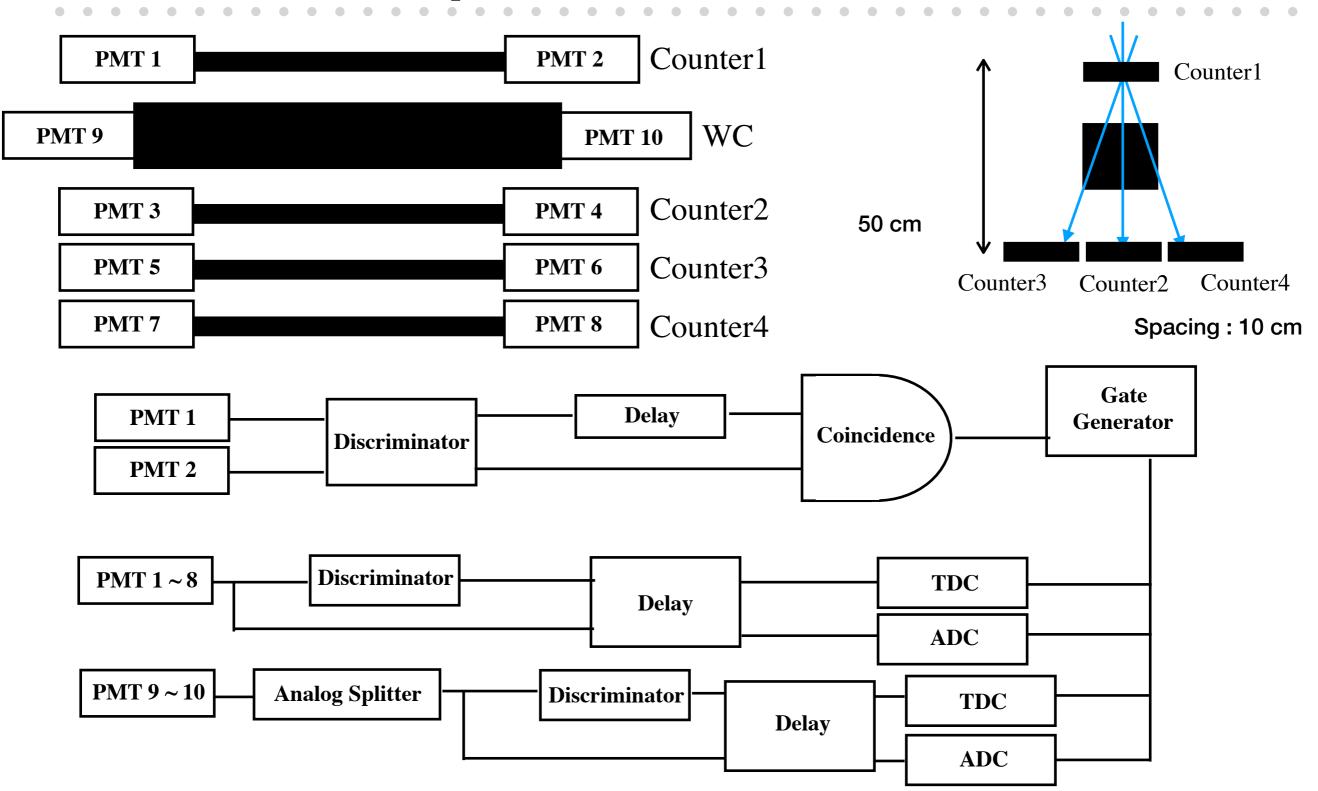
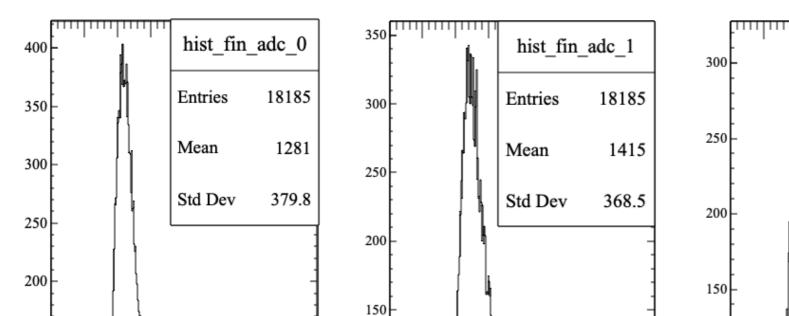
#### WC Test Progress -2nd Week

Sungwook Choi

#### Test Setup



ADC Distribution with Cut-Off Ch 1



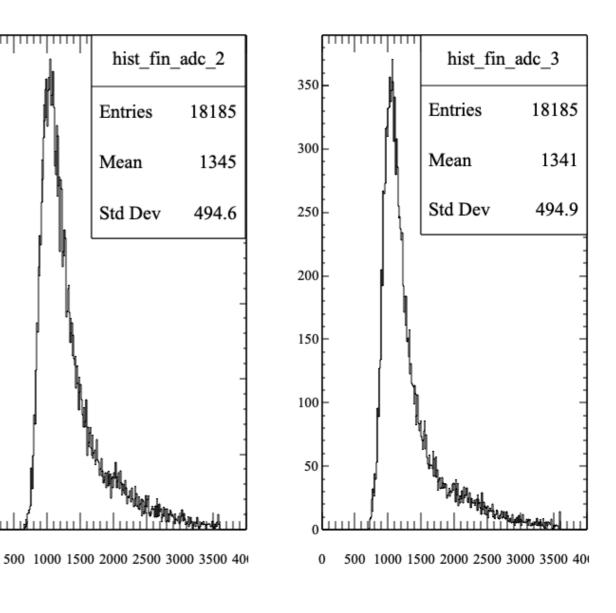
100

50

0

ADC Distribution with Cut-Off Ch\_2

ADC Distribution with Cut-Off Ch\_3



- Data taken for 14 days (from Jan.25)
- Final ADC distribution of trigger counters (Trigger : Channel 1 & Channel 2)

500 1000 1500 2000 2500 3000 3500 400

• After neglecting overshoot and applying coincidence cut and position cut

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500 1000 1500 2000 2500 3000 3500 4000

ADC Distribution with Cut-Off Ch 0

150

100

50

0

100

50

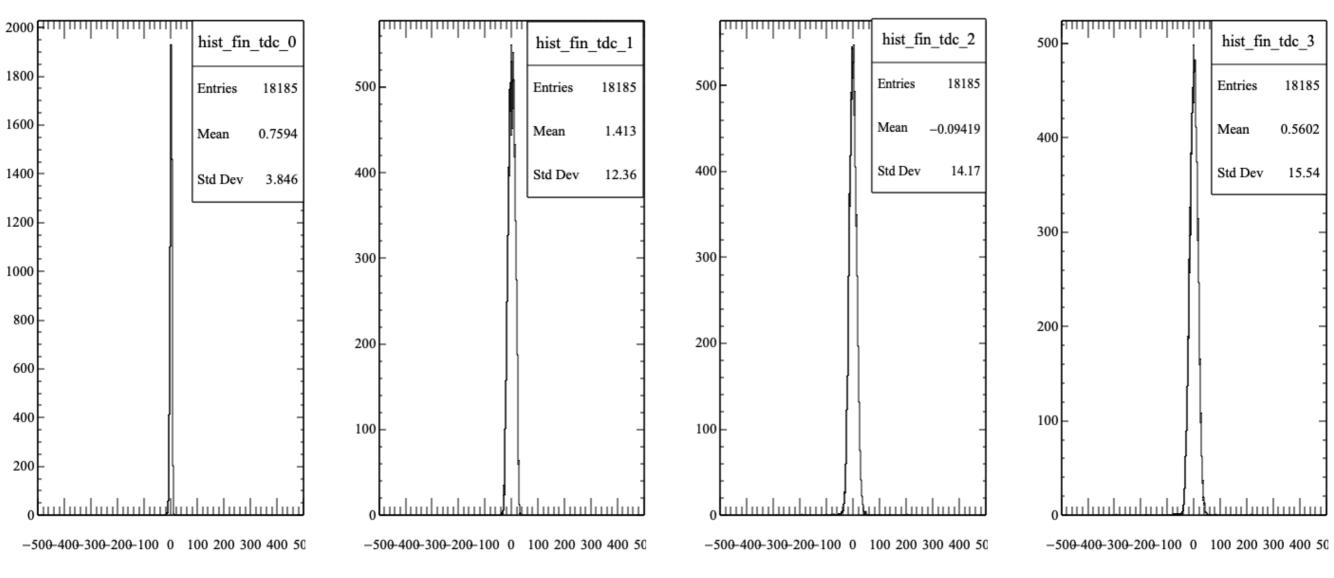
0

TDC Distribution with Cut-Off Ch\_0

TDC Distribution with Cut-Off Ch\_1

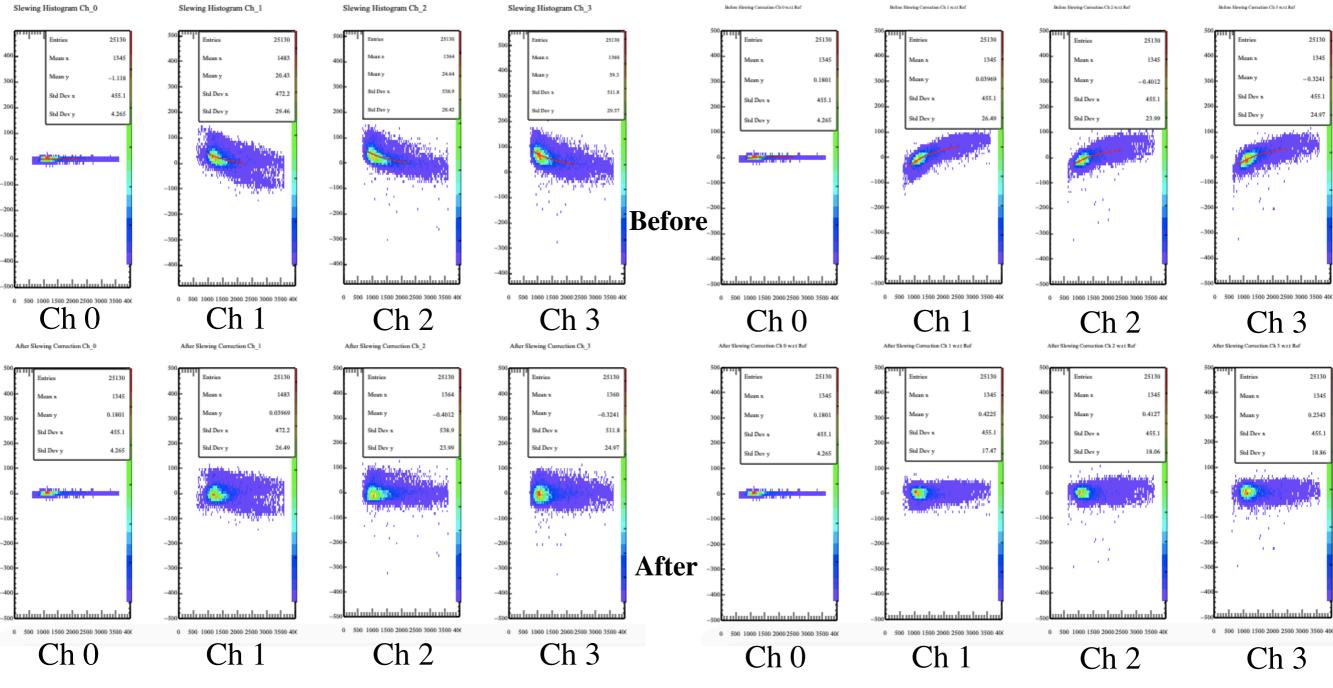
TDC Distribution with Cut-Off Ch\_2

TDC Distribution with Cut-Off Ch\_3

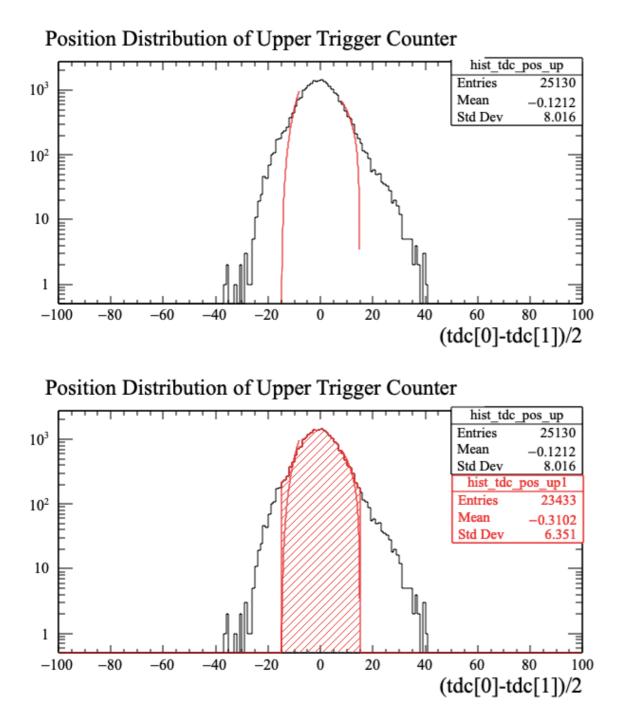


- Data taken for 14 days (from Jan.25)
- Final TDC distribution of trigger counters (Trigger : Channel 1 & Channel 2)
- After neglecting overshoot and applying coincidence cut and position cut

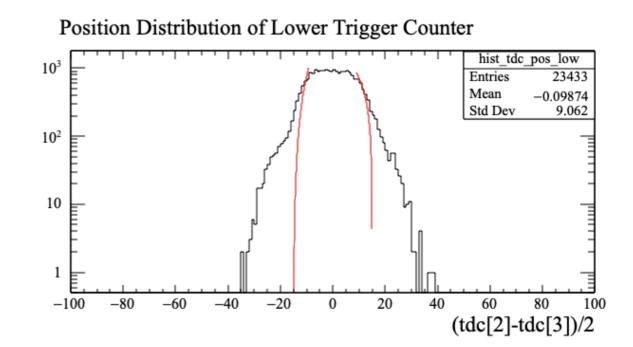
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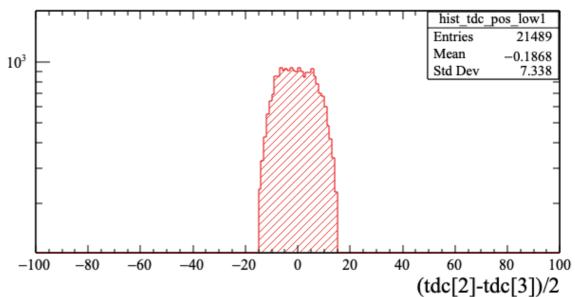
• Timewalk correction of raw TDC w.r.t each channel and reference



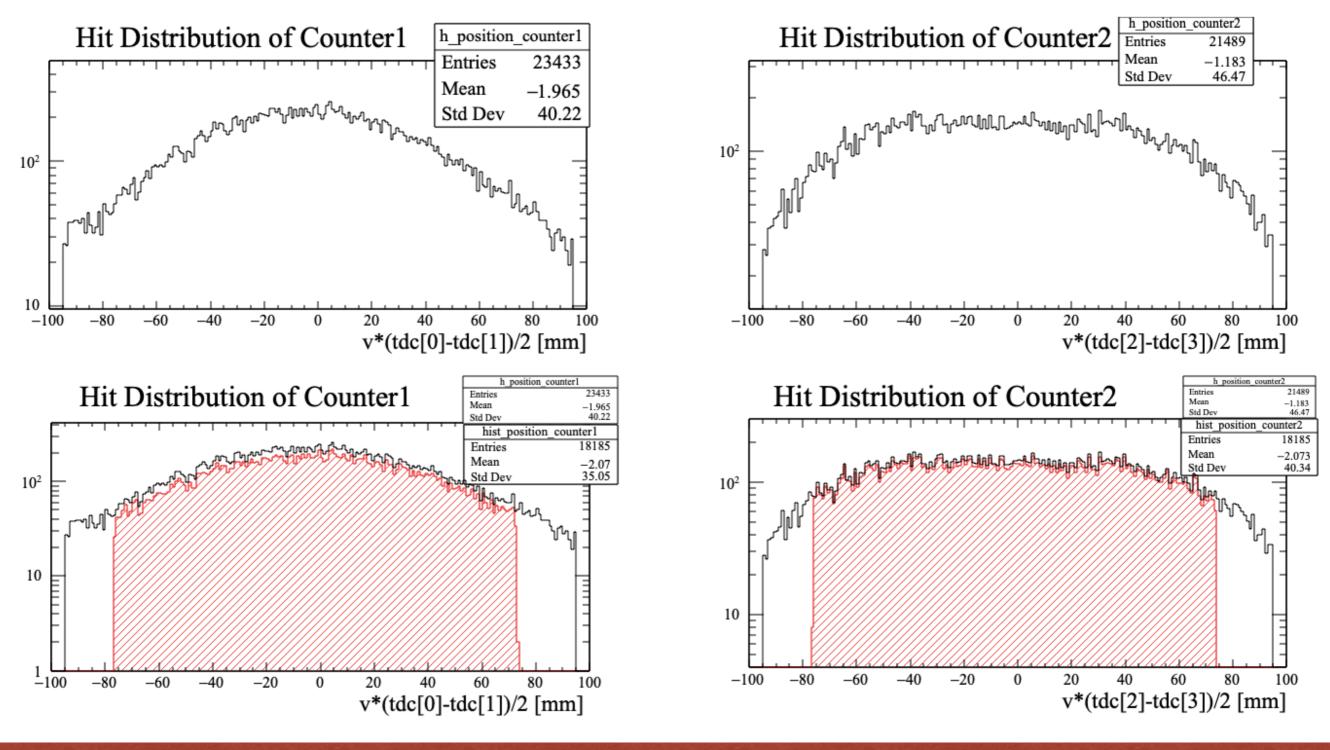
• Applying position cuts



Position Distribution of Lower Trigger Counter

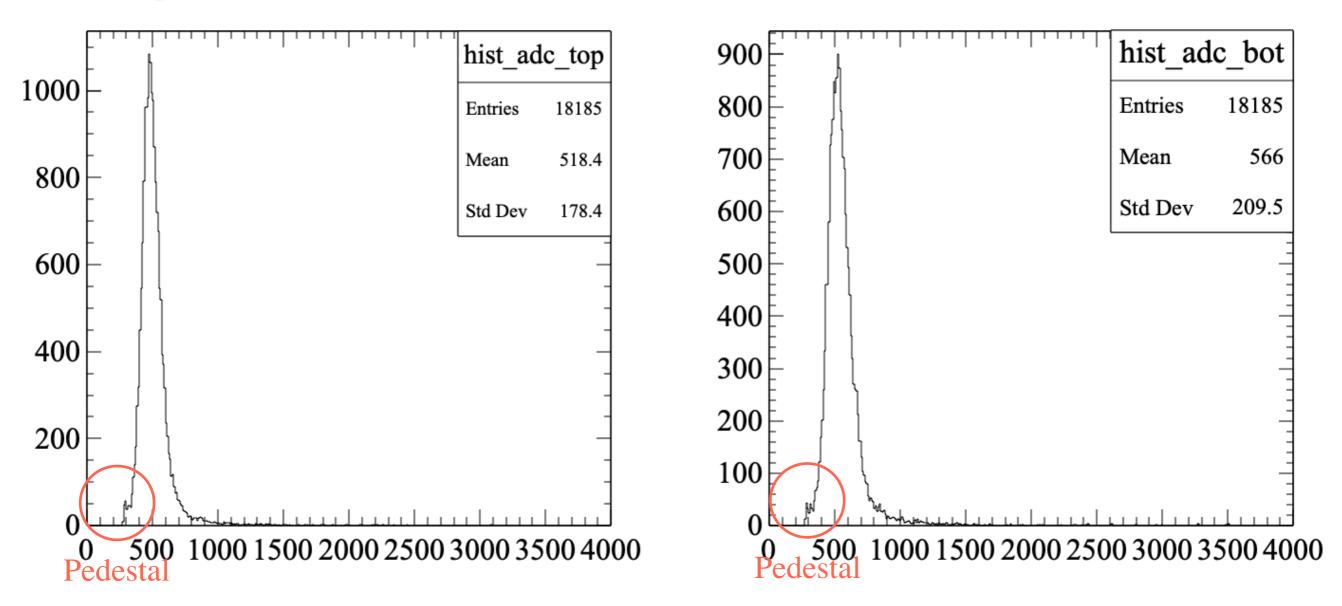


• Selecting hits between -75 mm and 75 mm (15 cm = radiator length)



#### WC Top Channel ADC Distribution

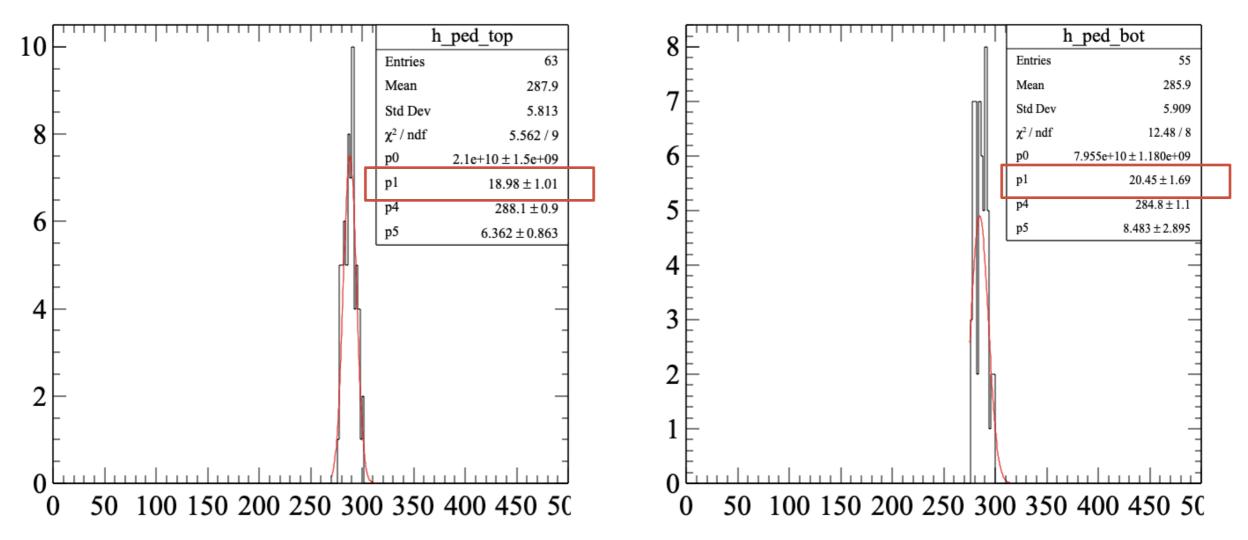
WC Bot Channel ADC Distribution



• After the data sorting, raw ADC distribution of WC top and bottom

- Pedestal is fitted with the convolution of gaussian and poisson distribution.
- Fitted mean of poisson distribution is **18.98 ± 1.01 [top]**, **20.45 ± 1.69 [bottom]**

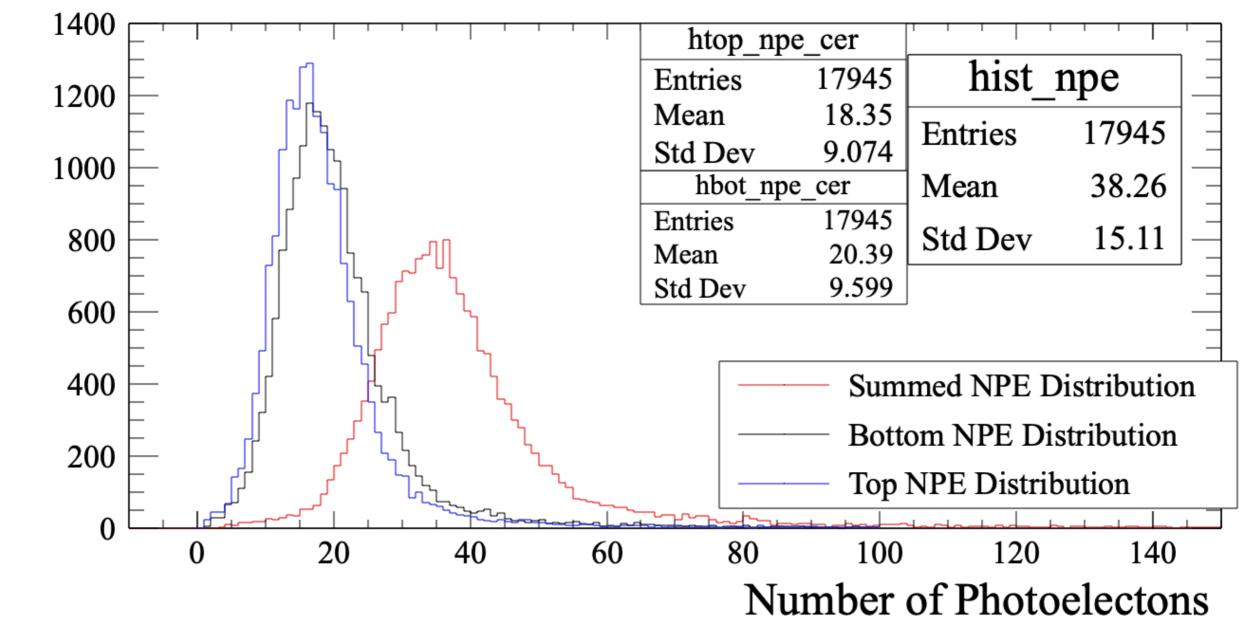




WC Bot Pedestal Distribution

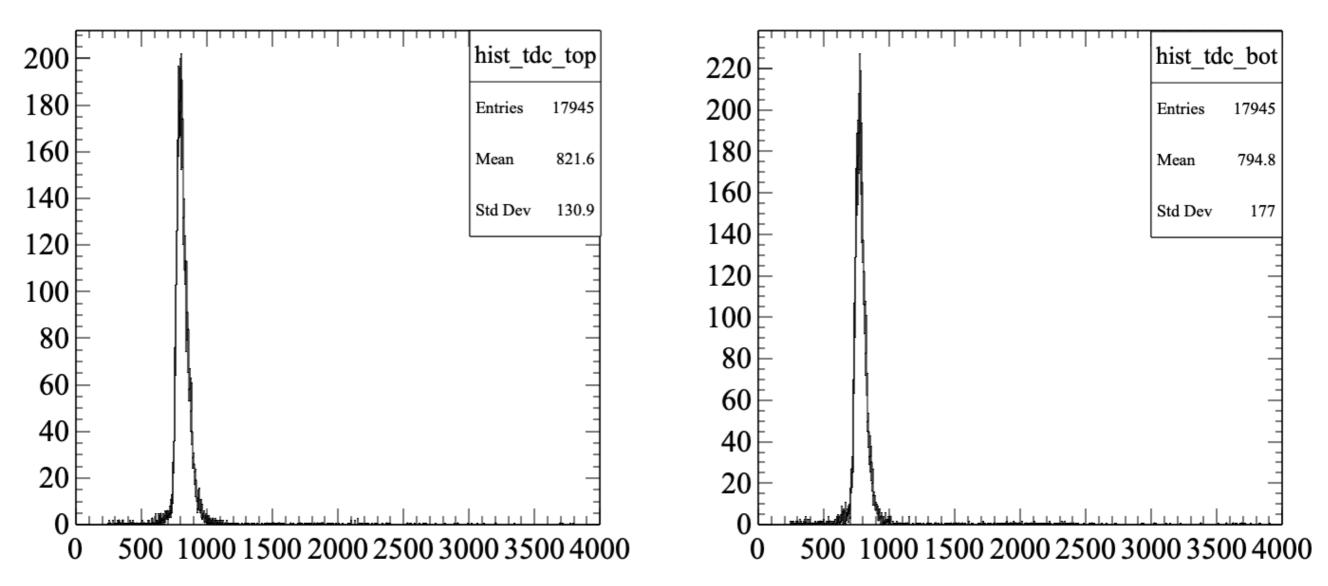
• Summation of top and bottom NPe distribution has a mean value of 38.26

Summed NPE Distribution



Counts

#### WC Top Channel TDC Distribution



• Corresponding TDC distribution

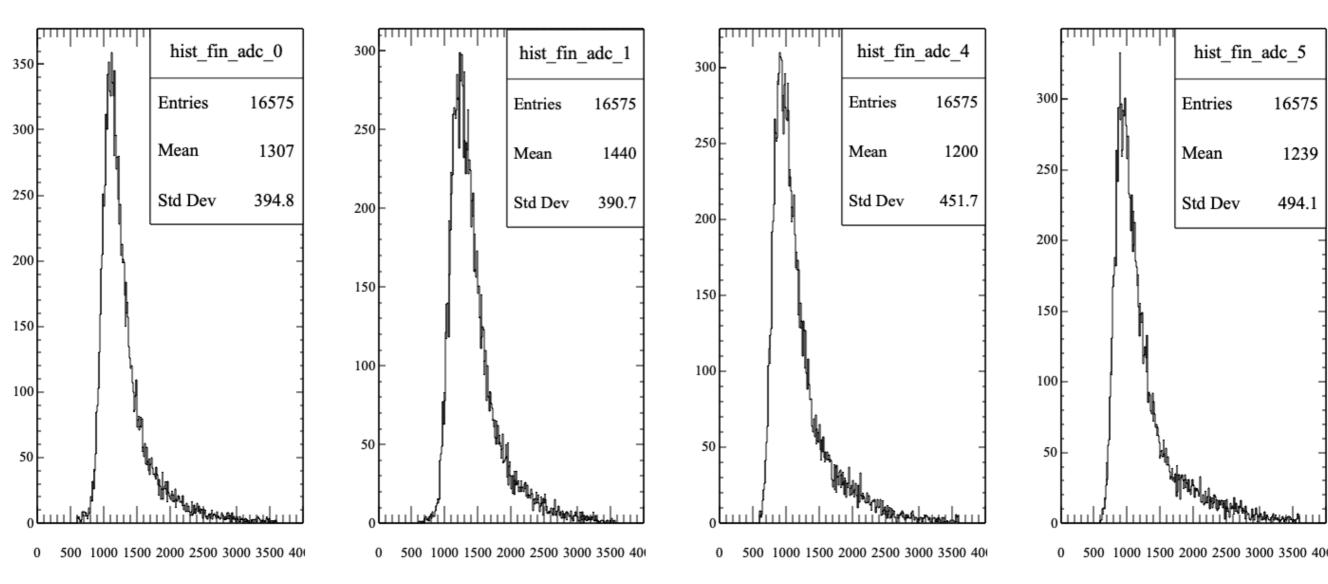
WC Bot Channel TDC Distribution

ADC Distribution with Cut-Off Ch 0

ADC Distribution with Cut-Off Ch\_1

ADC Distribution with Cut-Off Ch\_4

ADC Distribution with Cut-Off Ch\_5



- Data taken for 14 days (from Jan.25)
- ADC distribution of trigger counters (Trigger : Channel 1 & Channel 2)
- After neglecting overshoot and applying coincidence cut and position cut

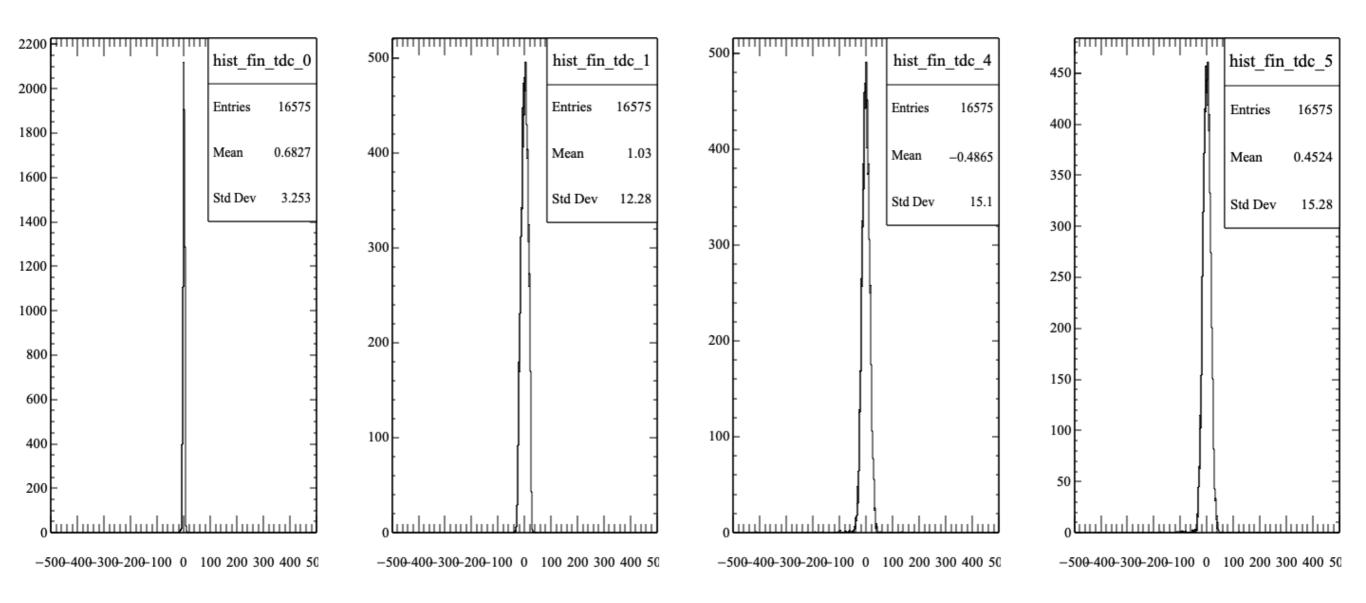
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TDC Distribution with Cut-Off Ch\_0

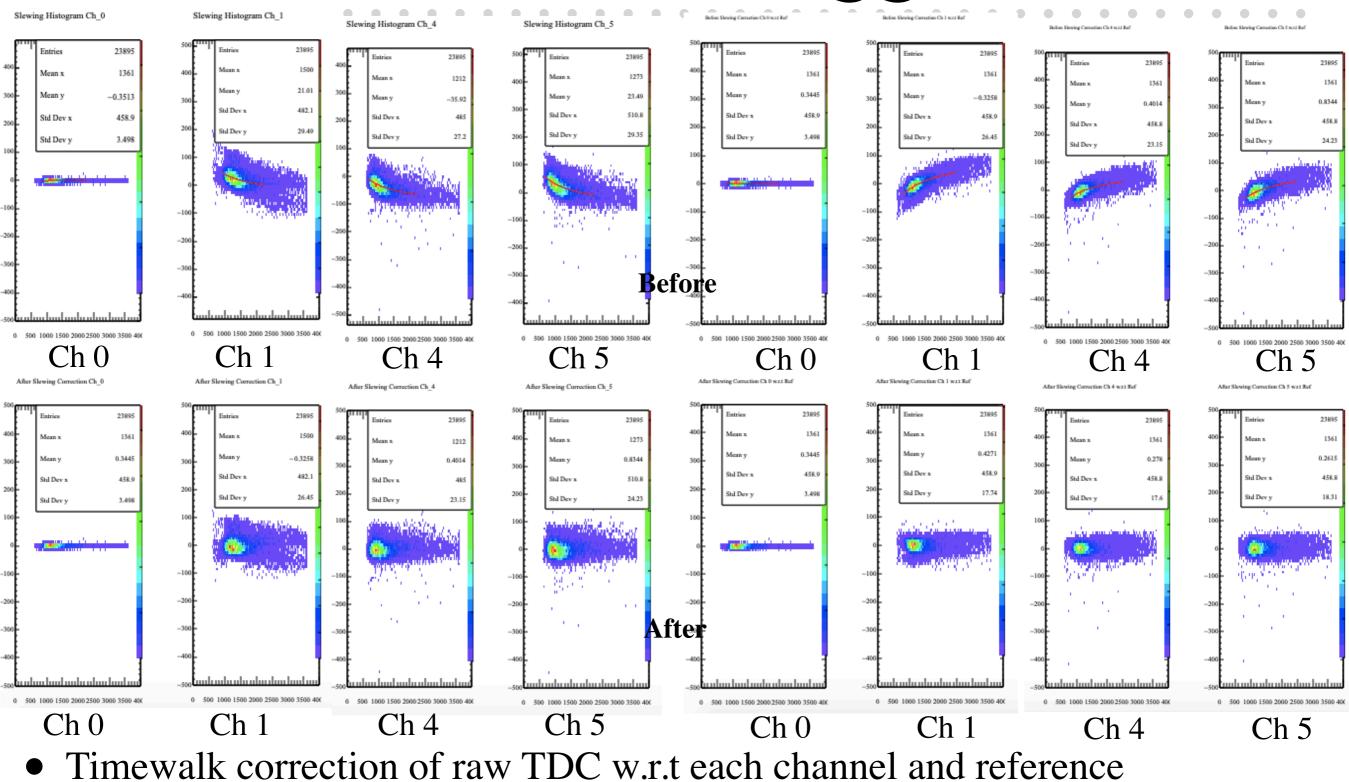
TDC Distribution with Cut-Off Ch\_1

TDC Distribution with Cut-Off Ch\_4

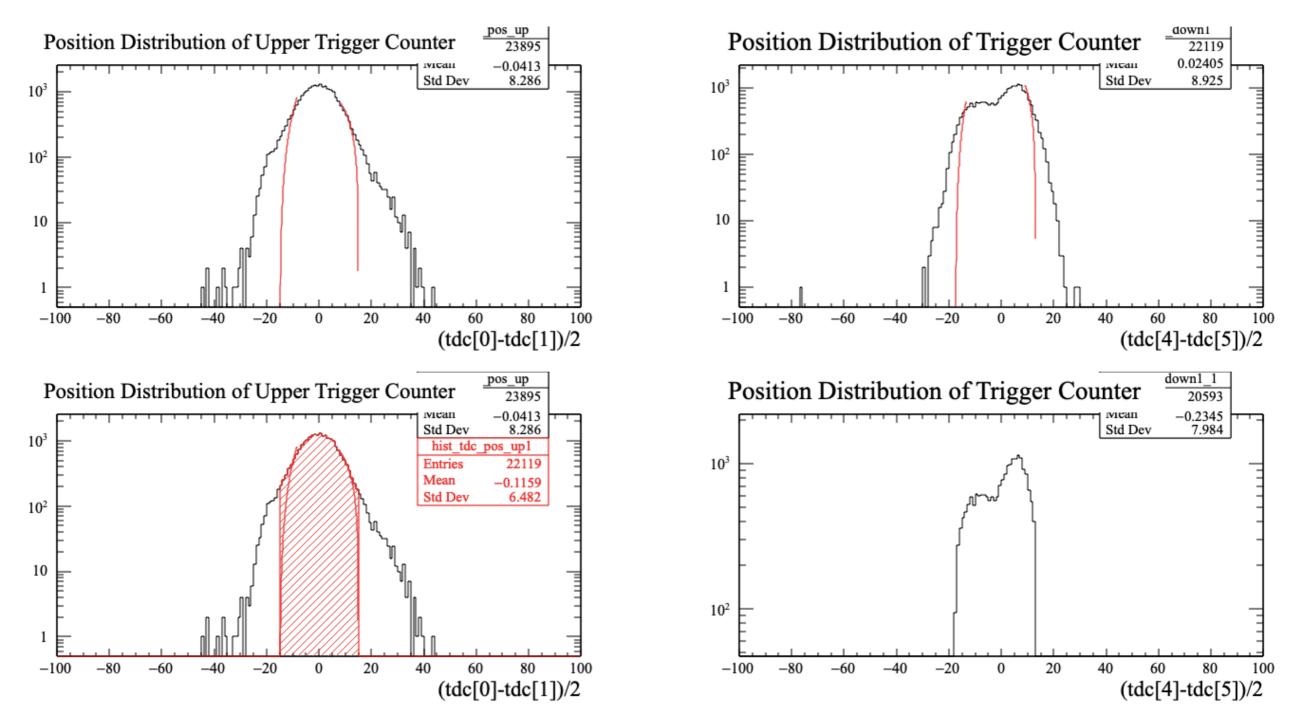
TDC Distribution with Cut-Off Ch\_5



• Corresponding TDC distribution of trigger counters

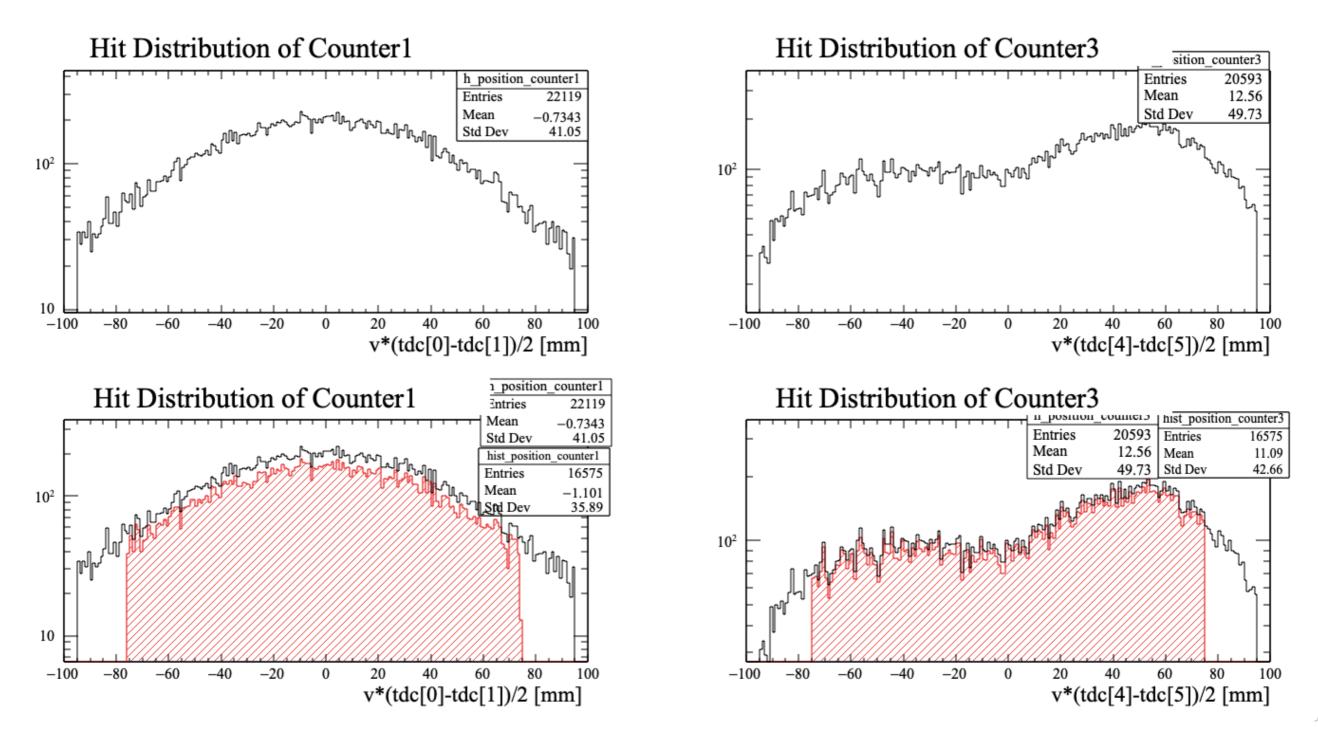


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• Applying position cuts

• Selecting hits between -75 mm and 75 mm (15 cm = radiator length)



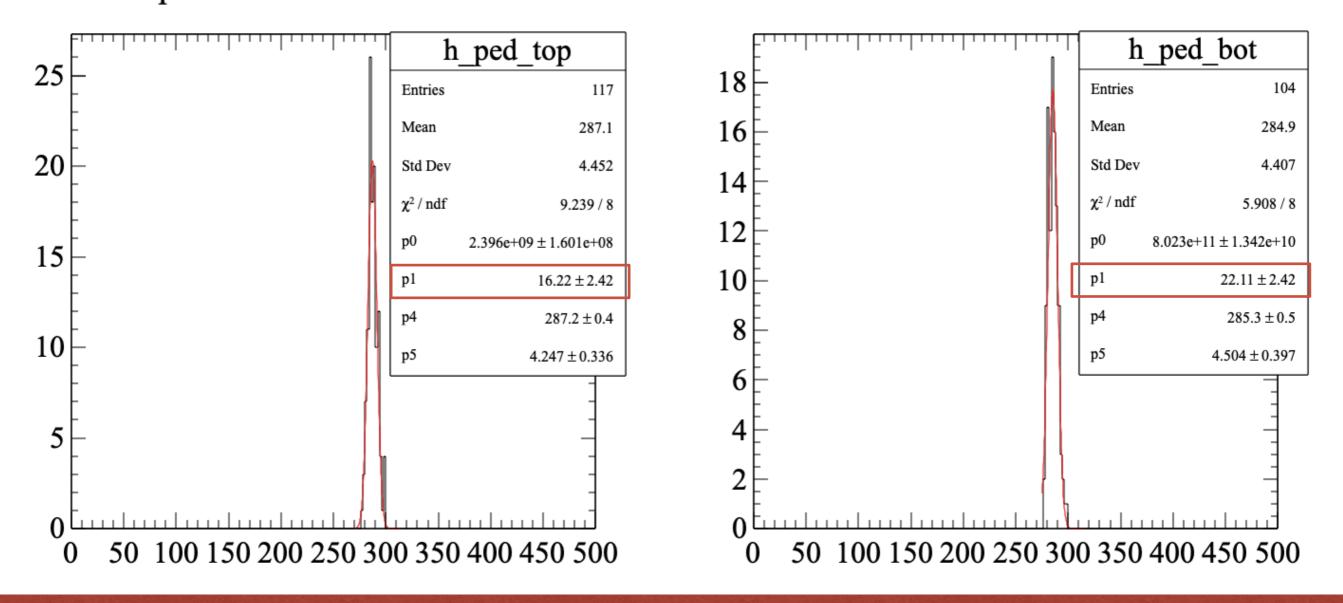
#### WC Top Channel ADC Distribution

hist adc bot 1000 hist\_adc\_top 700 Entries 16575 16575 Entries 600 800 Mean 609.6 Mean 489.2 500 Std Dev Std Dev 220.5 155 600 400 300 400 200 200 100 500 1000 1500 2000 2500 3000 3500 4000 500 1000 1500 2000 2500 3000 3500 4000 0 0 Pedestal Pedestal

• After the data sorting, raw ADC distribution of WC top and bottom

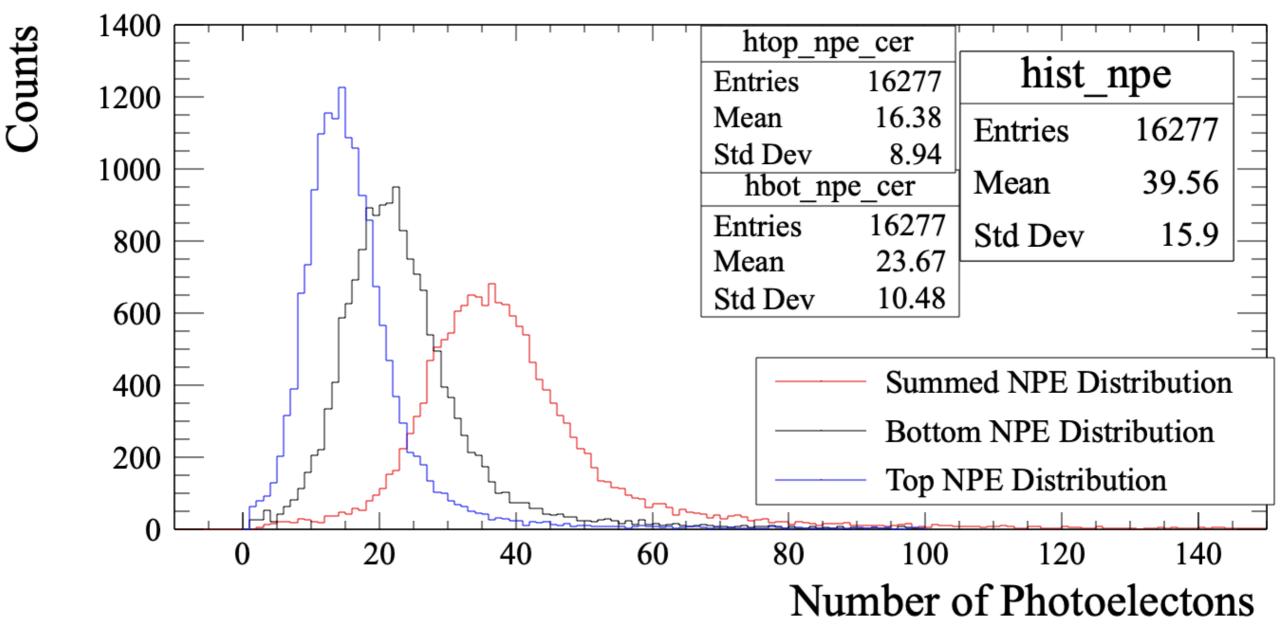
WC Bot Channel ADC Distribution

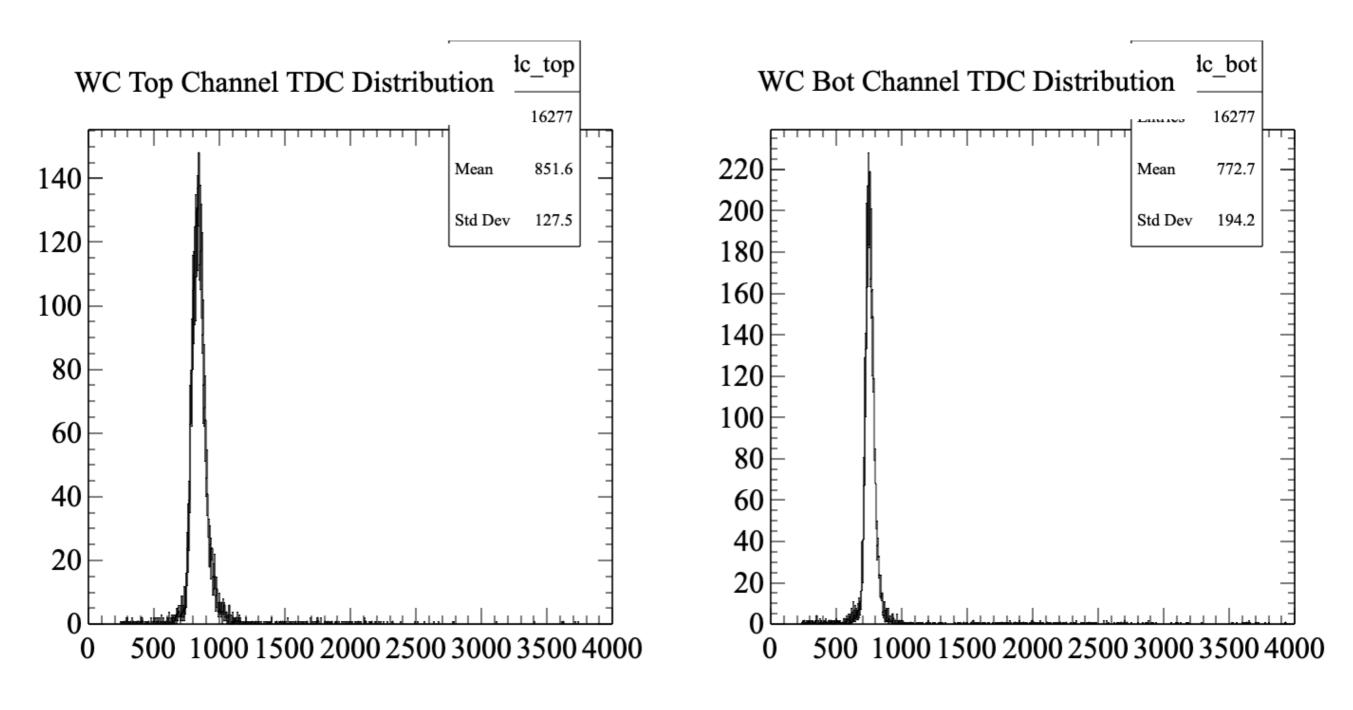
- Pedestal is fitted with the convolution of gaussian and poisson distribution.
- Fitted mean of poisson distribution is 16.22 ± 2.42 [top], 22.11 ± 2.42 [bottom]
  WC Top Pedestal Distribution
  WC Bot Pedestal Distribution



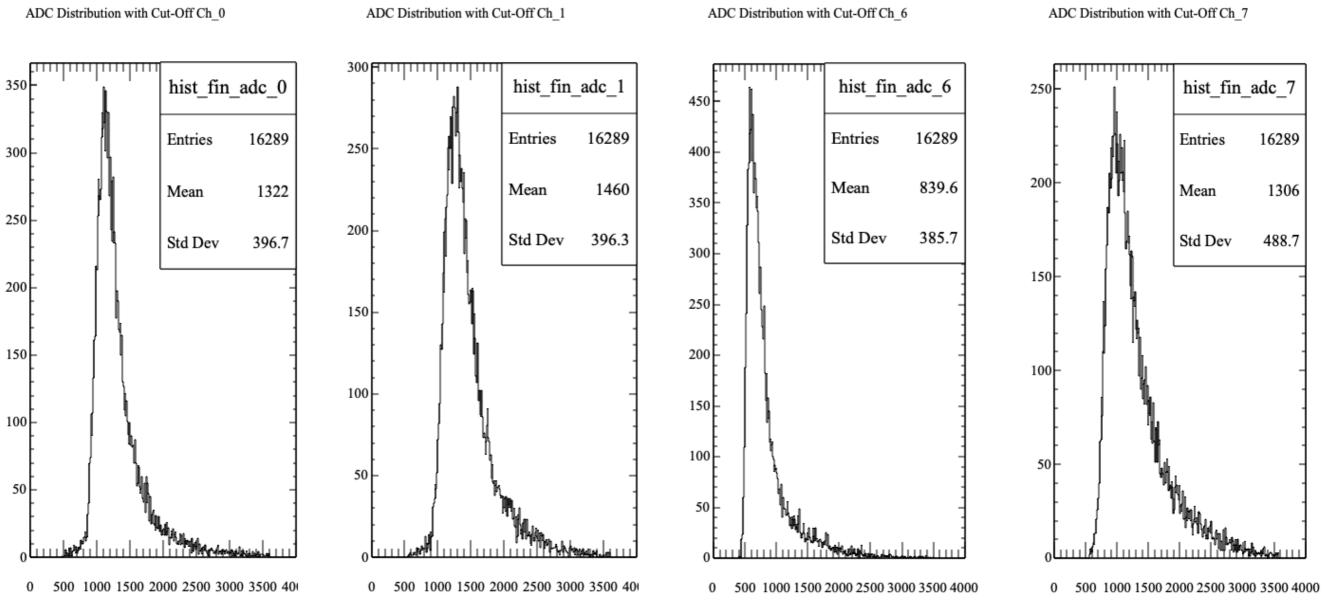
• Summation of top and bottom NPe distribution has a mean value of 39.56

Summed NPE Distribution





• Corresponding TDC distribution



- Data taken for 14 days (from Jan.25)
- ADC distribution of trigger counters (Trigger : Channel 1 & Channel 2)
- After neglecting overshoot and applying coincidence cut and position cut

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TDC Distribution with Cut-Off Ch 1

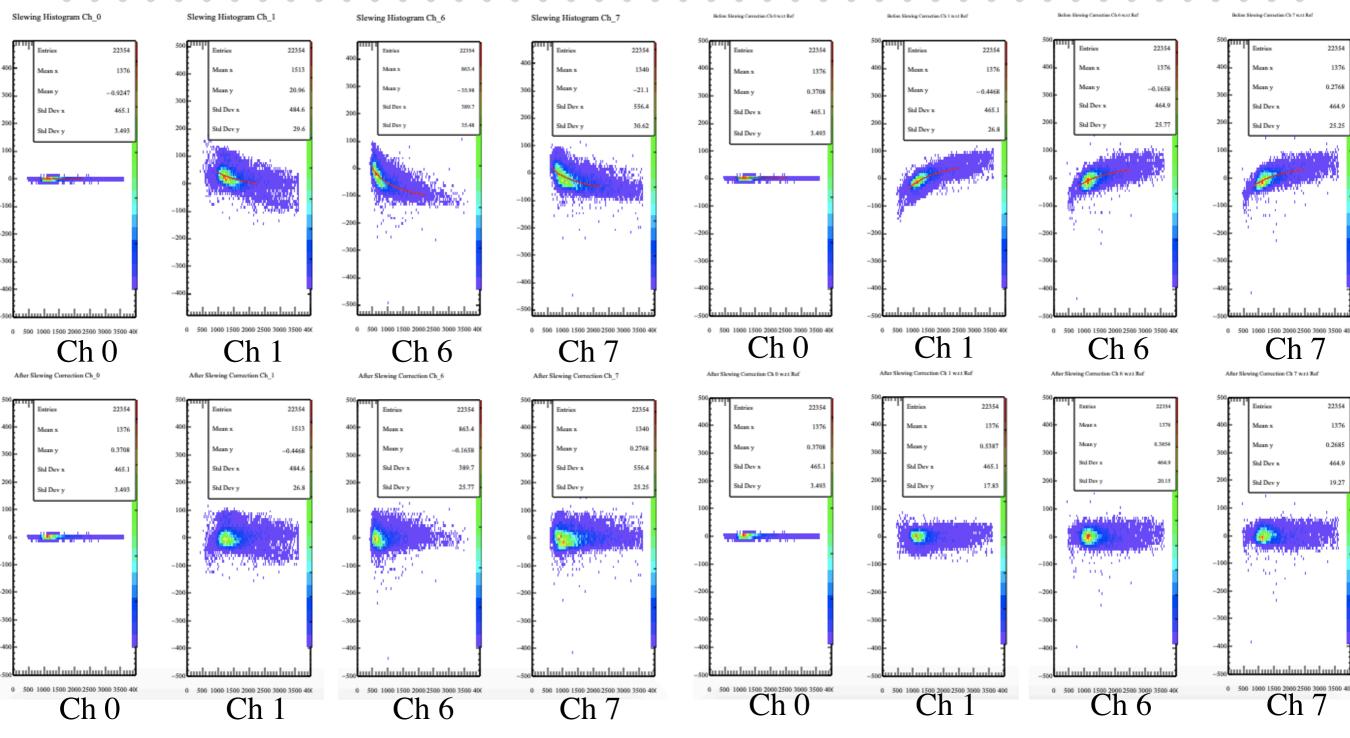
450 hist fin tdc 7 hist fin tdc 0 500 hist fin tdc 1 hist fin tdc 6 400 2000 400 16289 16289 Entries Entries 16289 Entries 16289 Entries 1800 350 350 400 Mean 0.6272 0.7105 Mean Mean Mean -1.805-1.3711600 300 300 Std Dev 3.307 Std Dev 17.25 Std Dev 12.32 Std Dev 16.93 1400 250 300 1200 250 200 1000 200 200 800 150 150 600 100 100 100 400 50 50 200 , նավավավույիս -500-400-300-200-100 0 100 200 300 400 50 -500-400-300-200-100 0 100 200 300 400 50 -500-400-300-200-100 0 100 200 300 400 50 -500-400-300-200-100 0 100 200 300 400 50

TDC Distribution with Cut-Off Ch 6

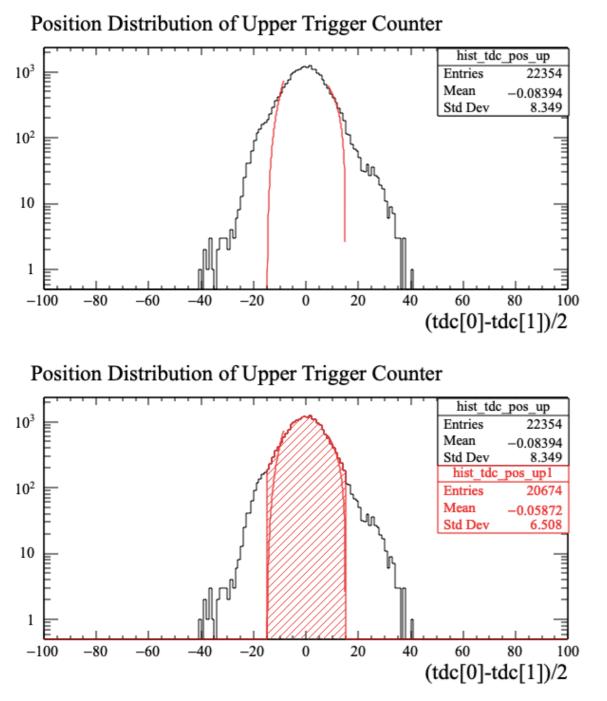
• Corresponding TDC distribution of trigger counters

TDC Distribution with Cut-Off Ch 0

TDC Distribution with Cut-Off Ch 7

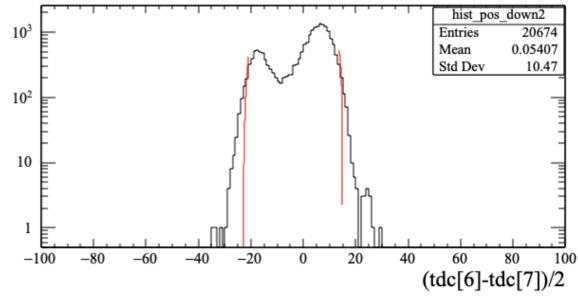


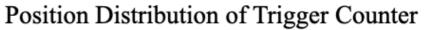
• Timewalk correction of raw TDC w.r.t each channel and reference

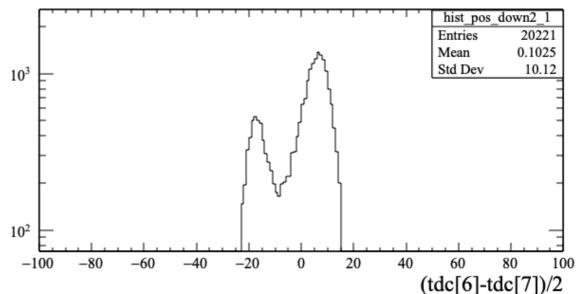


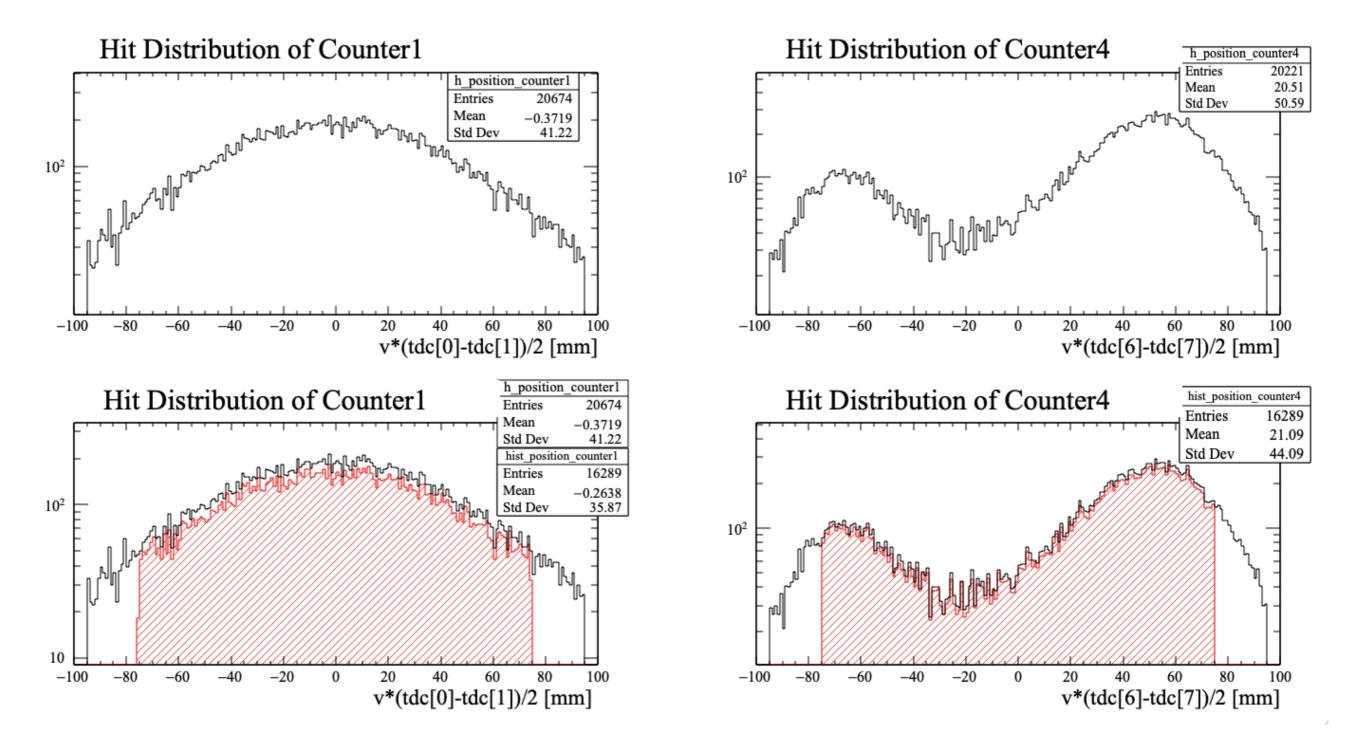
• Applying position cuts

Position Distribution of Trigger Counter



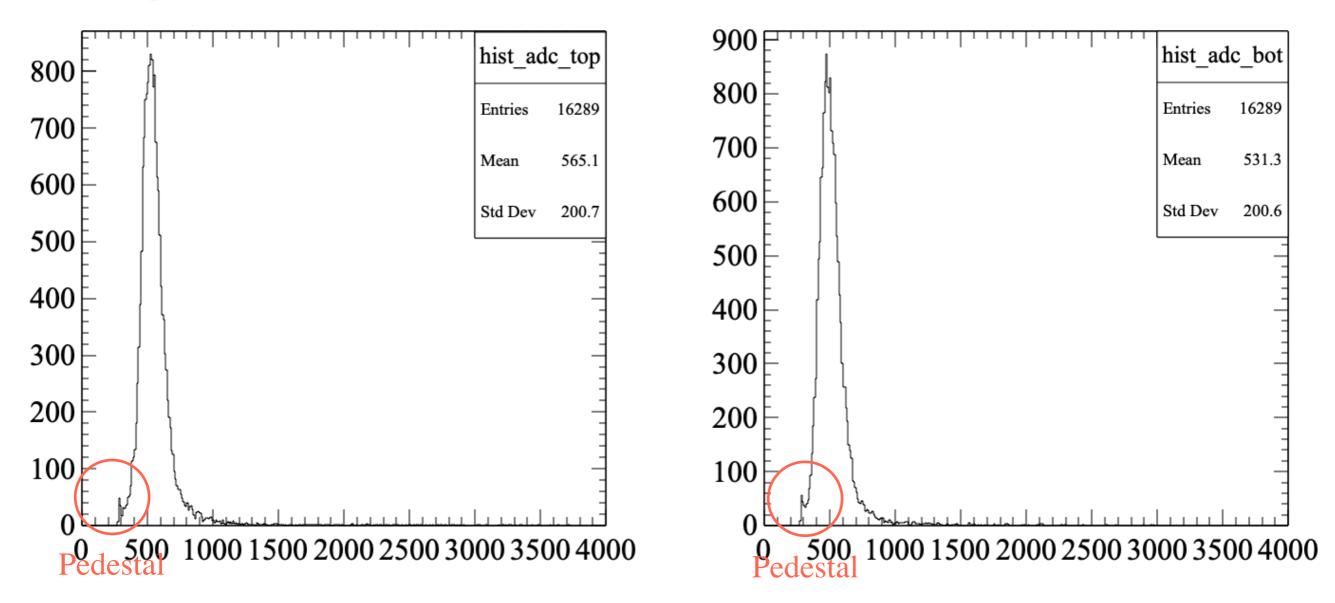






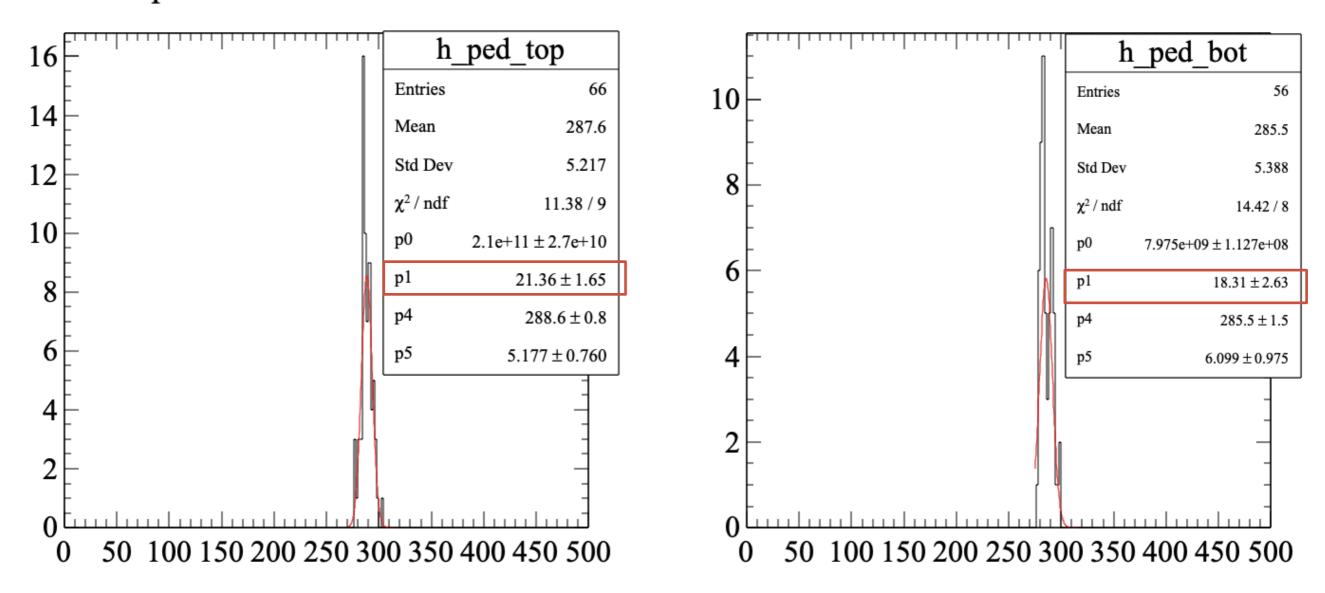
#### WC Top Channel ADC Distribution

WC Bot Channel ADC Distribution



• After the data sorting, raw ADC distribution of WC top and bottom

- Pedestal is fitted with the convolution of gaussian and poisson distribution.
- Fitted mean of poisson distribution is 21.36 ± 1.65 [top], 18.31 ± 2.63 [bottom]
  WC Top Pedestal Distribution
  WC Bot Pedestal Distribution

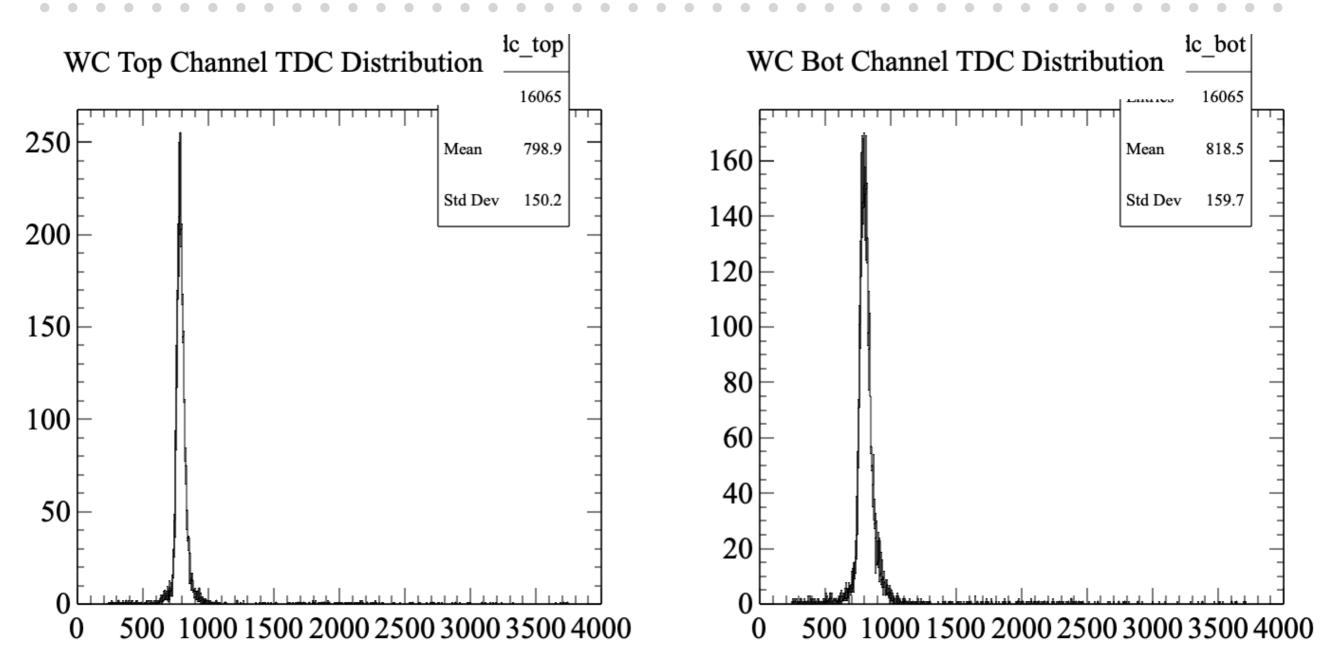


• Summation of top and bottom NPe distribution has a mean value of 39.25

1400 htop\_npe\_cer Entries 16065 hist npe 1200 21.92 Mean 16065 Entries 9.658 Std Dev 1000 hbot npe cer Mean 39.25 16065 Entries 800 Std Dev 15.56 17.75 Mean Std Dev 9.202 600 Summed NPE Distribution 400 **Bottom NPE Distribution** 200 **Top NPE Distribution** 0 20 40 80 100 120 140 0 60 Number of Photoelectons

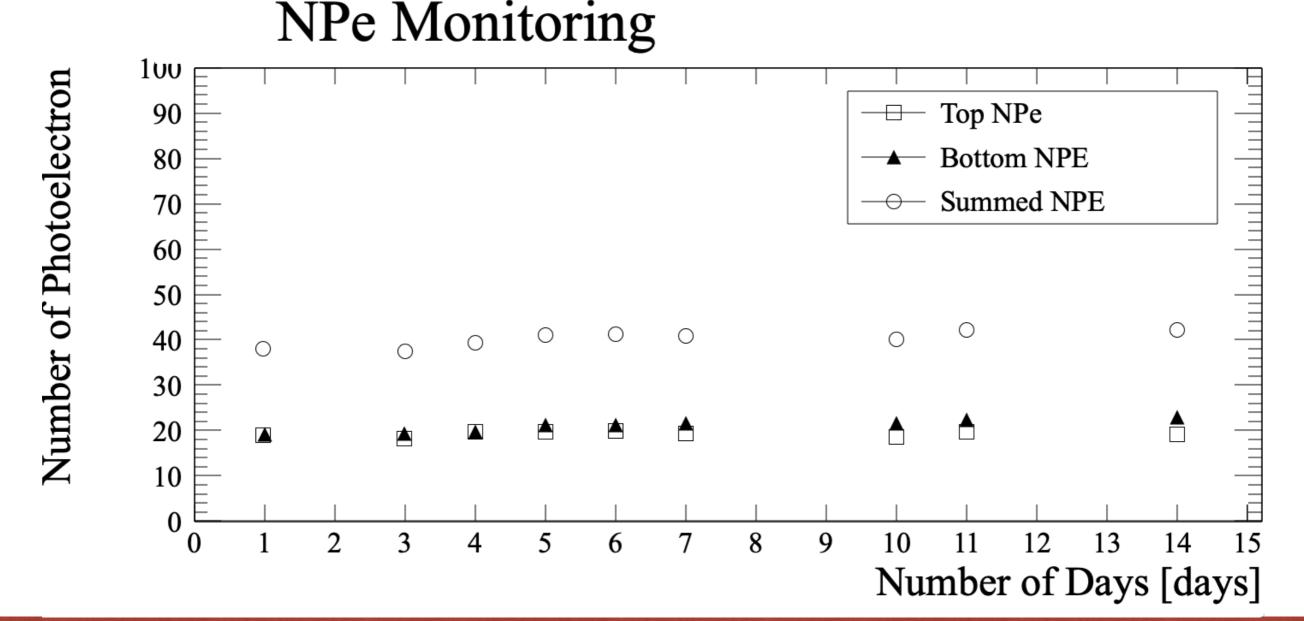
#### Summed NPE Distribution

Counts

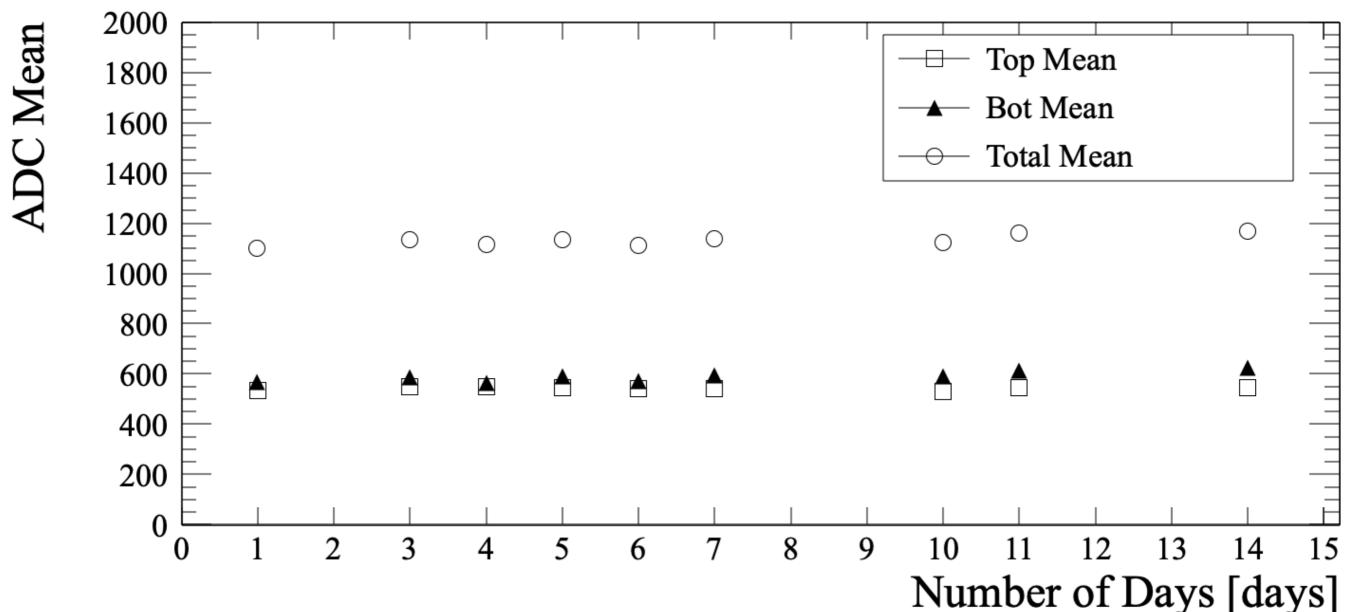


• Corresponding TDC distribution

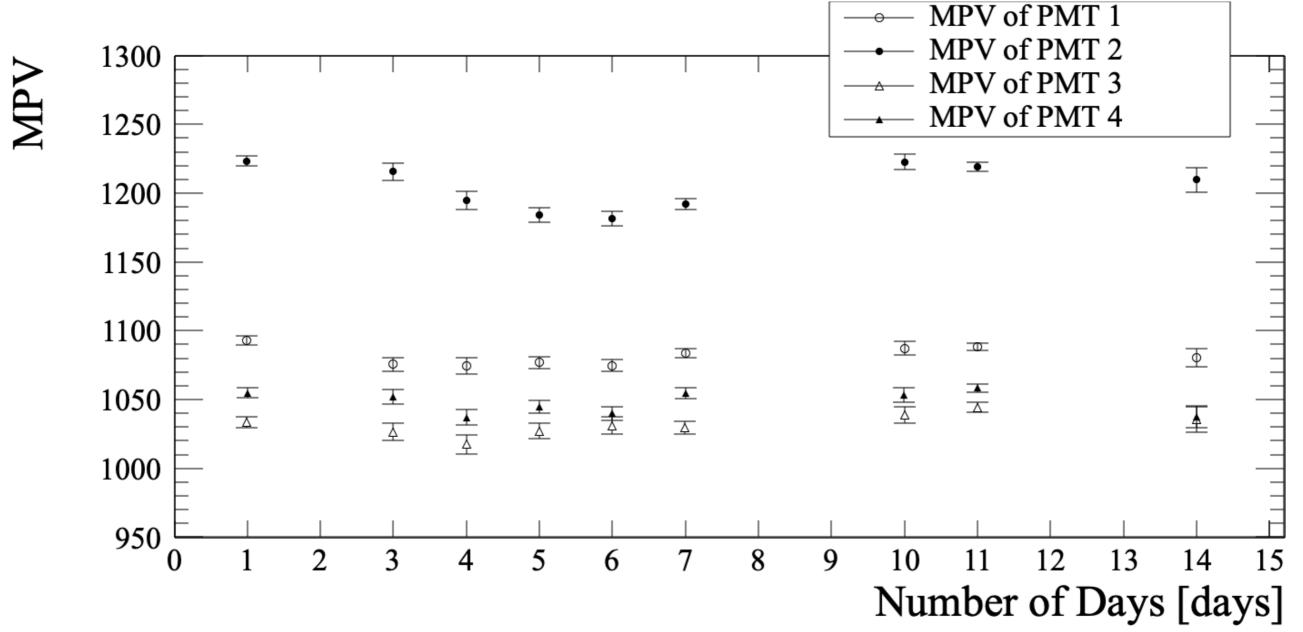
- NPe and ADC mean of WC are monitored
- Also, MPV, ADC Mean, RMS of 4 channels of trigger counter are also monitored



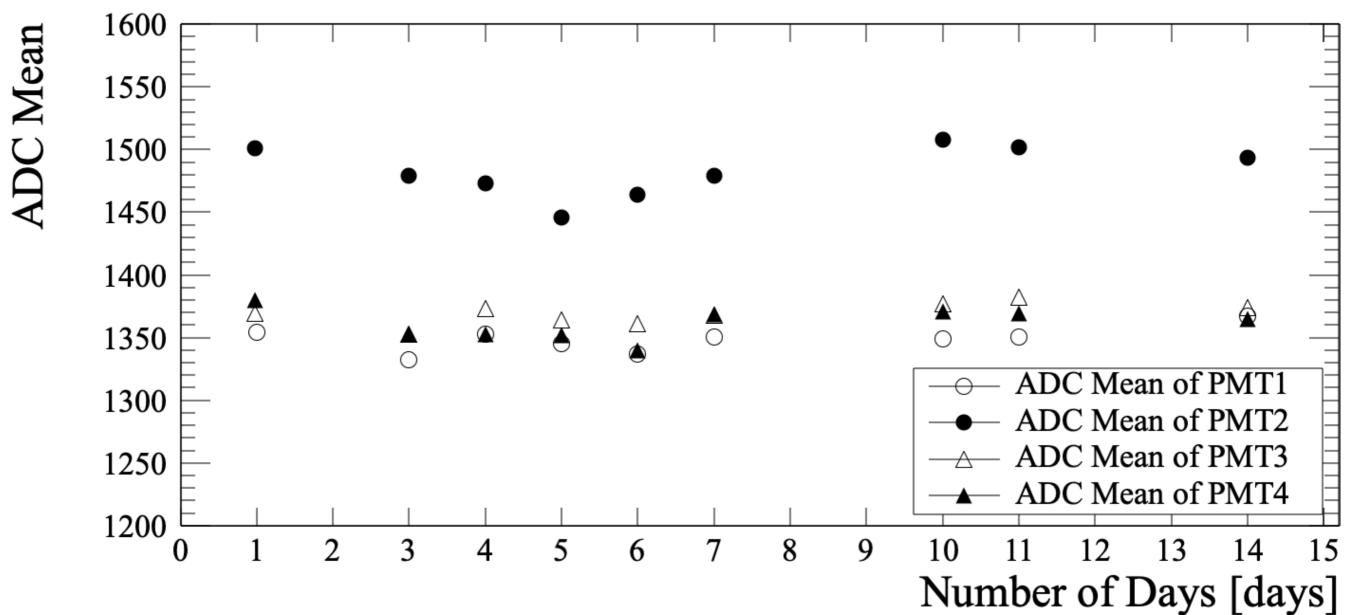
- NPe and ADC mean of WC are monitored
- Also, MPV, ADC Mean, RMS of 4 channels of trigger counter are also monitored



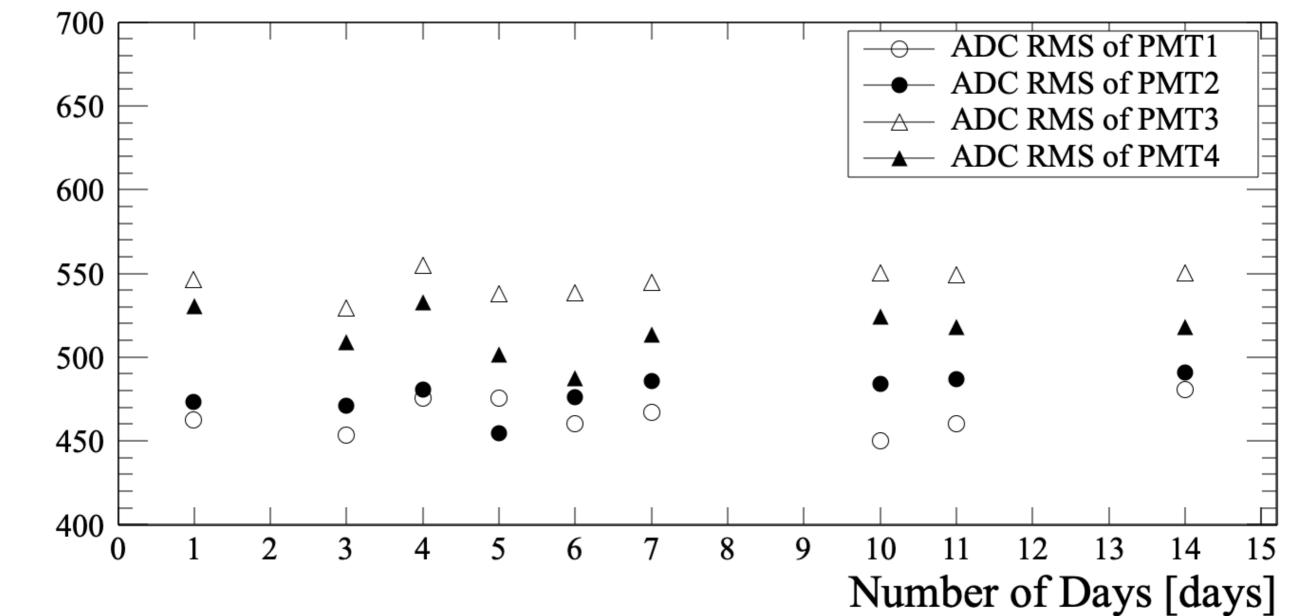
- NPe and ADC mean of WC are monitored
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ADC RMS

### Summary

	Lower Trigger	Center Trigger	Upper Trigger
Top NPE	16.38	18.35	21.92
Top Poisson Mean	$16.22 \pm 2.42$	$18.98 \pm 1.01$	$21.36 \pm 1.65$
Bottom NPE	23.67	20.39	17.75
Bot Poisson Mean	$22.11 \pm 2.42$	$20.45 \pm 1.69$	$18.31 \pm 2.63$
Summed NPE	39.56	38.26	39.25
Entries Ratio ( After Coinc. / Sorted)	0.98 (=16277/16575)	0.99 ( = 17945/18185 )	0.99 ( = 16065/16289 )

- Vertical distance between top and bottom trigger counters : 50cm
- Upper, lower, centre trigger counters have spacings of 10 cm each other -> ~11 deg

# Plan for Test at J-PARC



- E05 Water Cherenkov Detector
- Water Cherenkov Prototype from Japan (Op.Window : UV00)
- Water Cherenkov Prototype from Korea (Op.Window : ACRYLITE #000)

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#### Profile Structure



