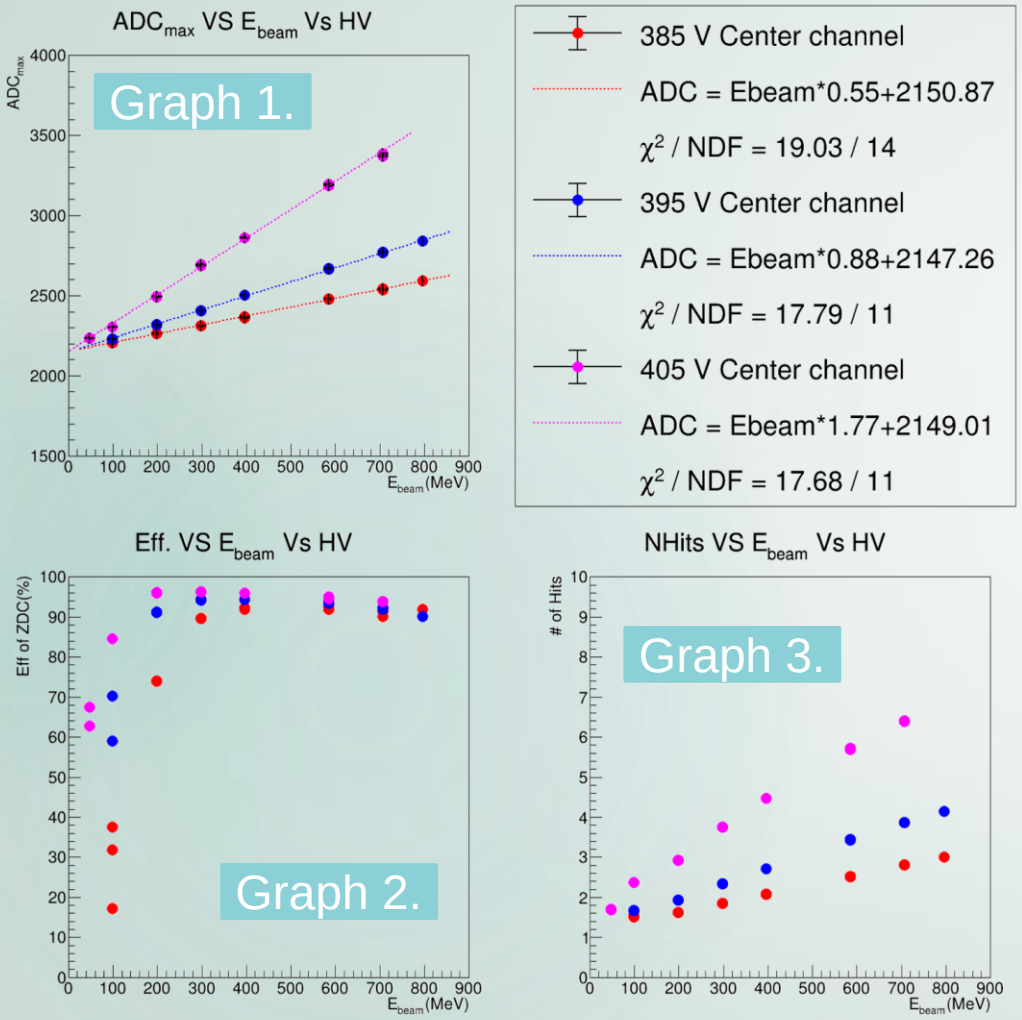
Weekly meeting

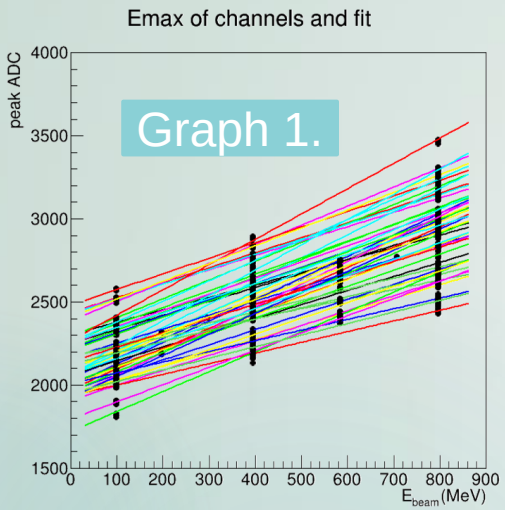
YU-SIANG XIAO (蕭宇翔)

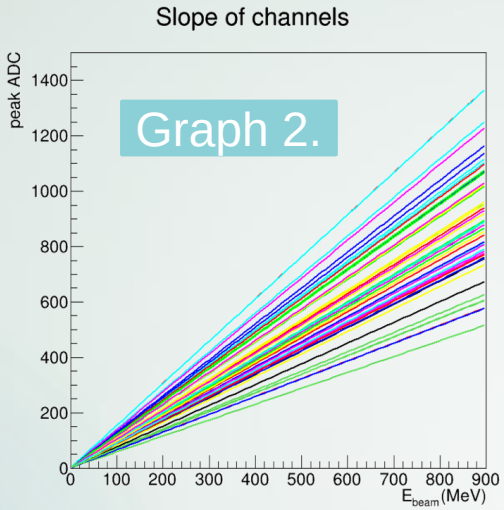
Beam test HV setting of LYSO

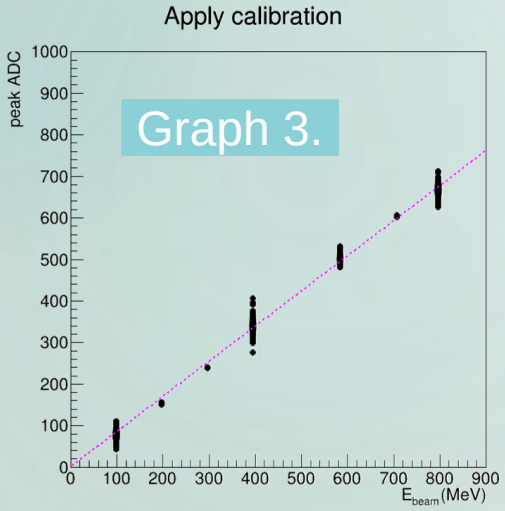


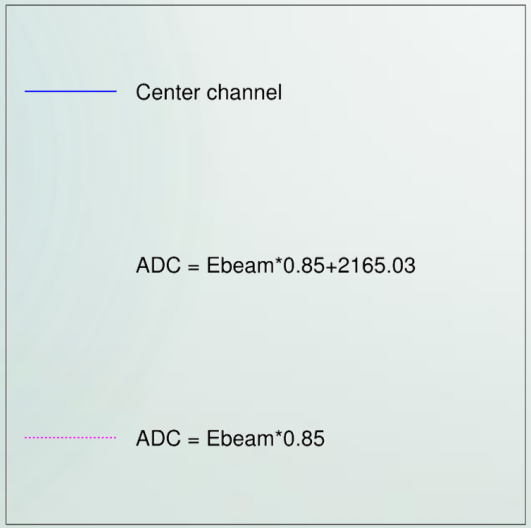
- The final set we use to do the beam test is : HV = 395 V
- The graphs show ZDC performance under difference HV setting:
  - 1. The fitting of peak channel ADC VS E_{beam}.
  - 2. The efficiency VS E_{beam}.
  - 3. The average NHits (number of hit) of ZDC VS E_{beam}.
- The result seems that the MeV 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





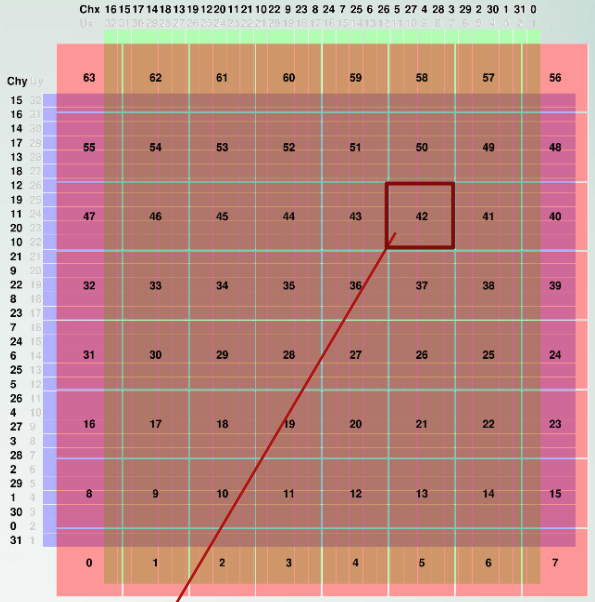




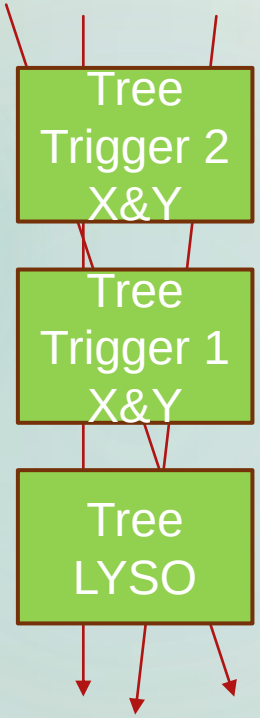
- Choose channel 35 to be center of detector.
- Calibrate the other channel by the coefficient of fitting result and the result of center channel.
- Graph shows the process of calibration:
  - 1. All peak channel VS E_{beam} and the fitting result.
  - 2. Remove the intercept of fitting results.
  -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

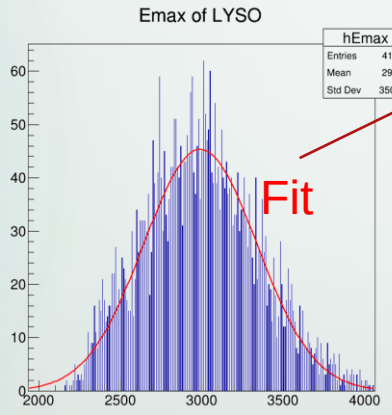


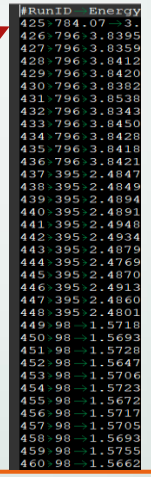
All detector need to fire in same time



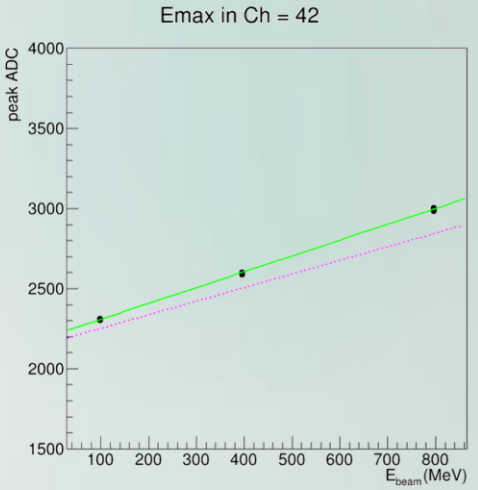
Draw ADC_{max} & ADC max come from Ch42

Run 425 for Ch 42 | Position scan Table



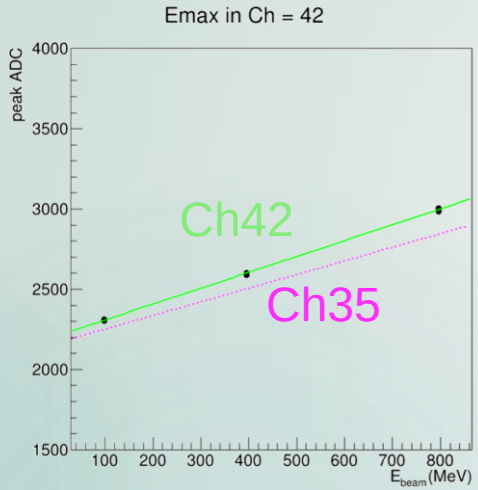


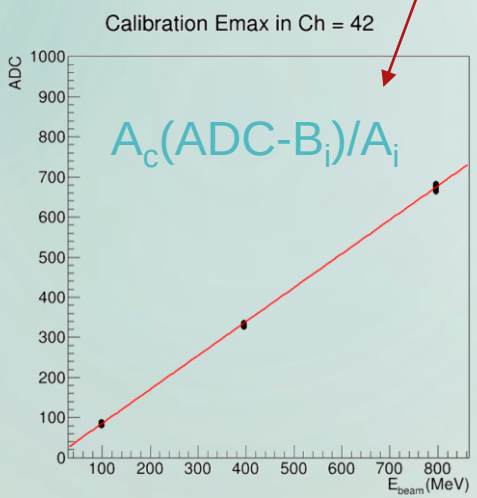
Draw ADC_{max} of all run together VS E_{beam}



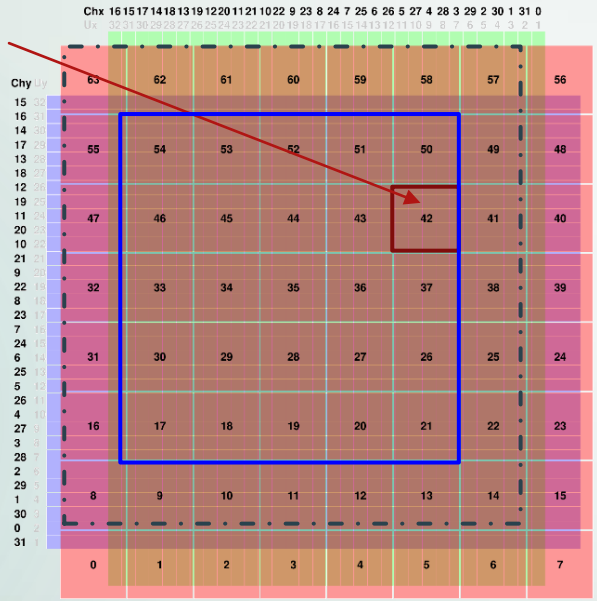
Process of calibration-2

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





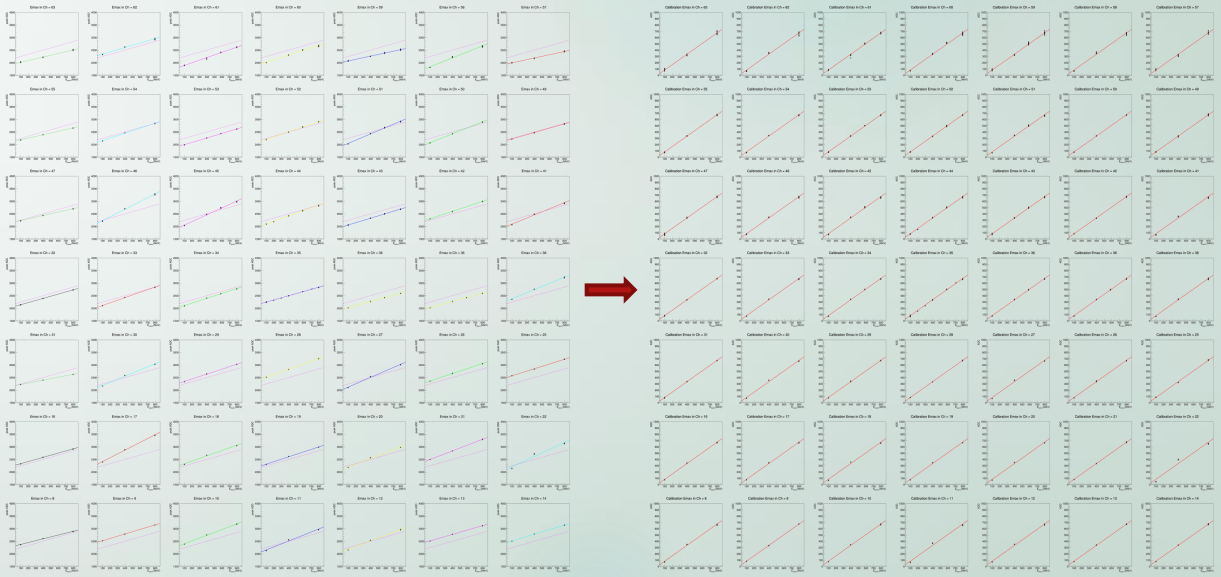
Do all case of position scan



- 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).

5x5 scan → Extend to 7x7

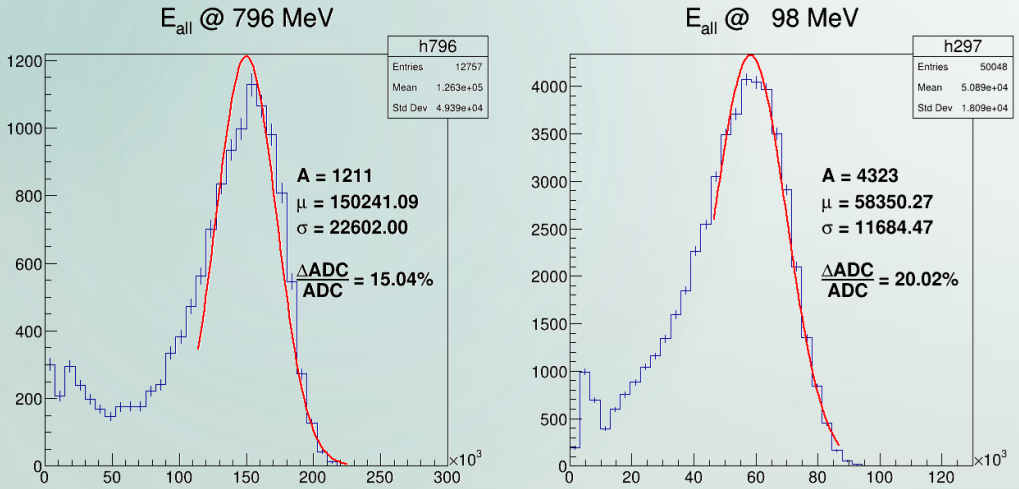
- Draw the comparison of all channels

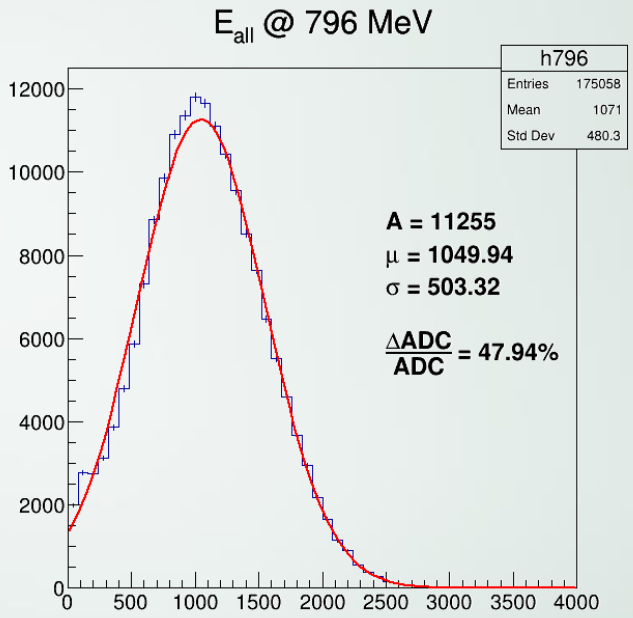


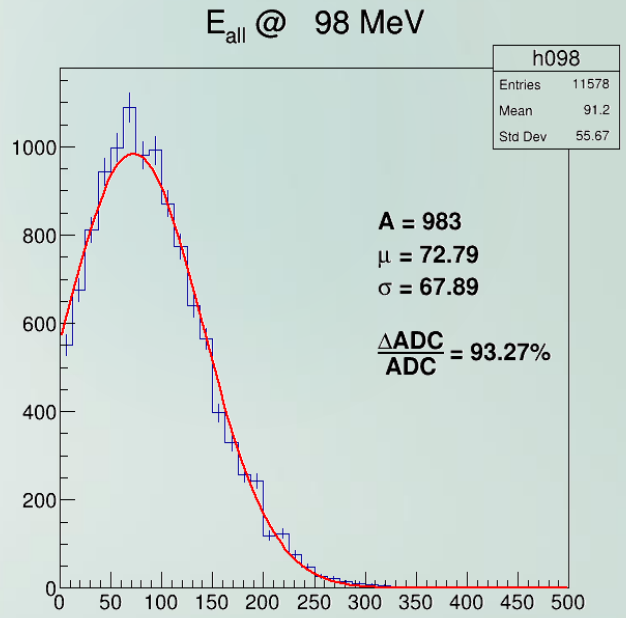
The ADC sum after calibration(LYSO)

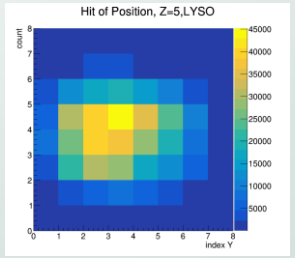
- After do the calibration of channels, we can calculate the better ADC sum.
- Because all hit in the matched event almost in range of 5x5, I sum up them together temporary for faster check.
- The resolution is bad, now.

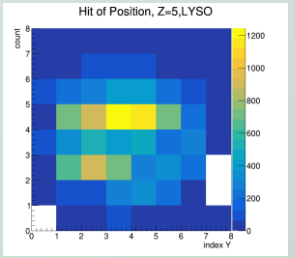
- In the future:
  - I will select by the tracking result after calibration of ADC to reweight.
  - And make the sum of ADC precisely.
- By the way… PWO in same method…it pass…









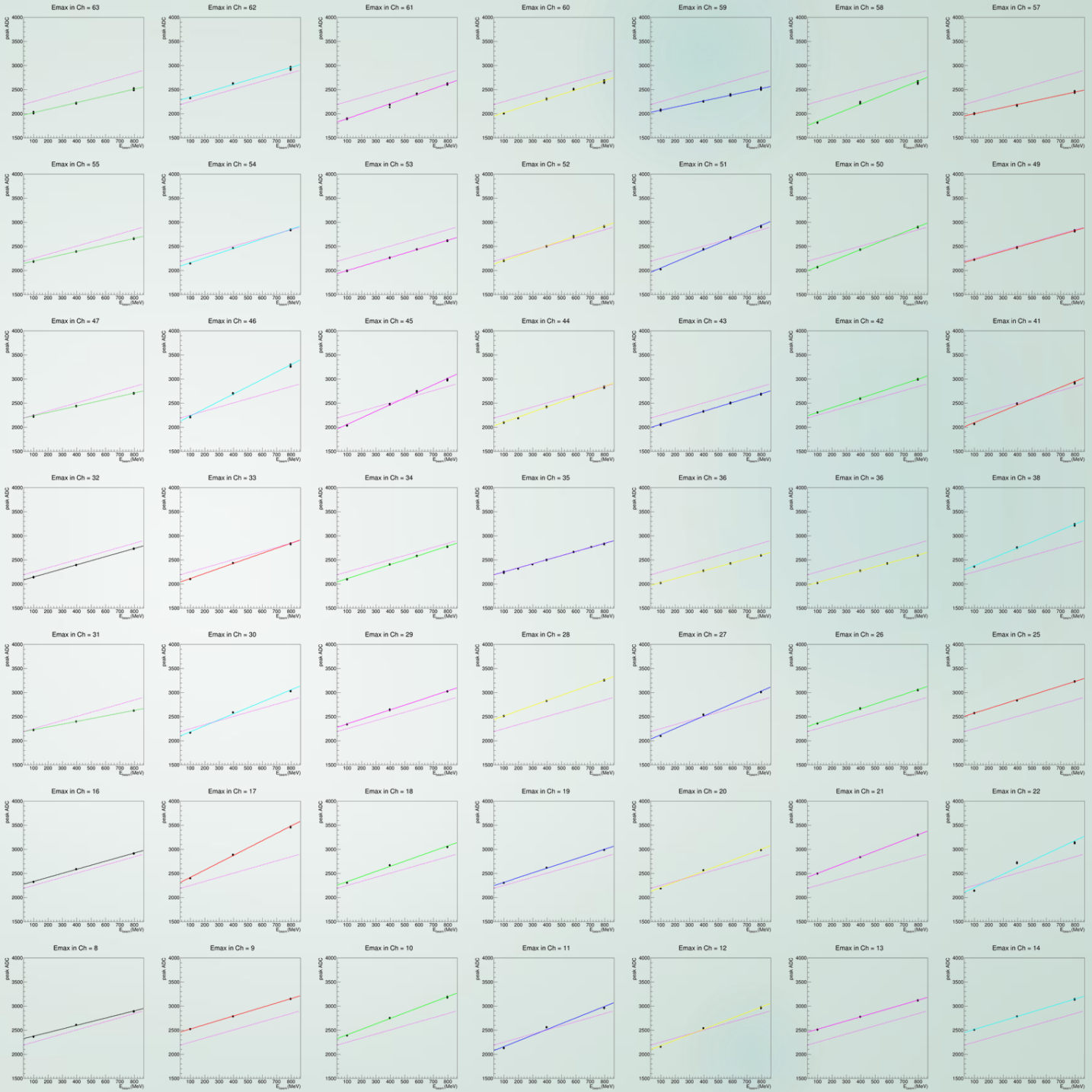


End

Backup

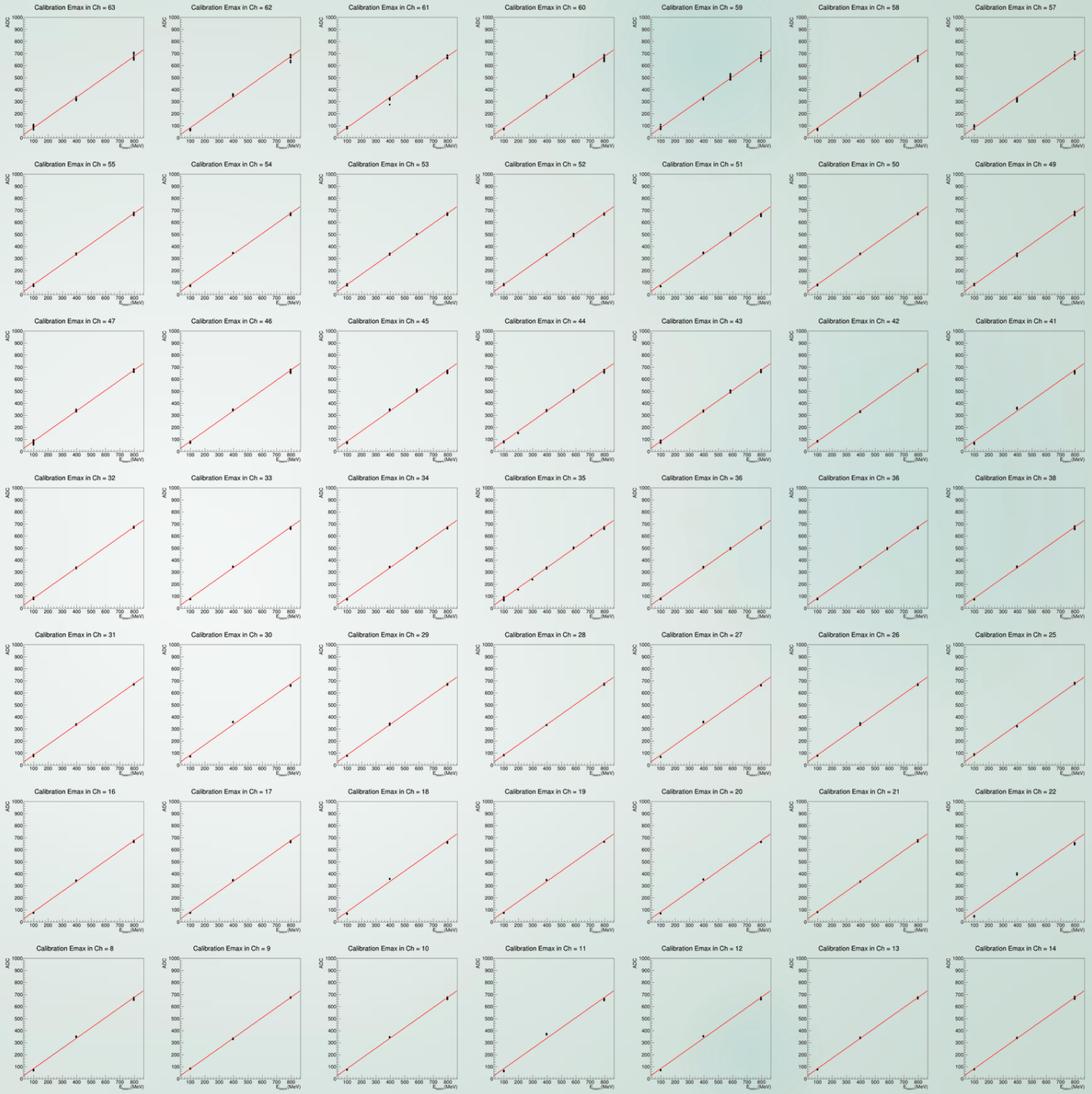
Before calibration

- 1



Calibration result

- 1



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