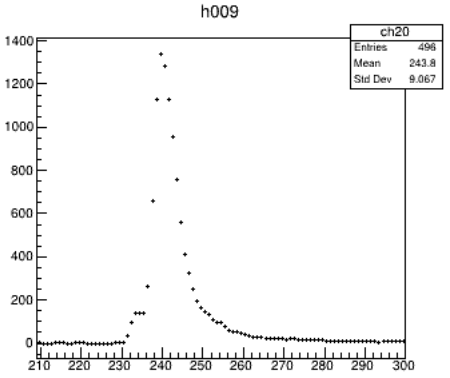

h004
ch10
Entries 496
Mean 243.2
Std Dev 8.678

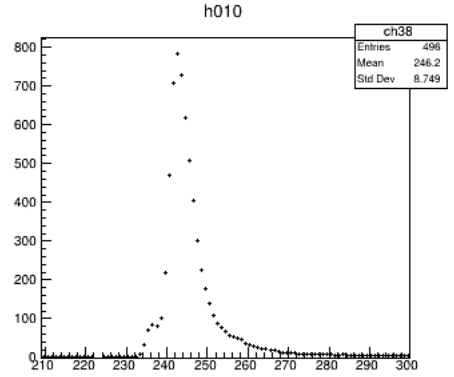

h005
ch31
Entries 496
Mean 247.4
Std Dev 8.238

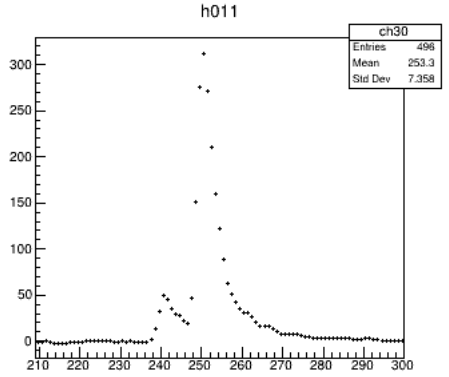

h006
ch39
Entries 496
Mean 251.2
Std Dev 9.44

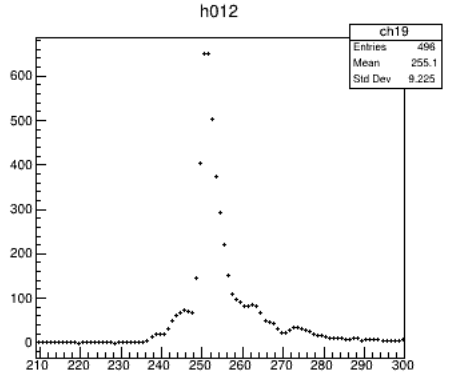

h007
ch44
Entries 496
Mean 246.5
Std Dev 8.008

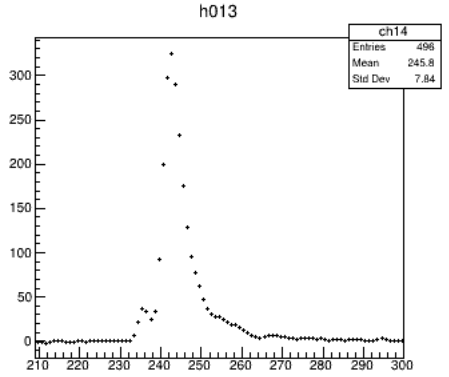

h008
ch40
Entries 496
Mean 244.8
Std Dev 8.461

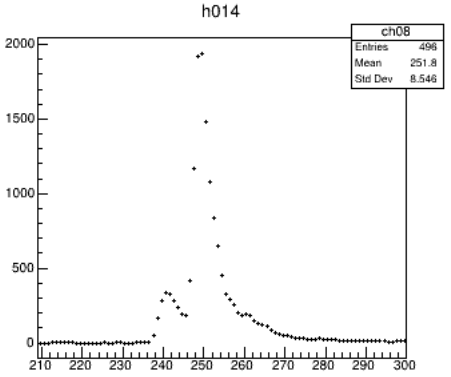

h009
ch20
Entries 496
Mean 243.8
Std Dev 9.067


h010
ch38
Entries 496
Mean 246.2
Std Dev 8.749


h011
ch30
Entries 496
Mean 253.3
Std Dev 7.358


h012
ch19
Entries 496
Mean 255.1
Std Dev 9.225


h013
ch14
Entries 496
Mean 245.8
Std Dev 7.84


h014
ch08
Entries 496
Mean 251.8
Std Dev 8.546

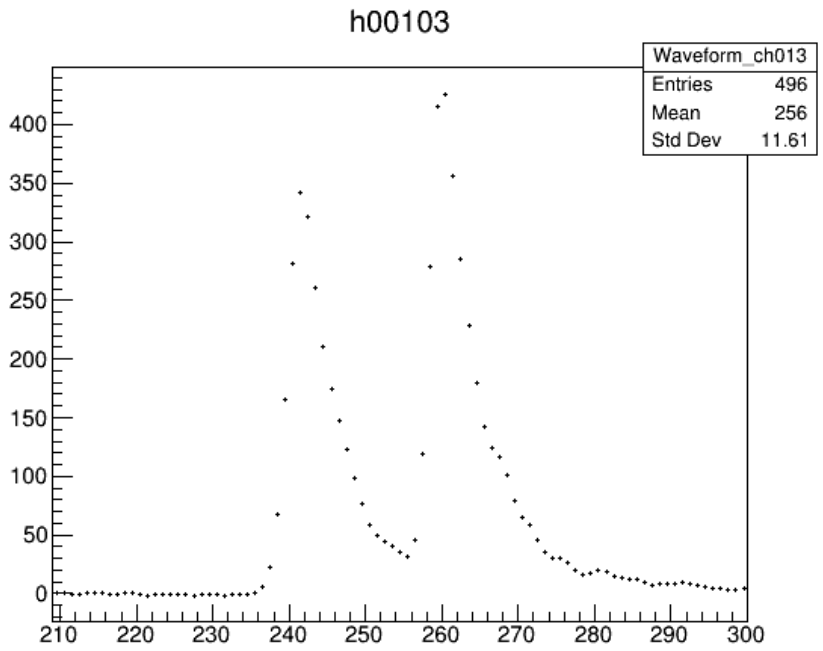
- DATA) FADCT_000746
- Event Number : 86,580
- 24Bars, 48 Channels

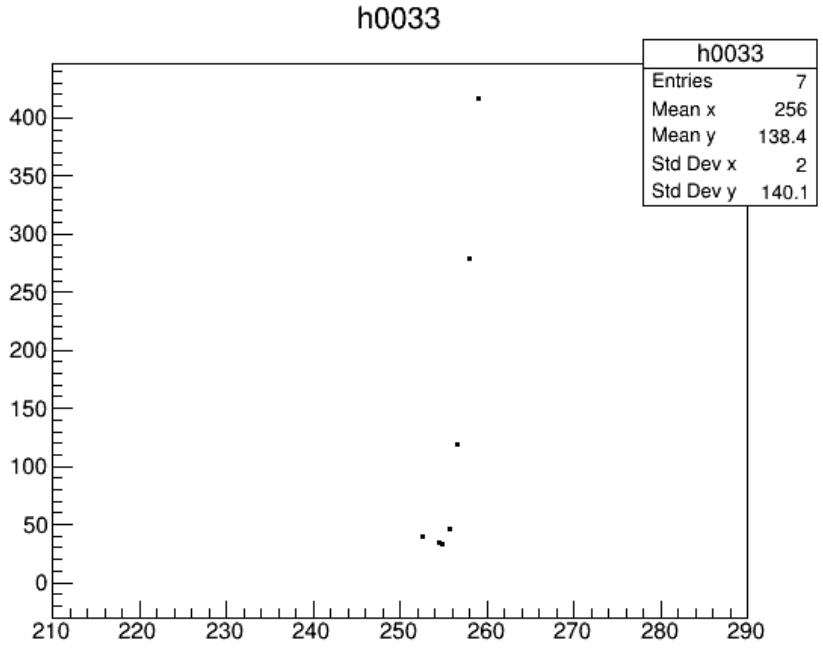
- Count the number of bars in each event, where the maximum pulse height > 100count at both PMT
- Total Entry : 2 × 641,399

	0	>20	101
Entries	106	61	37
Ratio (/total entry)	0.005%	0.008%	0.003%

HOW TO REVISE?

- 1. Modify few lines of code
  - Getting rid of data over 20 counter
  - Not using linear interpolation
- 2. Do nothing

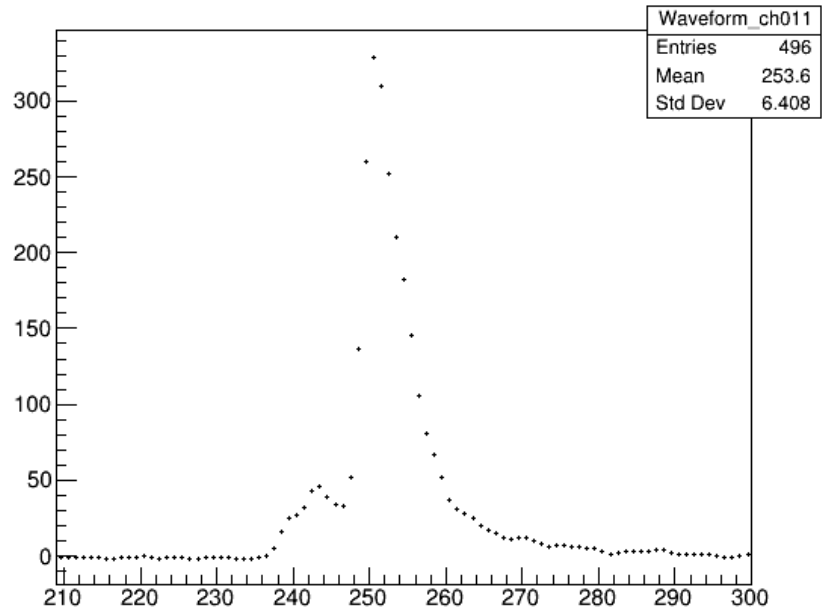




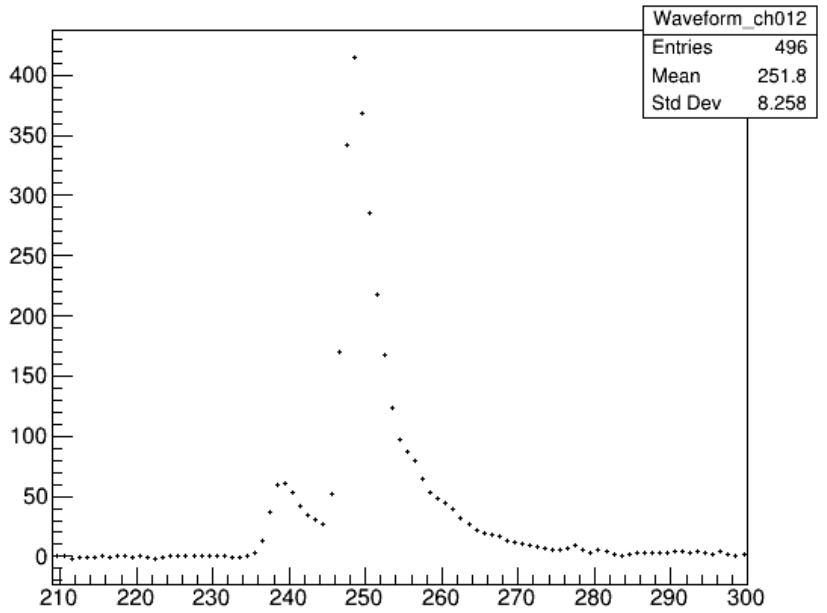

```
double h = xs[1] - xs[0];
double dif = abs(y- ys[0]);
int ns = 0;
for (int i = 0 ; i < n ; i++){
  if ( abs(y - ys[i]) < dif ) {
    ns = i; dif = abs(y - ys[i]); }}

if (ns < 2 || n - ns <= 3)
  return 0;
```

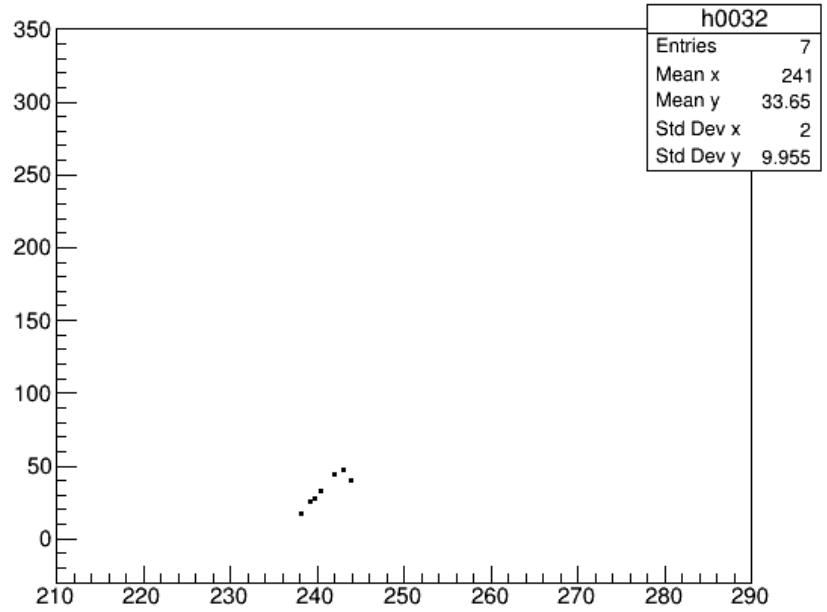
h00102



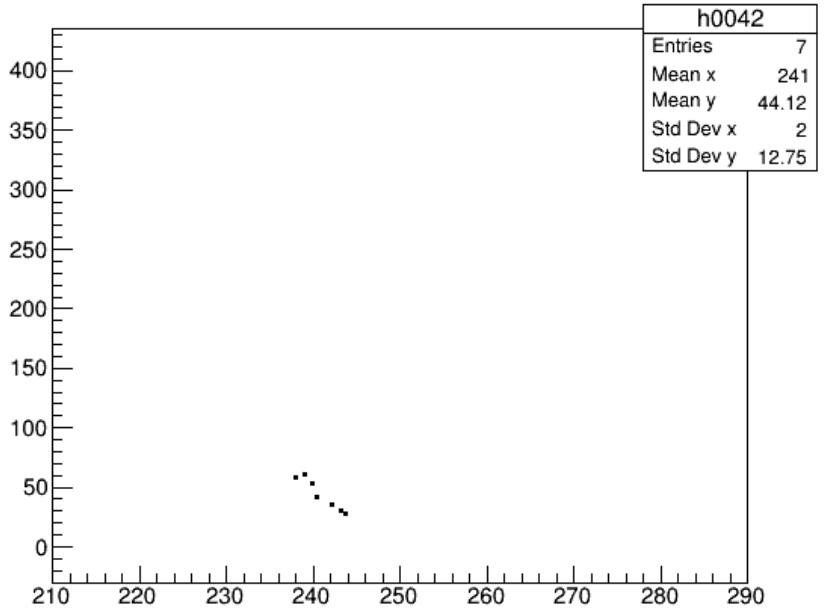
h10102



h0032



h0042



$$y = \frac{1}{2}(y_0 + y_1) + \left(u - \frac{1}{2}\right)\Delta y_0 + \frac{u(u-1)}{2!}\cdot\frac{1}{2}\left[\Delta^2 y_{-1} + \Delta^2 y_0\right] + \frac{(u-\frac{1}{2})u(u-1)}{3!}\Delta^3 y_{-1}$$

$$+ \frac{(u+1)u(u-1)(u-2)}{4!}\cdot\frac{1}{2}\left[\Delta^4 y_{-1} + \Delta^4 y_{-2}\right] + \ldots\ldots\ldots$$

```
double p_old = (y - f_0)/d_1;
double p_new = p_old;
do {
  counter++;
  p_old = p_new;
  p_new = (y - f_0 - d_2*p_old*(p_old - 1.0)/2.0
       - d_3*p_old*(p_old - 1.0)*(p_old - 0.5)/6.0
       - d_4*(p_old*p_old - 1.0)*p_old*(p_old - 2.0)/24.0)/d_1;
  *count = counter;
  if (counter > 100) return 0;
} while (abs(p_new - p_old) > eps);

return (xs[ns] + h*p_new);
```

It gives a useful estimate when 0.25<p<0.75

Optimal step size : $H=(\frac{\varepsilon}{M})^{1/4}$

H : step size

ε : truncation error

M : maximum value of d^4y

Fixed H, different M in each entry

-> Difficult to reduce error

0.353005
-1.083
0.353005
-1.083
0.353005
-1.083
0.353005
-1.083
0.353005
-1.083
0.353005
-1.083
0.353005
-1.083
0.353005
-1.083
0.353005
-1.083
0.353005
-1.083
0.353005
-1.083
0.353005
-1.083
0.353005
-1.083
0.353005
-1.083
0.353005
counter : 101
value : 472.706

0.0962023
-0.444578
0.094997
-0.444967
0.0960741
-0.444619
0.0951122
-0.44493
0.0959718
-0.444653
0.095204
-0.444901
0.09589
-0.444679
0.0952772
-0.444877
0.0958247
-0.4447
0.0953357
-0.444858
0.0957727
-0.444717
0.0953823
-0.444843
0.0957311
-0.444731
0.0954195
-0.444831
0.0956979
counter : 101
value : 464.191

1.82399
0.465725
-1.41725
1.82399
0.465725
-1.41725
1.82399
0.465725
-1.41725
1.82399
0.465725
-1.41725
1.82399
0.465725
-1.41725
1.82399
0.465725
-1.41725
1.82399
0.465725
-1.41725
1.82399
0.465725
-1.41725
1.82399
0.465725
-1.41725
1.82399
counter : 101
value : 465.648

CONFIGURATION

```
TCB
  PTRIG      100    # pedestal trigger [ms]
  CW       200    # coincidence width
  TRGON      1    # normal 1, pedestal 2, ext 8
  GATEWIDTH 10
  MTHRF        2  # multiplicity
#  DTF       1000 # deadtime[ns]
  PSCF       1 #prescale
#  GATEWIDTH 10
  GATEDLY 0
END
```