RARIS test beam application

ePIC-ZDC test beam meeting

2024.7.9 (Tue)

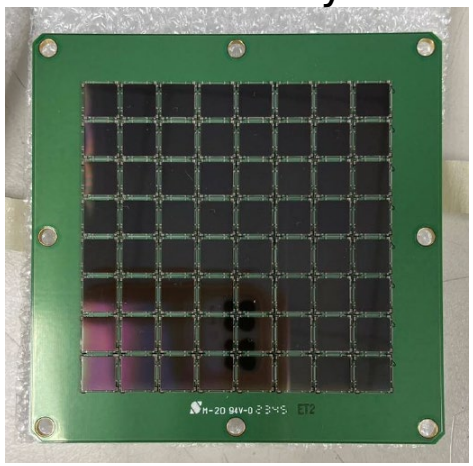
Yuji Goto (RIKEN)

2024.2 test beam

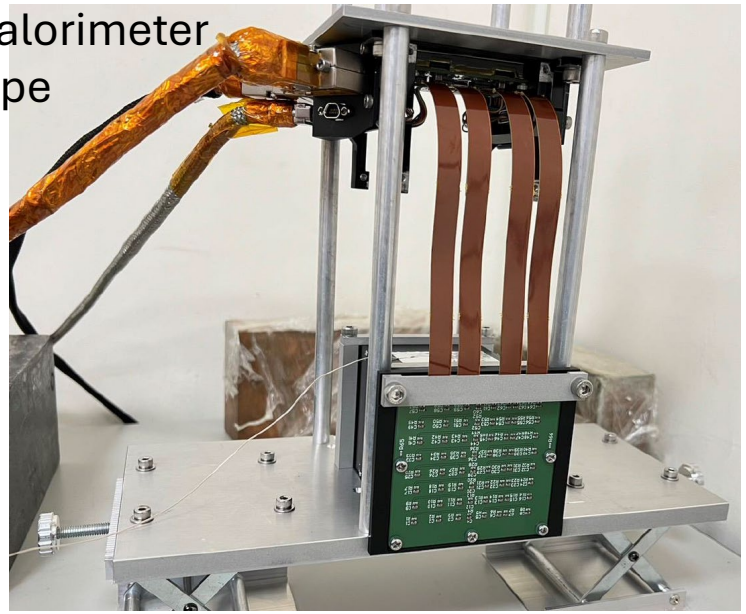
- LYSO crystal calorimeter prototype test
  - Built by Taiwan group
    - Tower: 7.12 mm x 7.12 mm x 88.3 mm (8 X0)
    - 8 x 8 array: 56.96 mm x 56.96 mm x 88.3 mm
    - Each tower readout with by one SiPM
  - 2024.2.19 – 2.21 (36 hours)
  - Only self trigger available in the DAQ system
    - No combination with other detector

8 x 8 LYSO crystal array

8 x 8 SiPM array



LYSO calorimeter prototype



2024.2 test beam

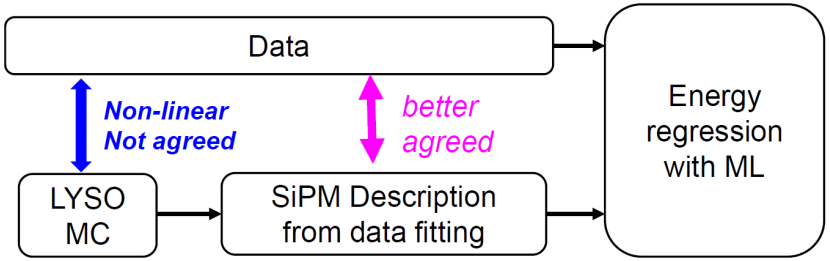
- 50 MeV – 800 MeV positron beam
  - HV scan of SiPM
  - Background measurement
  - Gain adjustment of each tower
  - Energy dependence, nonlinearity
  - Energy resolution
  - Position dependence, nonuniformity, shower map
  - Angle dependence, injection from backside
  - Absorber + LYSO prototype configuration
- Data analysis underway
  - Simulation calculations being performed
  - Data being compared with these calculations to advance understanding of the data

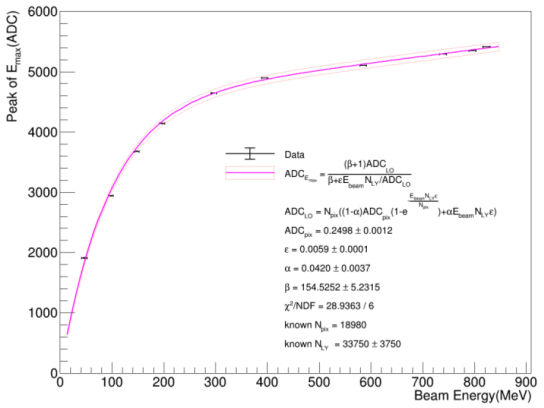
2024.2 data analysis

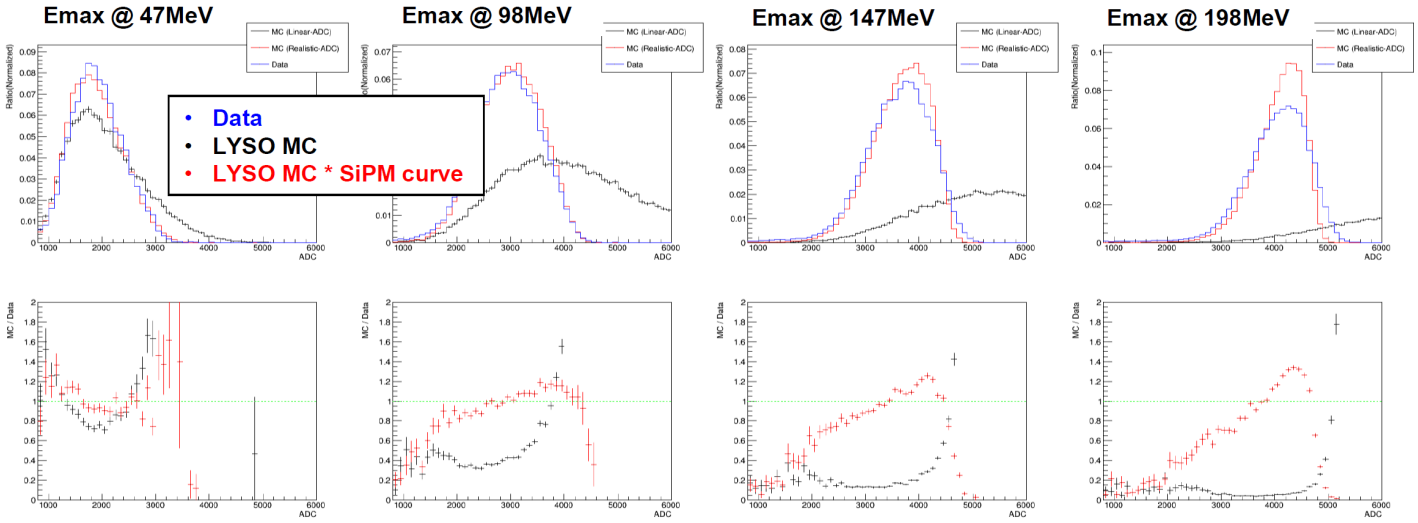
- Data vs simulation

Slide by Chia-Yu Hsieh

Review

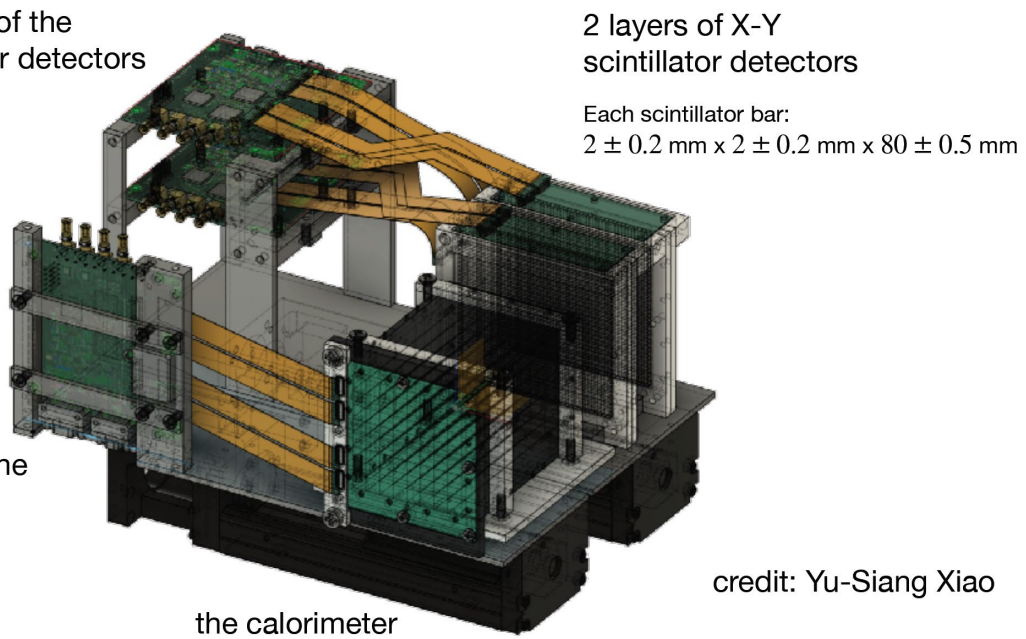






2024 fall/winter test beam

- New LYSO calorimeter + PWO calorimeter
  - LYSO crystal with APD
  - PWO crystal with SiPM / APD
  - Beam hodoscope with trigger signal output
    - To combine other detectors (independent DAQ system with common event number)



2024 fall/winter test beam

- New DAQ system to combine other detectors
  - Beam hodoscope with trigger signal output
  - Shower leakage measurement
    - ALICE-FoCal-E pad detector
    - Evaluation as an integrated system
- Temperature measurement
  - Comparison of LYSO and PWO
- Remote-control movable table?
- Other new items?
- Measurement menu?
  - Beam time estimation
- Test beam time in 2024 November preferred
  - Nov. 16 – 22 period (or Nov. 4 – 8)