

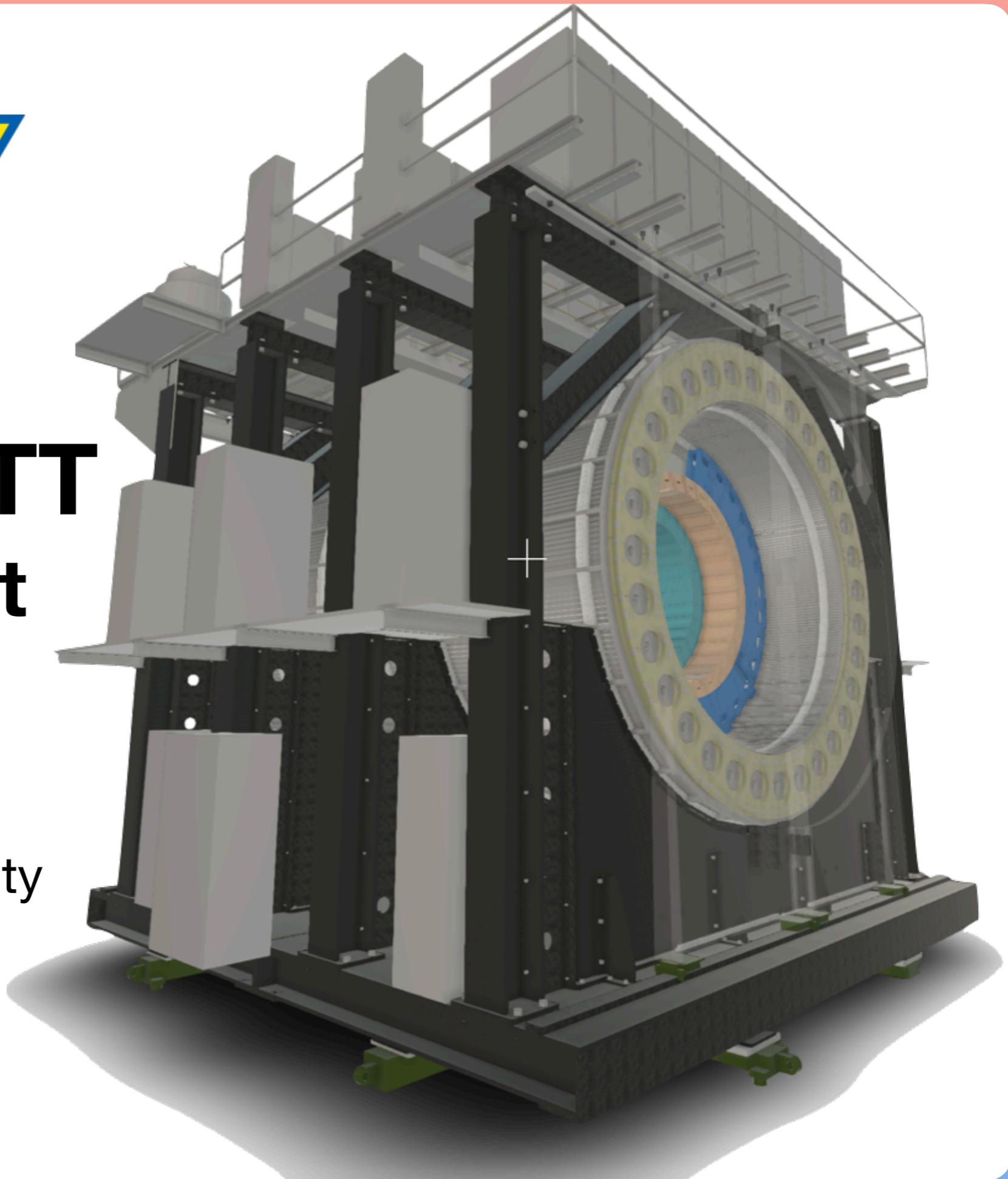


# SPHENIX INTT - Weekly Report

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National Central University

2021/9/1



# Channel classification update

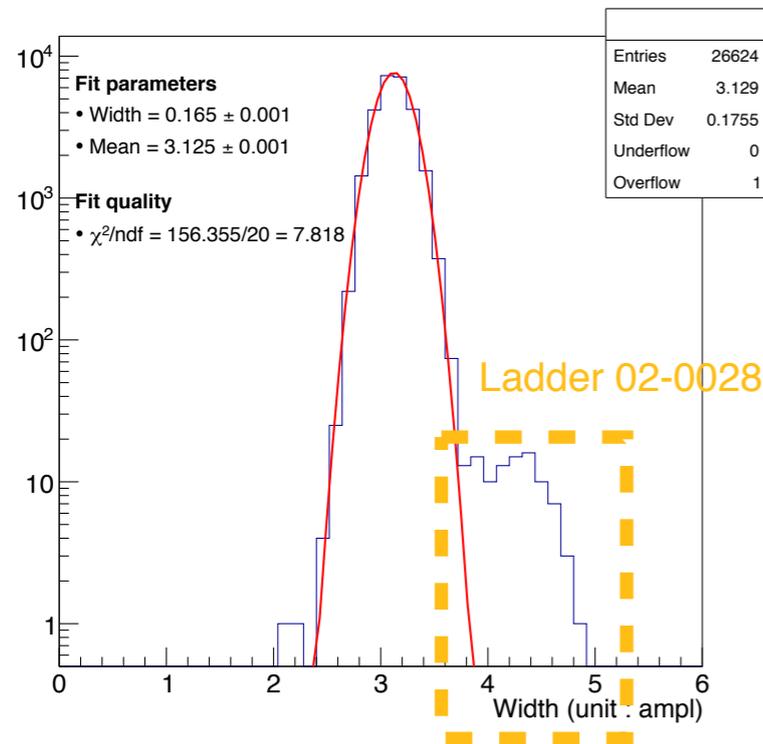


9 criteria are used so far



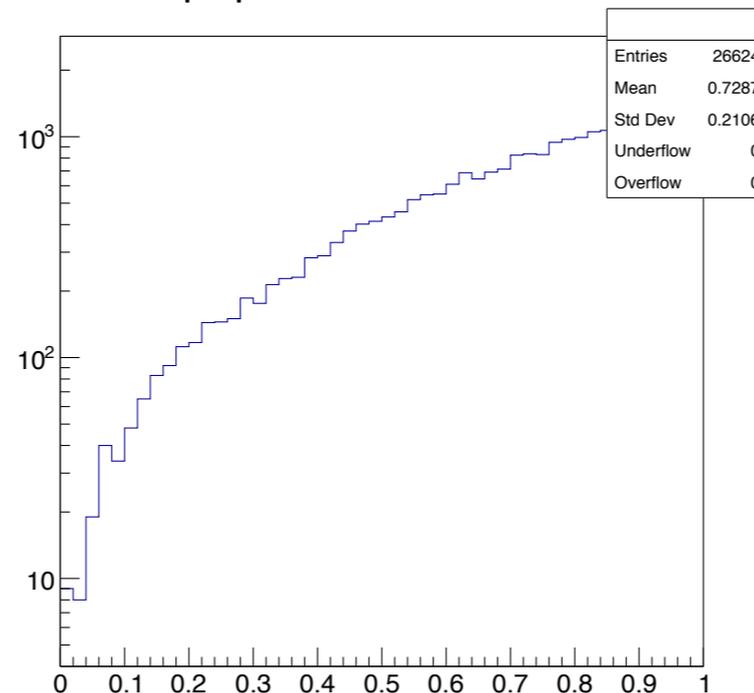
## 1. Noise study

offseted width of each channel



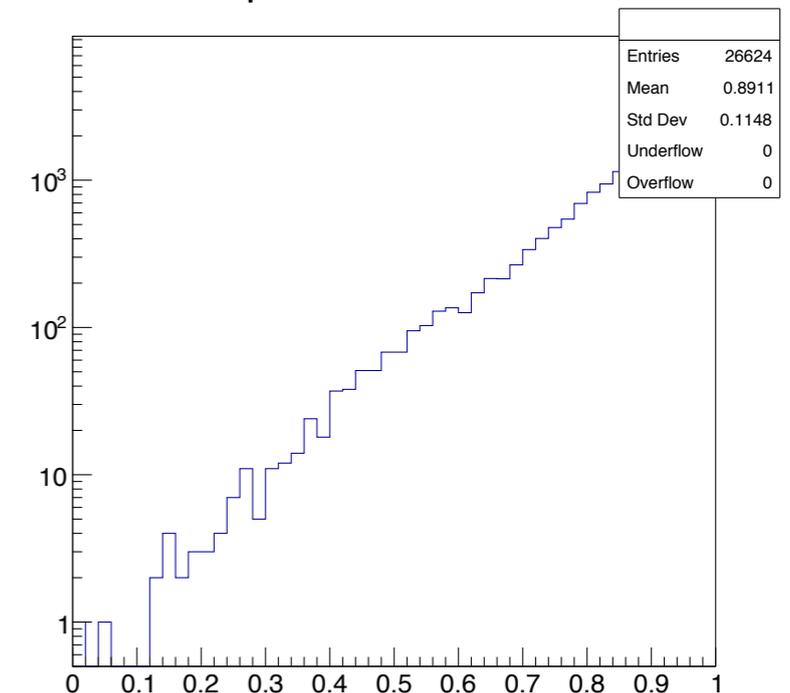
## 2. Linearity study

slope p-value of each channel

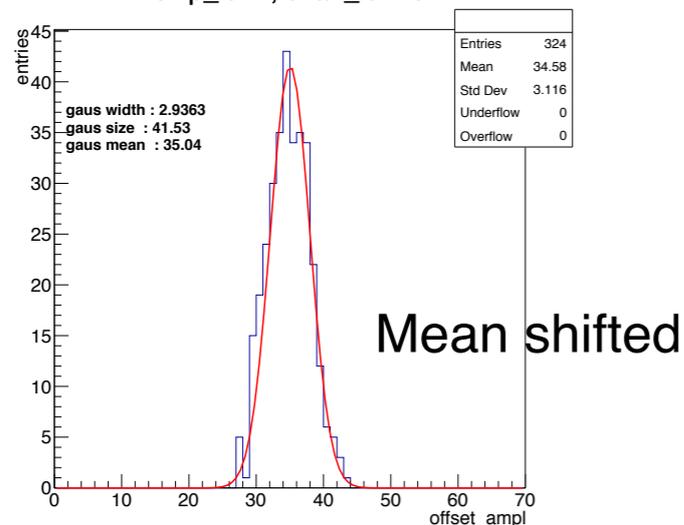


## 3. Width consistence study

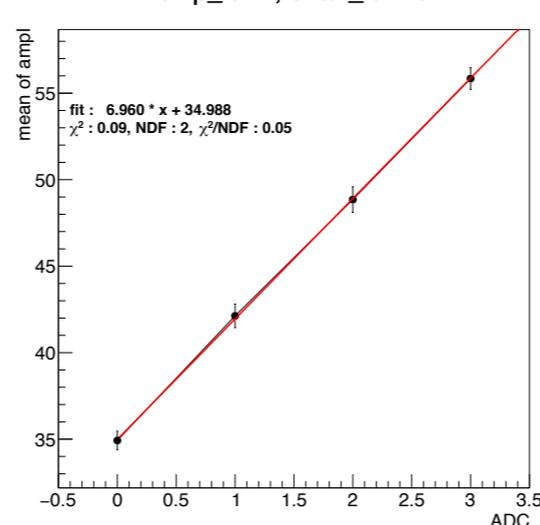
width p-value of each channel



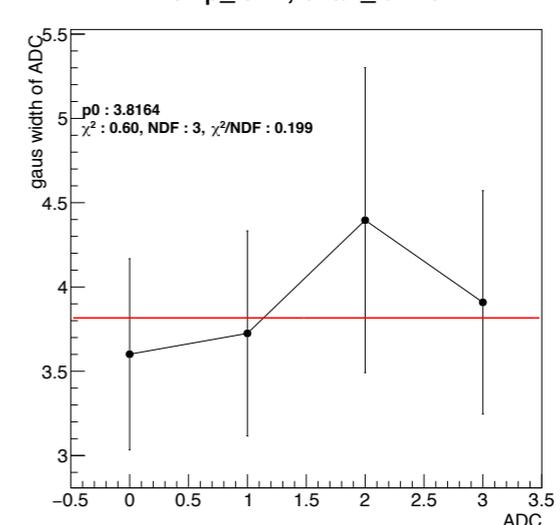
chip\_id=1, chan\_id = 0



chip\_id=1, chan\_id = 0



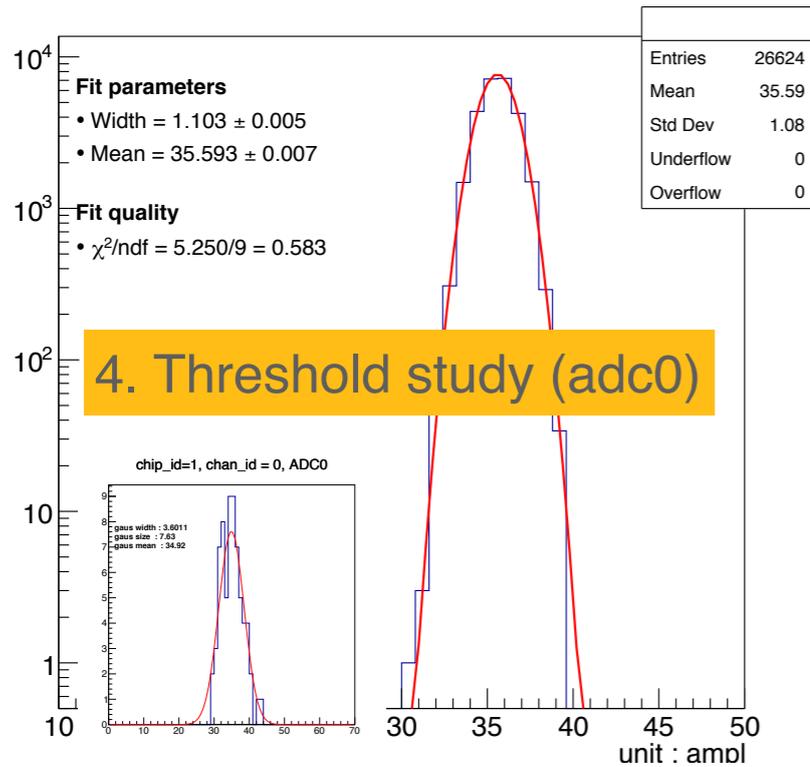
chip\_id=1, chan\_id = 0



# Channel classification update

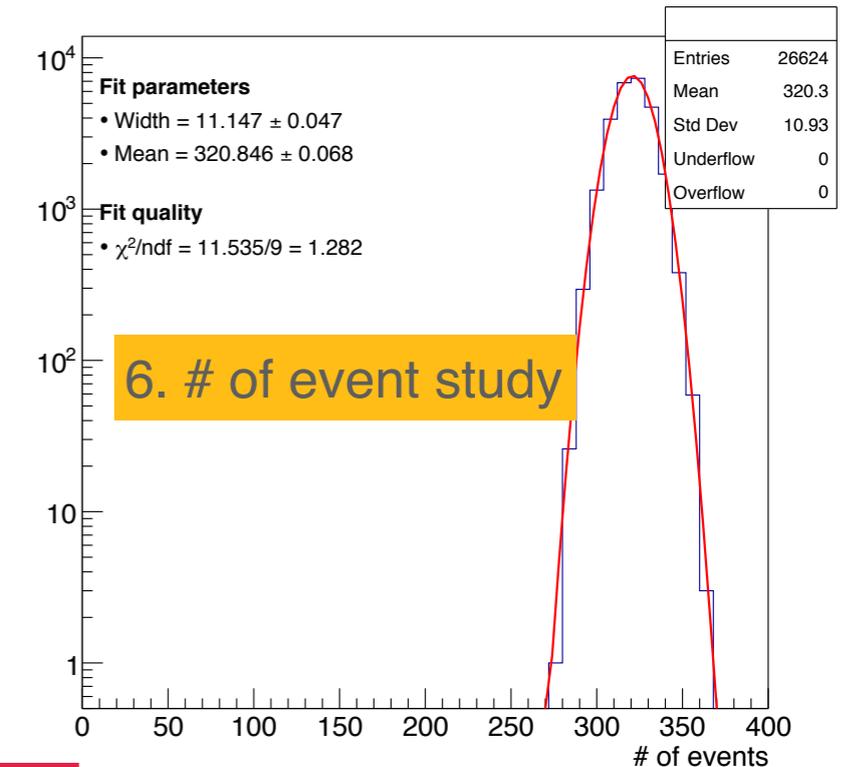
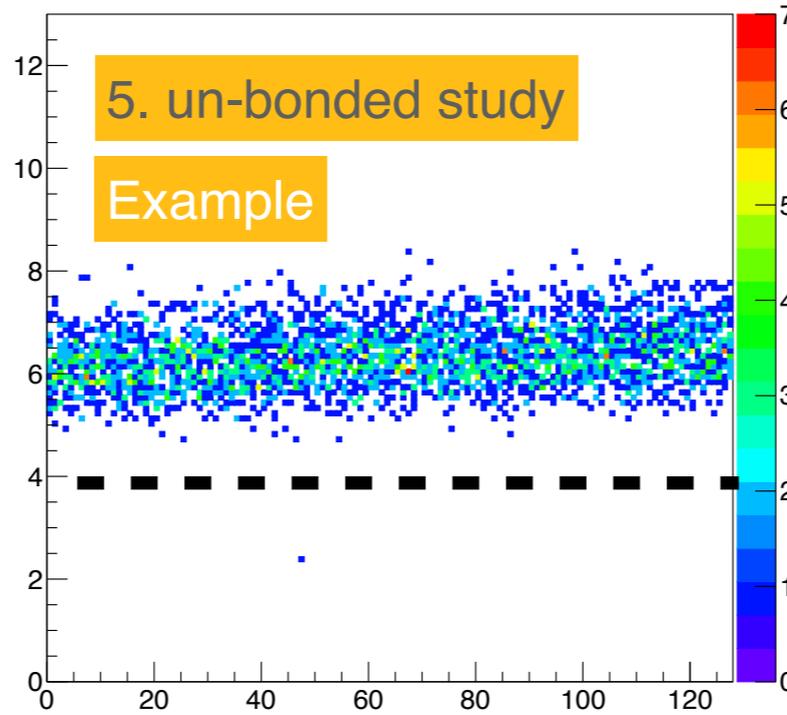


mean of adc0 distribution of each channel



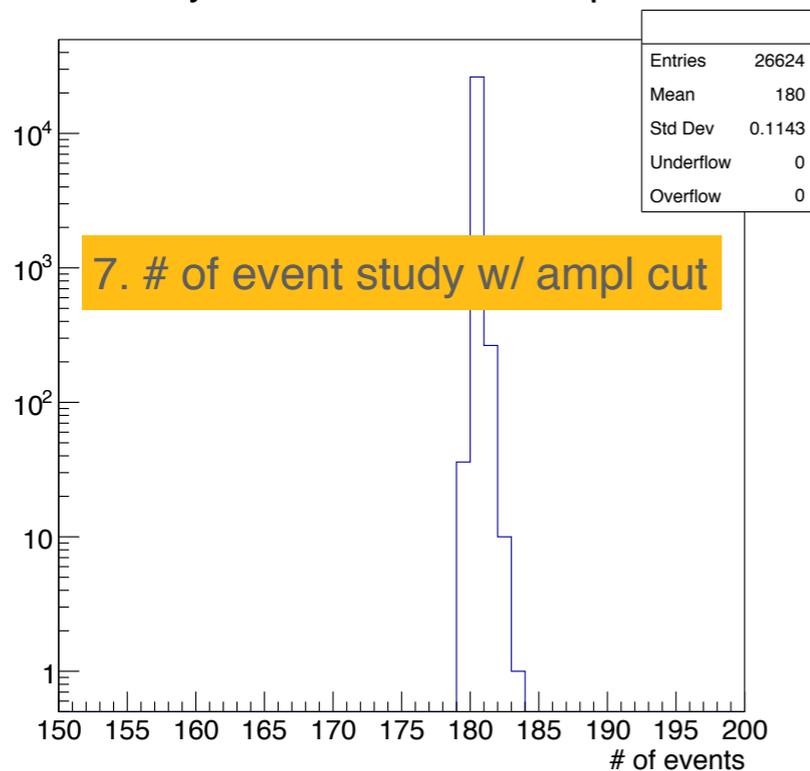
4. Threshold study (adc0)

entry of each channel



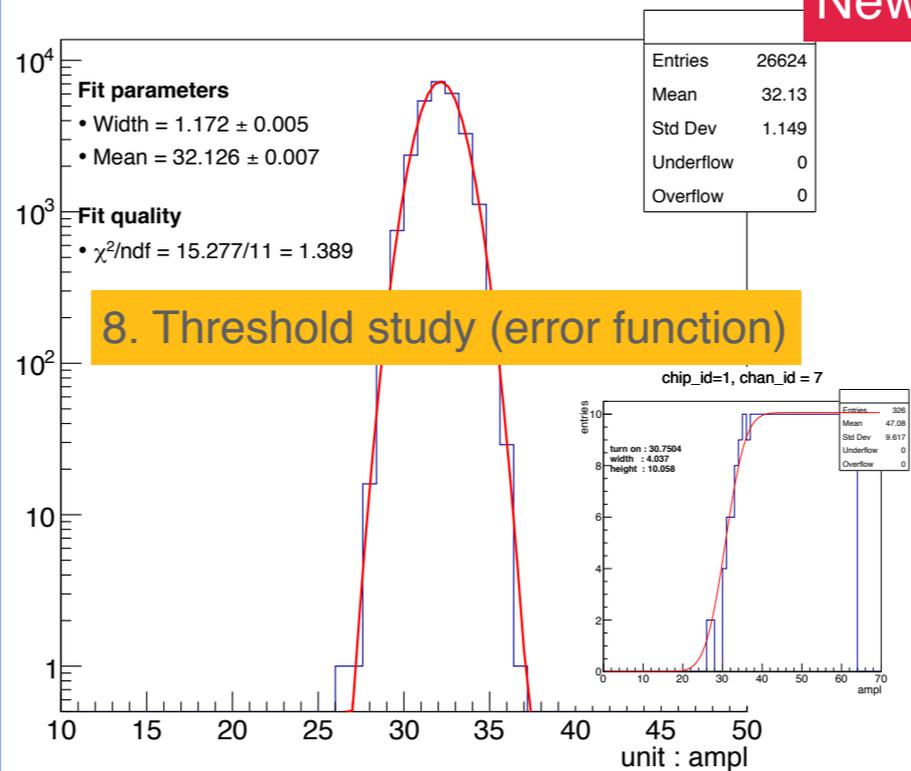
6. # of event study

entry of each channel w/ ampl cut



7. # of event study w/ ampl cut

(error function) threshold position of each channel



New

8. Threshold study (error function)

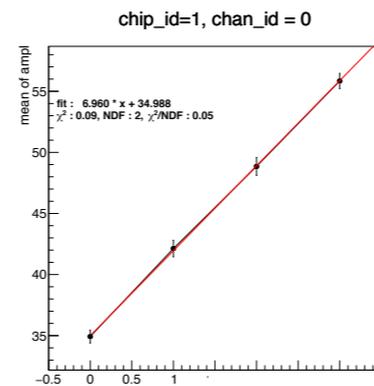
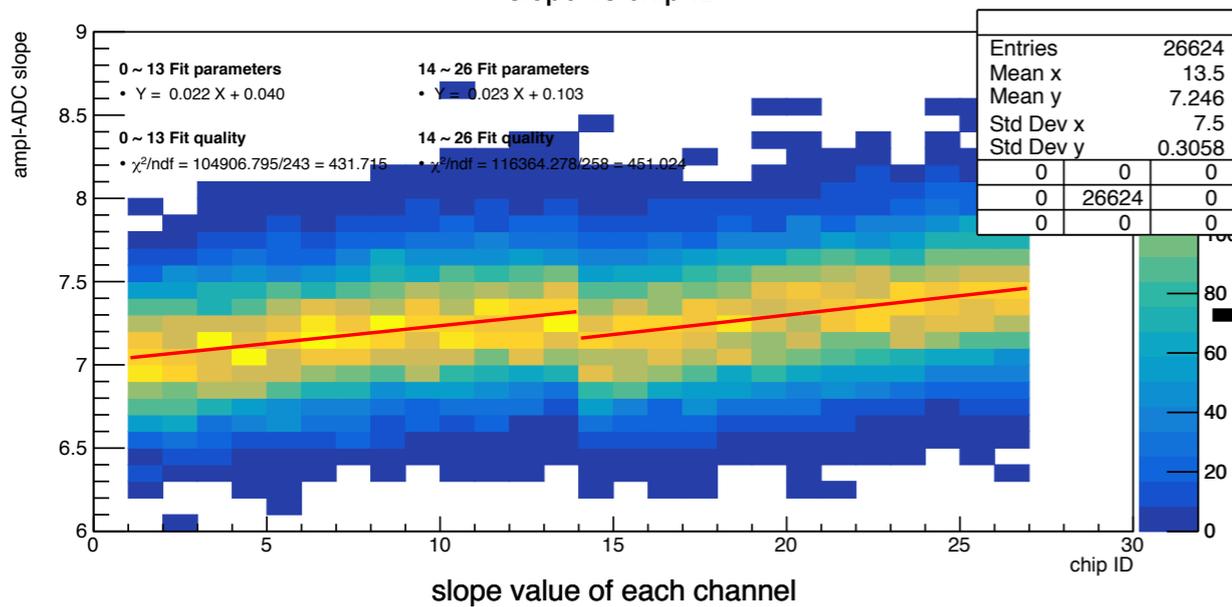
# Channel classification update



## 9. slope value New

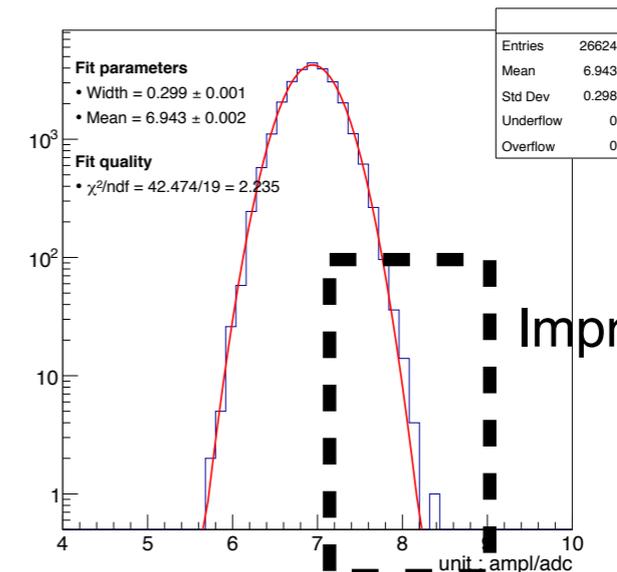
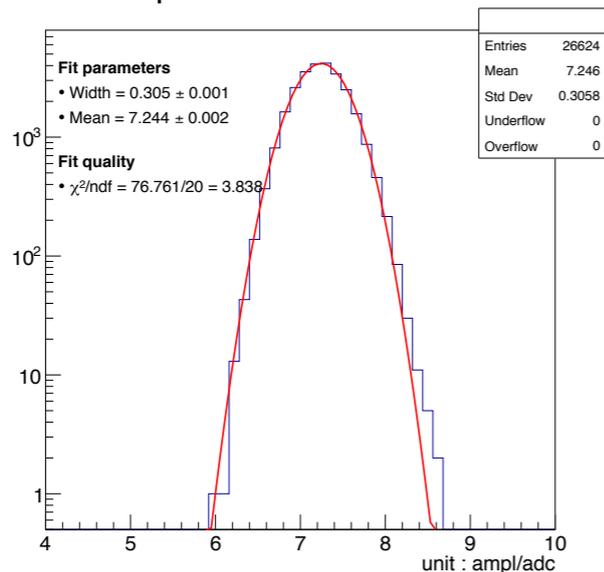
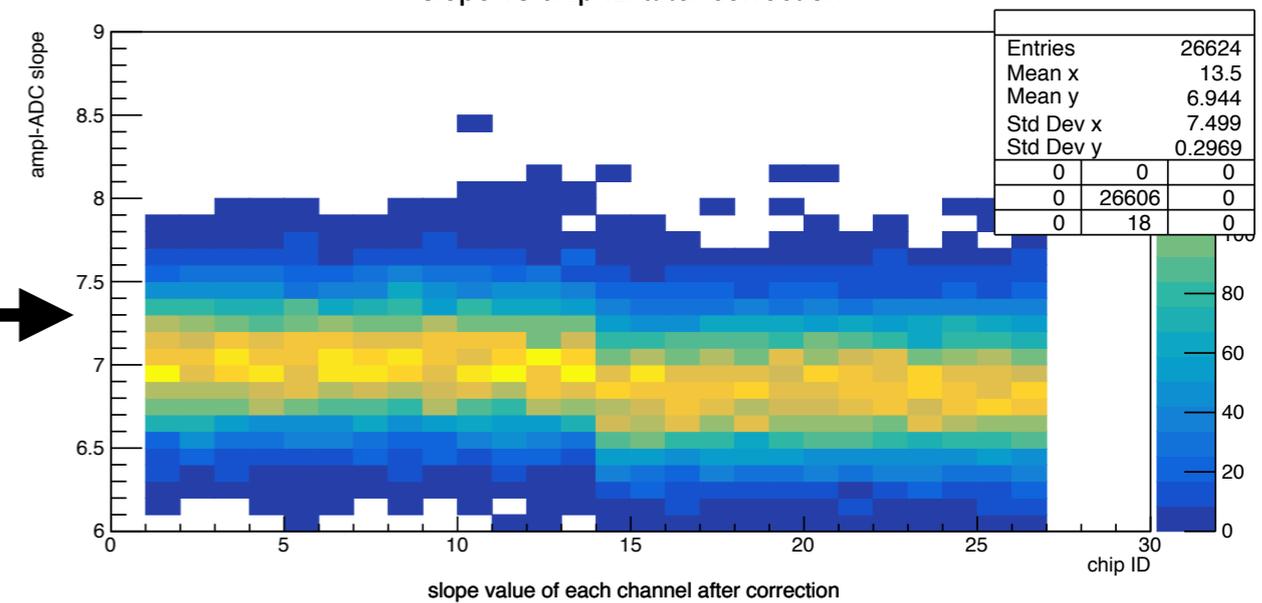
The amplitude of test pulse attenuates as it goes father

Before amplitude correction  
slope vs chip ID



Linearity study  
Error bar : mean fit error

After amplitude correction  
slope vs chip ID after correction



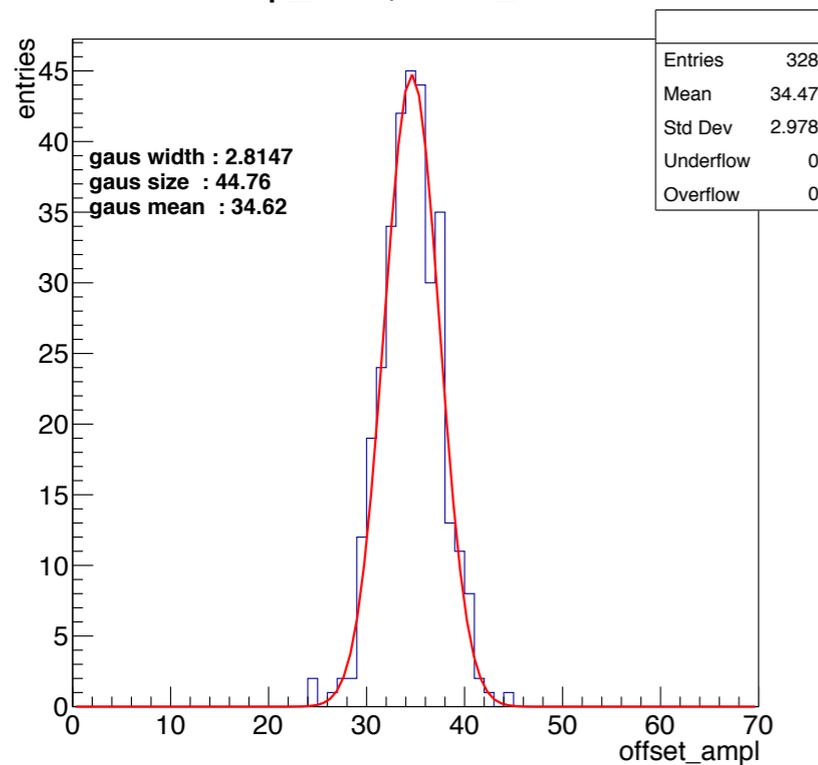
Improvement

# Offset width, double counting issue



All events

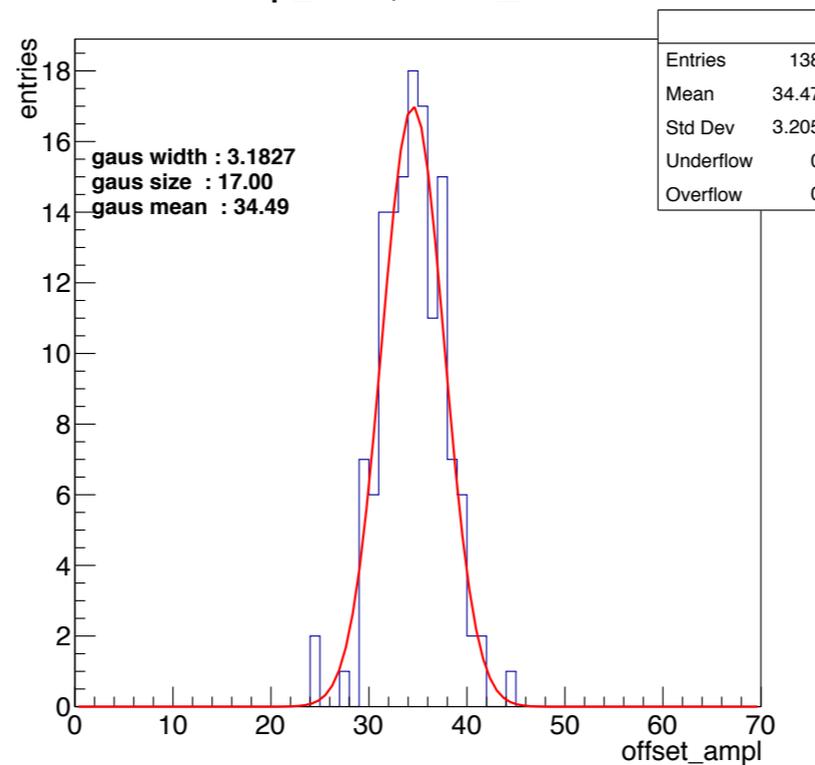
chip\_id=2, chan\_id = 2



Event 328  
Width 2.814

ADC 0 and ADC 2

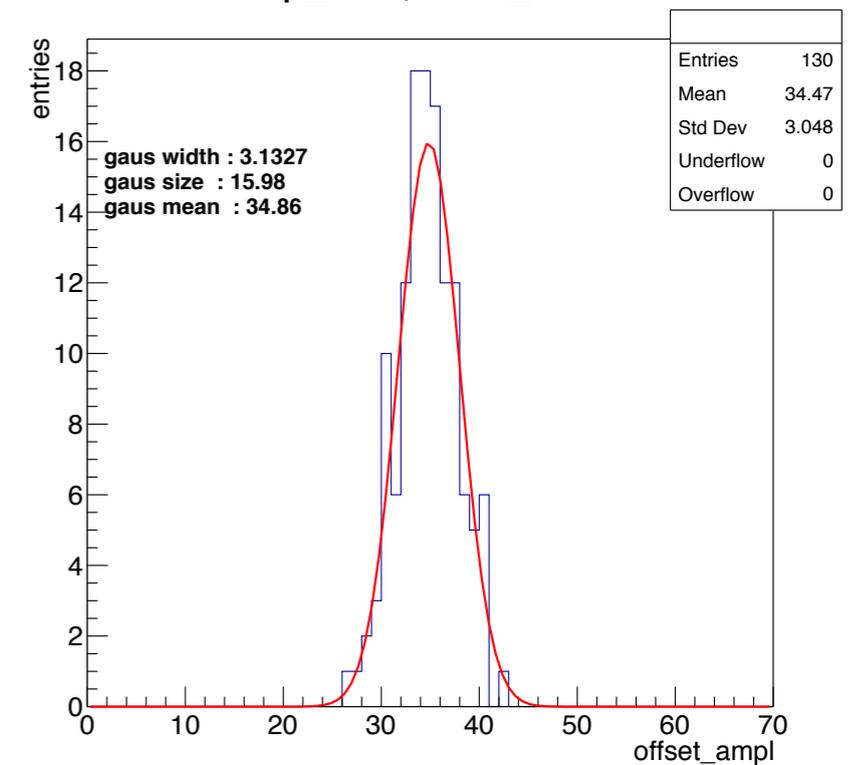
chip\_id=2, chan\_id = 2



Event 138  
Width 3.182

ADC 1 and ADC 3

chip\_id=2, chan\_id = 2



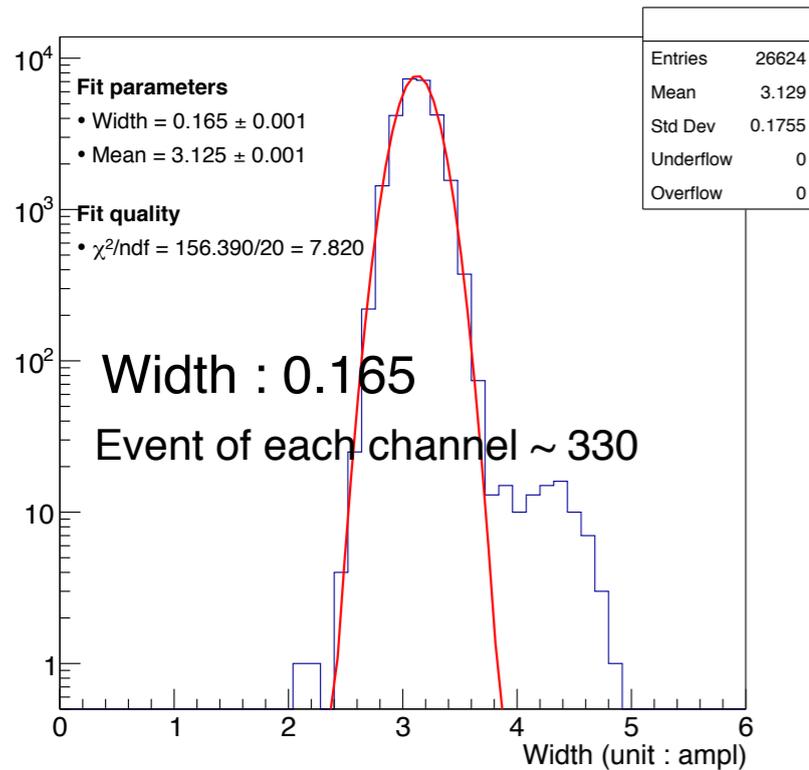
Event 130  
Width 3.132

# Offset width, double counting issue



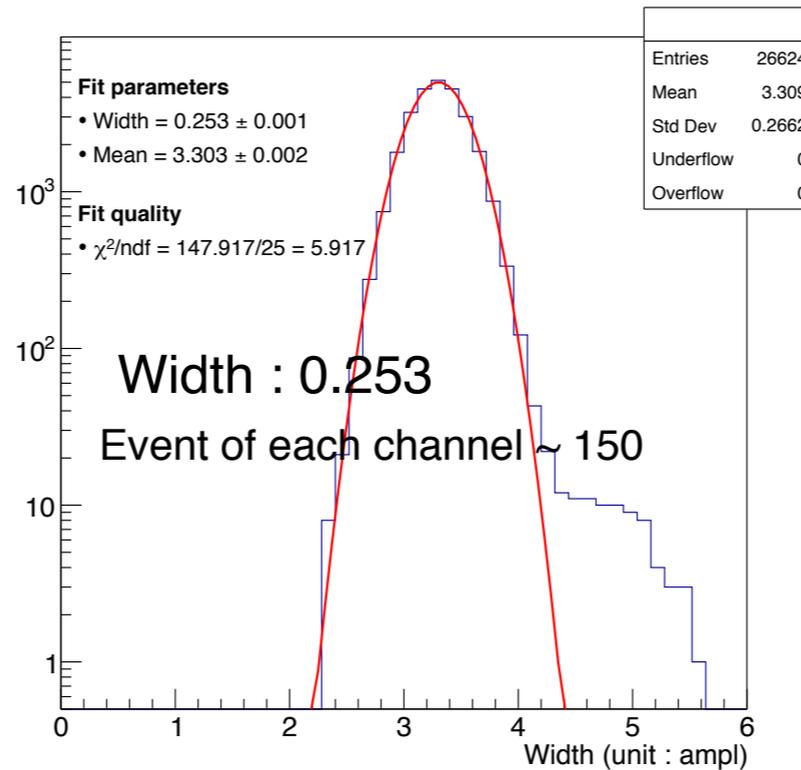
All events

offseted width of each channel



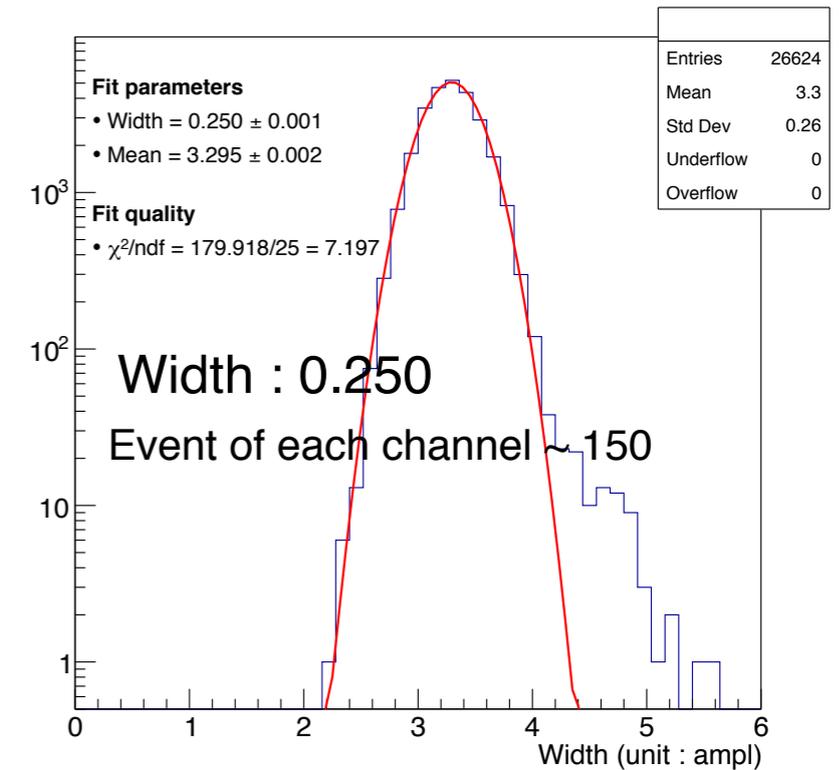
ADC 0 and ADC 2

offseted width of each channel (0, 2)



ADC 1 and ADC 3

offseted width of each channel (1, 3)



The width becomes wider if we consider only 2 adc distributions

# Gaussian fitting test

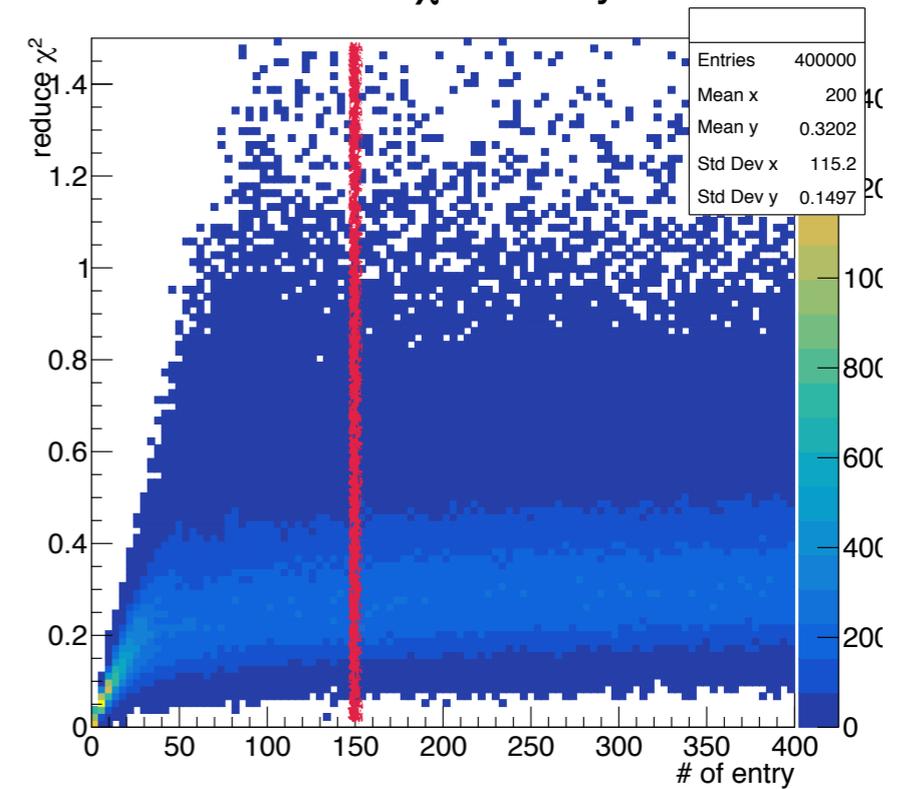


same random seed  
set mean : 0  
set width : 4

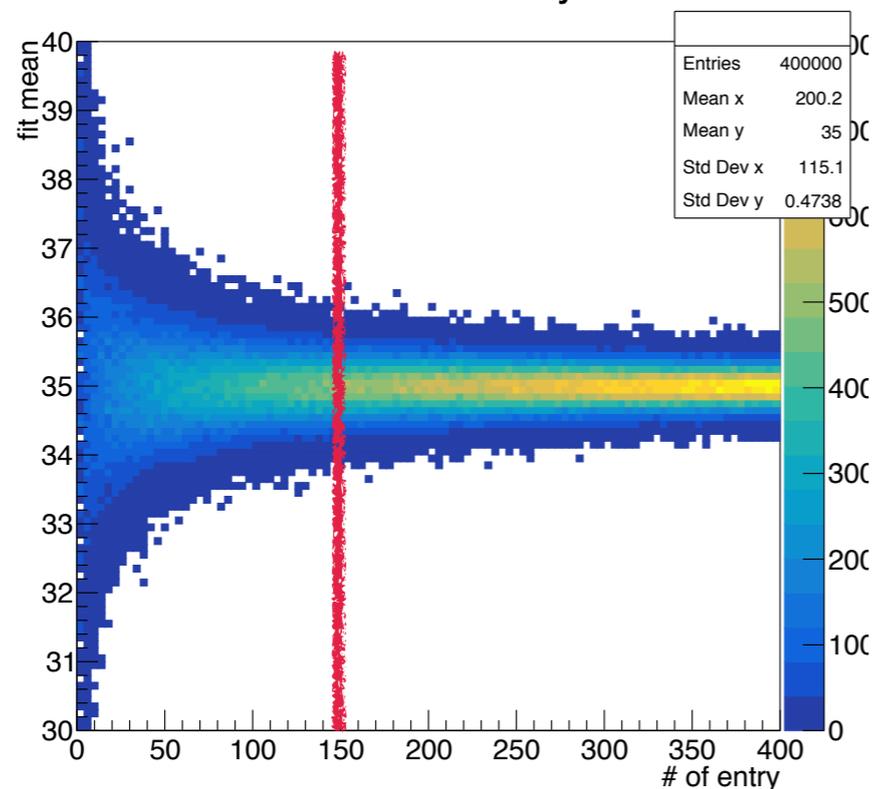
```
for (int i=0; i<number_of_entry; i++)  
{  
  for (int i2=0; i2<1000; i2++)  
  {  
    for (int i1=0; i1<i+1; i1++)  
    {  
      //rand->SetSeed(i1*2);  
      rGaus1 = double(rand -> Gaus(35, 4));  
      gaus_1D->Fill(rGaus1);  
    }  
  }  
}
```

ideal gaussian

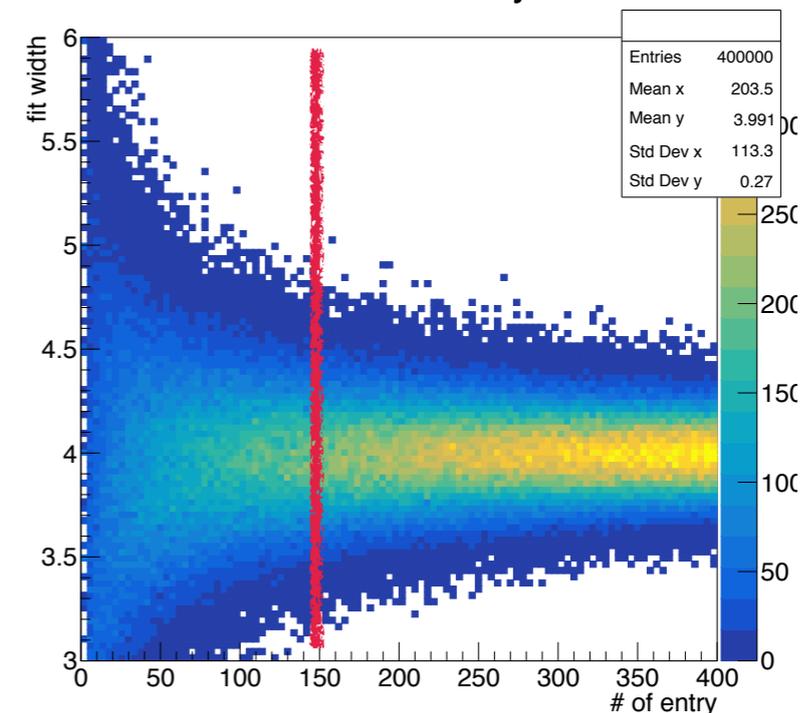
reduce  $\chi^2$  vs entry



fit mean vs entry



fit width vs entry



# Cut value finder



The cut value is defined by the majority of distribution

```
////////////////////////////////////  
//////// cut finding result //////////  
//////// 5-sigma cut //////////  
////////////////////////////////////  
1. offseted width      : 2.29972 to 3.94959  
2. entry               : 265.11 to 376.583  
3. entry ampl cut     : 170 to 200 (P.S. No fitting)  
4. mean adc 0         : 30.076 to 41.1099  
5. threshold position : 26.2654 to 37.9863  
6. width rchi2 p-value: 5-sigma -> 0.0000006 (P.S. No fitting)  
7. slope rchi2 p-value: 5-sigma -> 0.0000006 (P.S. No fitting)  
8. slope value correct: 5.44815 to 8.4377  
9. offseted width 02  : 2.03665 to 4.56993  
10.offseted width 13  : 2.04647 to 4.5427  
  
/////slope correct/////  
Fit : chip 1 ~ 13, Y = 0.022 X + 0.040  
Fit : chip 14~ 26, Y = 0.023 X + 0.103
```

Width is too narrow

# Ladder summary (4 ladders)



# of bad channels of each ladder

Criteria	A	B	C
02-0028	77	61	44
02-0046	1	1	1
02-0049	0	0	0
02-0052	0	0	0

A : 9 cuts, offset width : all events

B : 9 cuts, offset width :  $adc0 + adc2$

C : 9 cuts, offset width :  $adc1 + adc3$

# Summary



- Channel classification :
  - Threshold study (error function) & slope value are considered as criteria now.
  - The width becomes wider if only 2 ADC distributions are considered.
  - 9 criteria are being used now.
- To do :
  - Assemble 10 more ladders before 9/15. (4/10)
  - Ship 1 ladder to NWU.
  - Producing acrylic LTB

# Back up



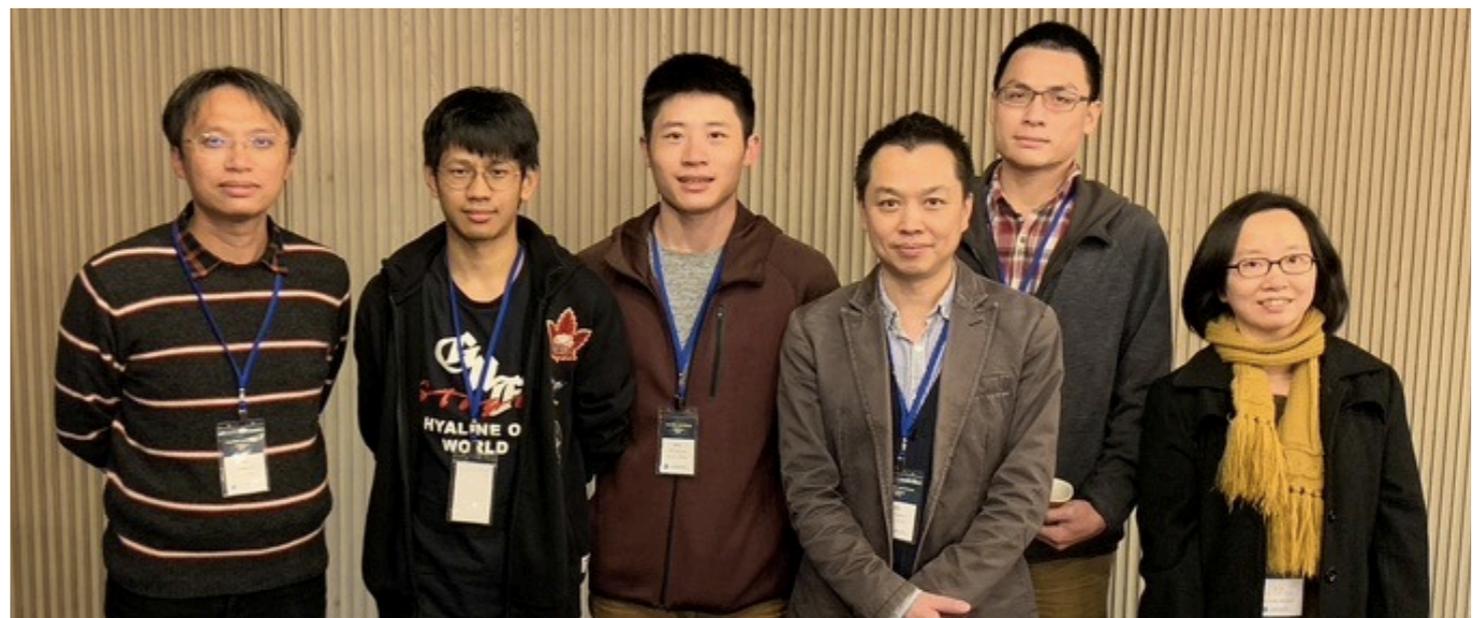
# Taiwan INTT team



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Jenny Huang