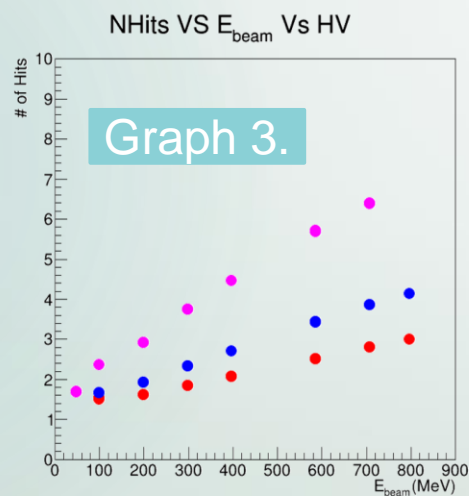
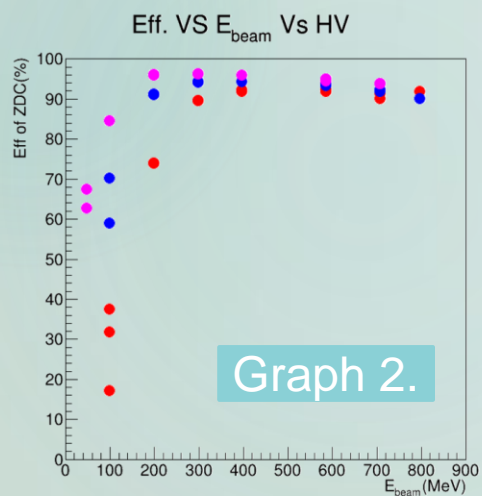
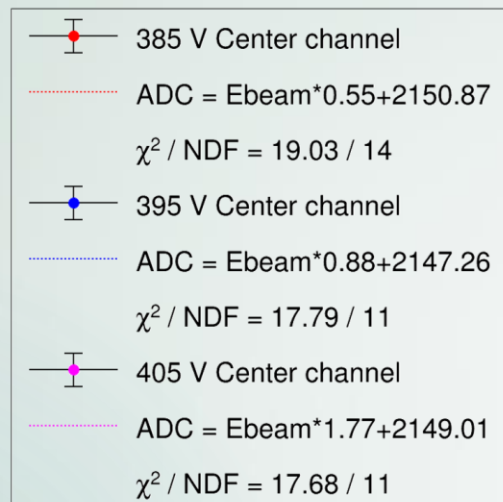
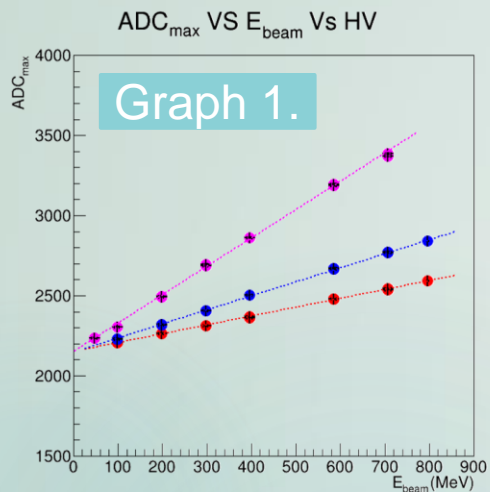


# Weekly meeting

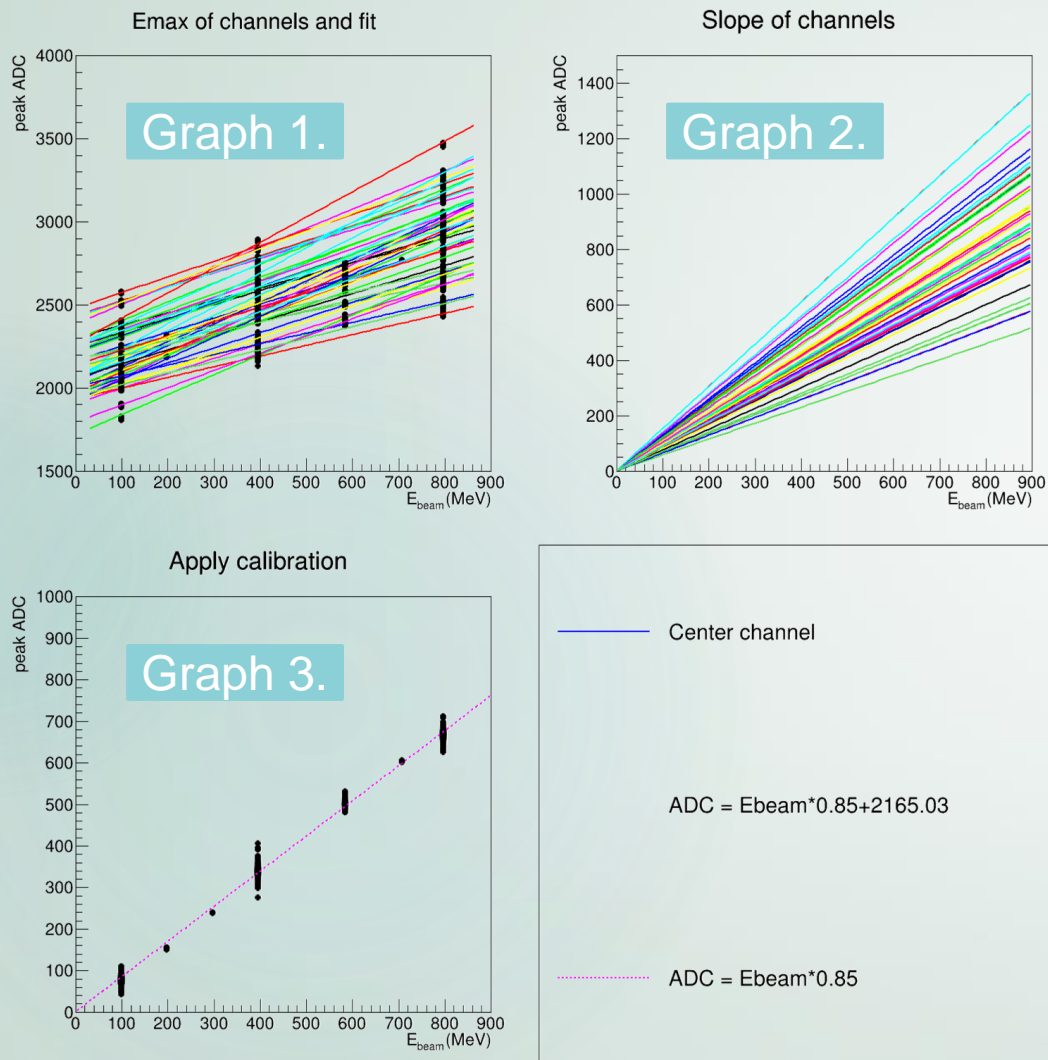
YU-SIANG XIAO (蕭宇翔)

# Beam test HV setting of LYSO



- The final set we use to do the beam test is : **HV = 395 V**
- The graphs show ZDC performance under difference HV setting:
  - 1. The fitting of peak channel ADC VS E<sub>beam</sub>.
  - 2. The efficiency VS E<sub>beam</sub>.
  - 3. The average NHits (number of hit) of ZDC VS E<sub>beam</sub>.
- The result seems that the MeV to ADC performance of LYSO+APD is fit to the linear function.
- The higher voltage with the higher Eff and number of hit(loss less signal).
  - PS: I remove some run with higher percentage error and the threshold have a large difference with the subsequent test.

# The ADC calibration of channels



- Choose channel 35 to be center of detector.
- Calibrate the other channel by the coefficient of fitting result and the result of center channel.
- Graph shows the process of calibration:
  - 1. All peak channel VS  $E_{\text{beam}}$  and the fitting result.
  - 2. Remove the intercept of fitting results.
  - 3. Scale the slope to make MeV VS ADC of the all channel to be same.
  - The math part:
    - Fitting of center channel:  $\text{ADC} = E_{\text{beam}} * A_c + B_c$
    - Fitting of  $\text{Ch}_i$ :  $\text{ADC} = E_{\text{beam}} * A_i + B_i$
    - The calibration ADC of  $\text{Ch}_i$ :  $A_c(\text{ADC} - B_i) / A_i$
- The distribution of channels is better after calibration.

# Process of calibration-1

- All  $ADC_{max}$  come from the position scan.
- For example: Run 425 scan for channel 42, I take the matching result of detector arrays. And I select the  $E_{max}$  channel to be 42. Draw the ADC and fit and calibration

All detector need to fire in same time

Tree  
Trigger 2  
X&Y

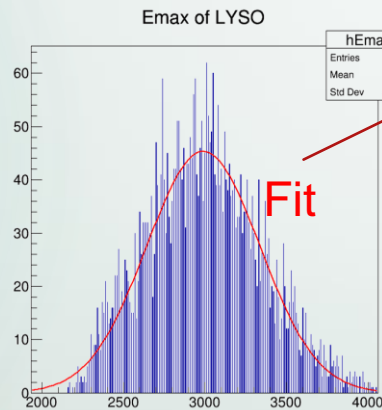
Tree  
Trigger 1  
X&Y

Tree  
LYSO

Draw  $ADC_{max}$  &  $ADC_{max}$  come from Ch42

Run 425 for Ch 42

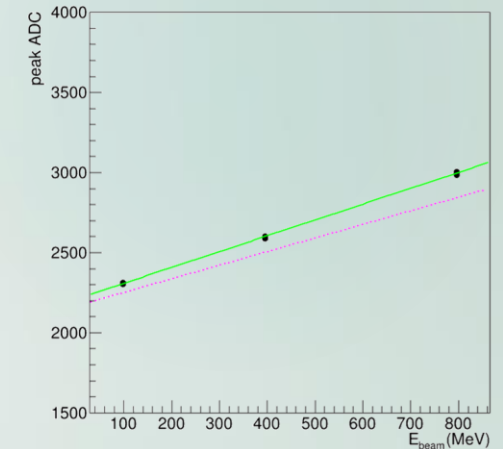
Position scan Table



RunID	Energy
425	784.07 -3.1
426	796.3.8395
427	796.3.8359
428	796.3.8412
429	796.3.8420
430	796.3.8382
431	796.3.8538
432	796.3.8345
433	796.3.8450
434	796.3.8428
435	796.3.8418
436	796.3.8421
437	395.2.4847
438	395.2.4849
439	395.2.4894
440	395.2.4891
441	395.2.4948
442	395.2.4934
443	395.2.4879
444	395.2.4769
445	395.2.4870
446	395.2.4913
447	395.2.4860
448	395.2.4801
449	98 -1.5718
450	98 -1.5693
451	98 -1.5728
452	98 -1.5647
453	98 -1.5706
454	98 -1.5723
455	98 -1.5672
456	98 -1.5717
457	98 -1.5705
458	98 -1.5693
459	98 -1.5755
460	98 -1.5662

Draw  $ADC_{max}$  of all run together VS  $E_{beam}$

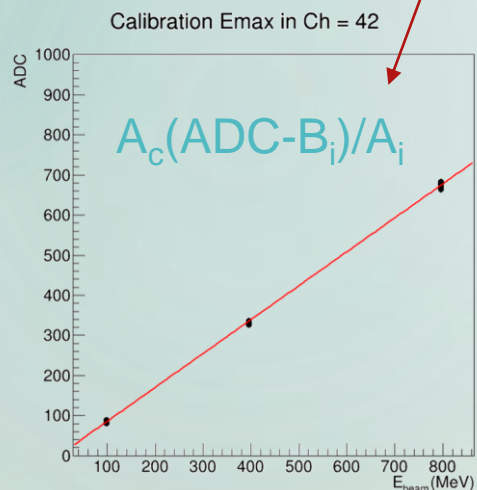
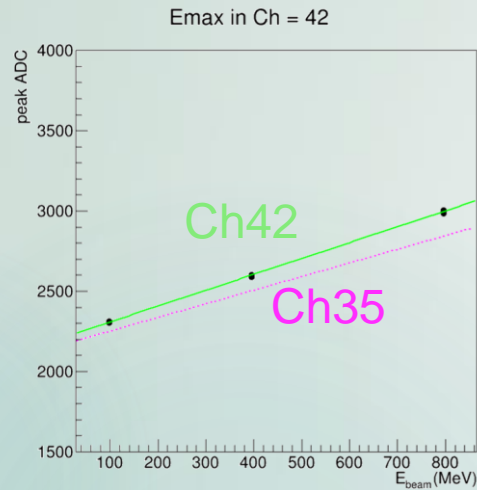
Emax in Ch = 42



# Process of calibration-2

5

Draw  $ADC_{max}$  of all run together VS  $E_{beam}$



Yu-Siang Xiao (NCUHEP, Taiwan)

- Because we know that the beam is wider than 1 channel. Thus, we could also use Ch37 data to calibrate the Ch38.
- In the final, I extend the calibration result into 7x7 range (we only scan 5x5).

Do all case of position scan



5x5 scan

Extend to 7x7

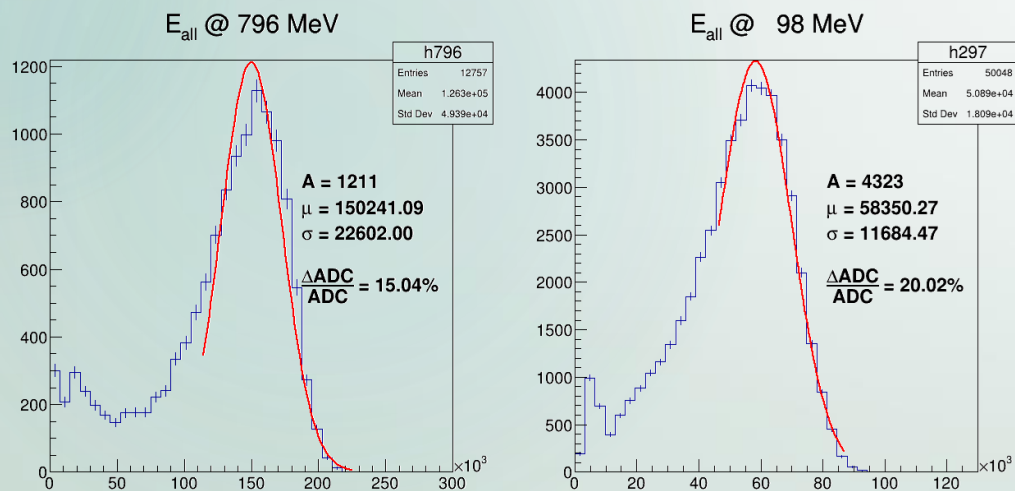
- Draw the comparison of all channels



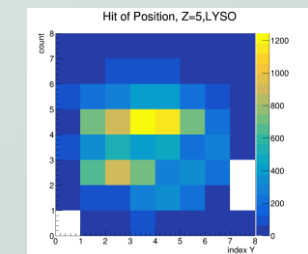
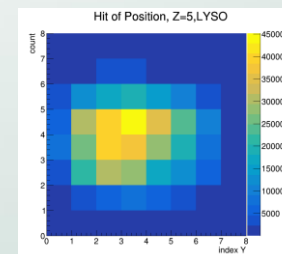
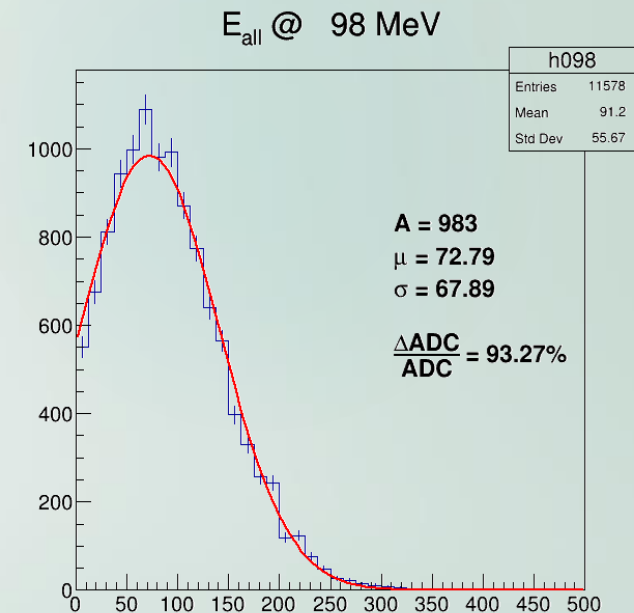
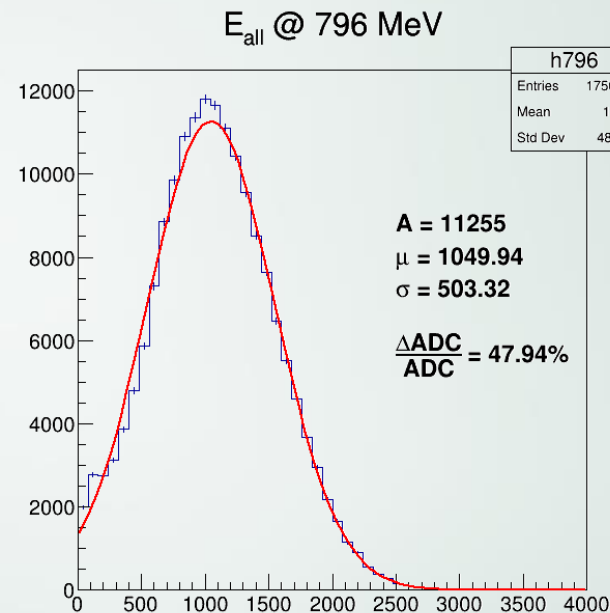


# The ADC sum after calibration(LYSO)

- After do the calibration of channels, we can calculate the better ADC sum.
- Because all hit in the matched event almost in range of 5x5, I sum up them together temporary for faster check.
- The resolution is bad, now.
- In the future:
  - I will select by the tracking result after calibration of ADC to reweight.
  - And make the sum of ADC precisely.
- By the way... PWO in same method...it pass...



Yu-Siang Xiao (NCUHEP, Taiwan)





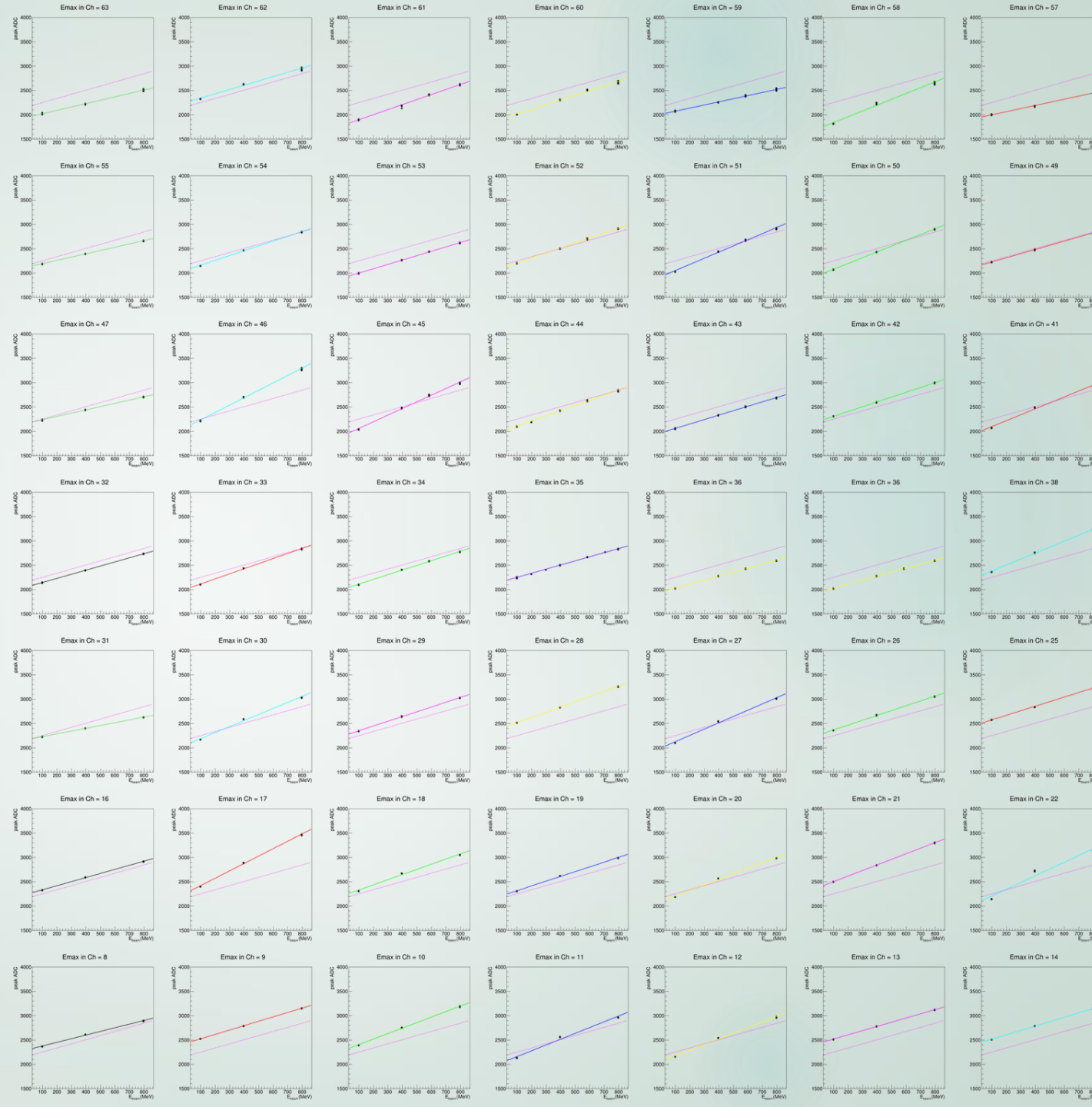
End



# Backup

# Before calibration

➤ 1



10

# Calibration result

➤ 1

