

*RARiS test beam
2025/2/17-20*

RBRC exp group meeting

2025/1/17

Yuji Goto (RIKEN)

Test schedule

- Beam time
 - 2025/2/17–20
 - 12 hours during the day x 4 days
 - 2/14 start of preparation
 - 2/20–21 cleanup
- GeV- γ irradiation room
 - 50 MeV – 800 MeV positron beam
- Purpose of the test
 - Test prototype LYSO & PWO crystal calorimeters for use in ePIC-ZDC
 - Measure and evaluate basic performance such as light yield and gain, and performance such as energy resolution, position dependence, and angular dependence
 - Evaluation of backward EM shower leakage and position measurement combined with several layers of W-Si (ALICE-FoCal) calorimeter
 - Parasitic test of W-Si (ALICE-FoCal) calorimeter

Participants

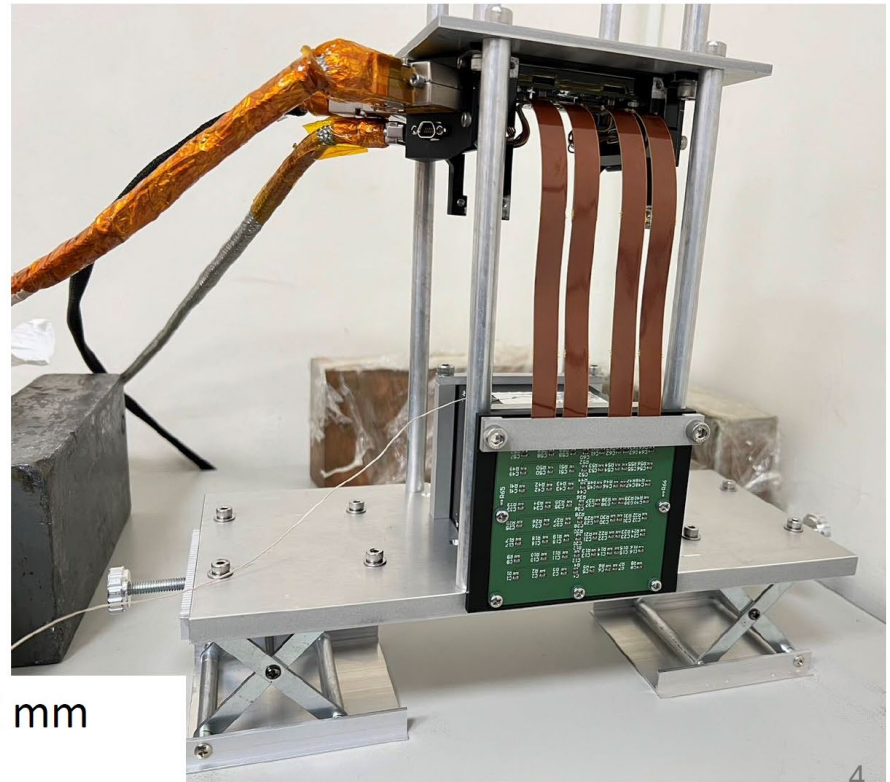
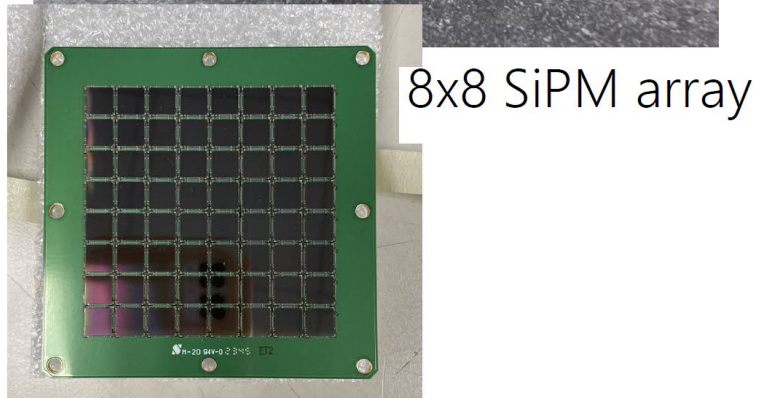
- Taiwan group
 - National Central Univ.
 - Chia-Ming Kuo, Po-Ju Lin
 - Yu-Siang Xiao, Chia Sheng Chu, Shao-Yang Lu
 - Academia Sinica
 - Kei-Yu Cheng, Chia-Yu Hsieh
 - 2/13-22 in Japan
- Japan group
 - RIKEN
 - Yuji Goto (2/14-21)
 - Univ. of Tsukuba
 - Tatsuya Chujo + students
 - Tsukuba Univ. of Technology
 - Motoi Inaba, Shingo Sakai
 - Shinshu Univ.
 - Kentaro Kawade + student
 - Nihon Univ.
 - Toshi-Aki Shibata

Previous test beam

- 2024/2/19–21 (12 hours x 3)
- 1st prototype LYSO crystal calorimeter test
 - Produced by Taiwan group, SiPM readout
 - Self-trigger DAQ 64 channels, standalone system



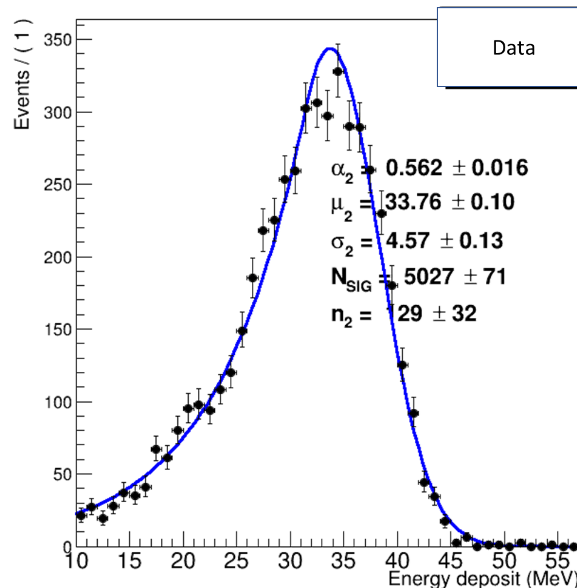
LYSO calorimeter
prototype



One crystal: 7.12 mm x 7.12 mm x 88.3 mm
8x8 array: 56.96 mm x 56.96 mm

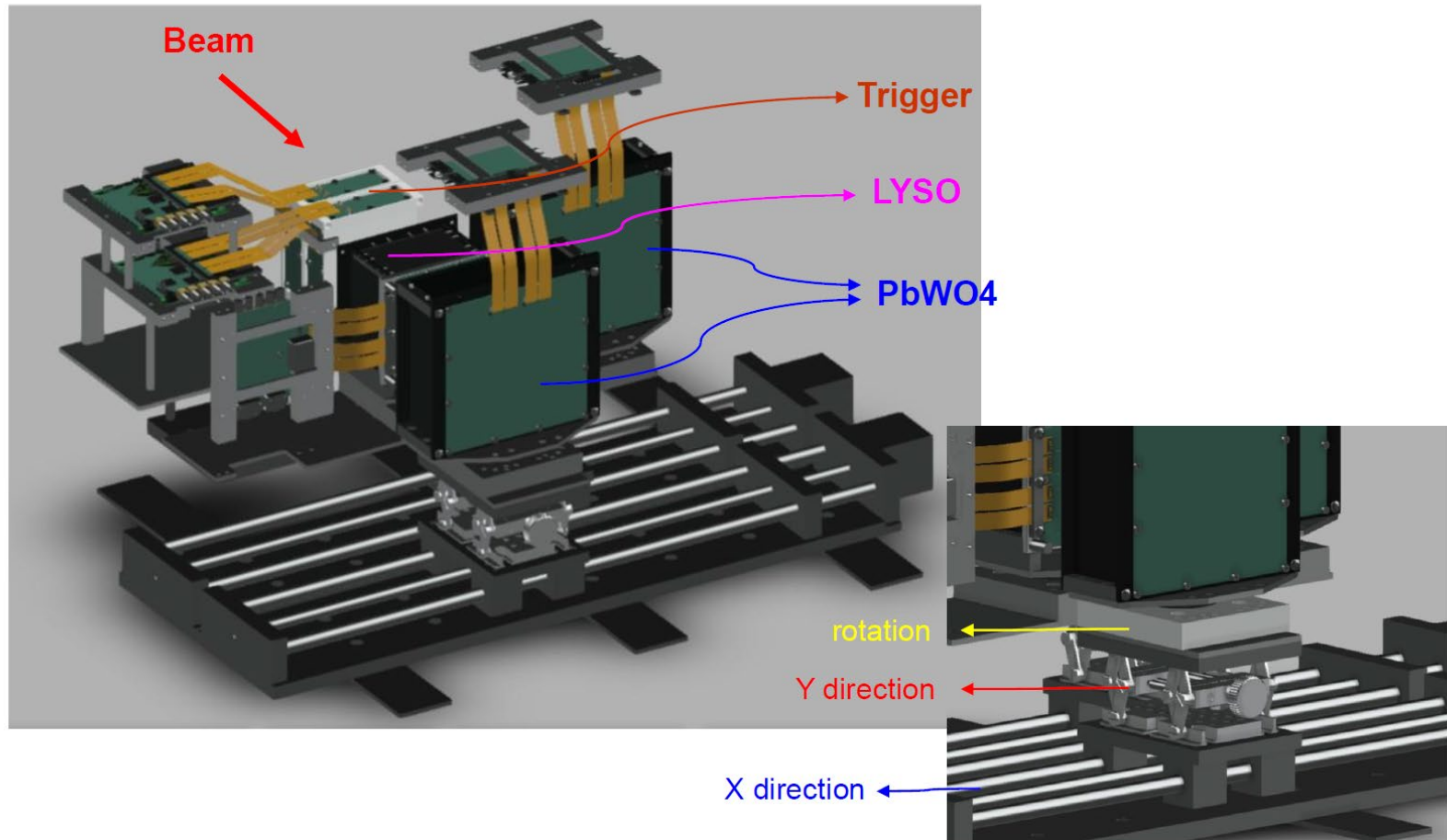
Previous test beam

- 1st prototype LYSO crystal calorimeter test
 - SiPM saturated
 - Crystal ball fitting of energy sum of 5x5 crystals for 47MeV data
 - 33.8 MeV mean, 4.6 MeV sigma → 13% resolution
 - Evaluation still requires considerations such as understanding test data up to high energies, readout methods, physics event simulation, etc.



2nd prototype

2nd ZDC EMCal Prototype



2nd prototype

- LYSO crystal
 - 1cm x 1cm x 6.6cm, 8x8 array
 - APD readout
- PWO crystal
 - 2cm x 2cm x 5.3cm, 6x6 array
 - SIPM & APD readout
- Trigger hodoscope
 - 2mm x 2mm x 8cm
 - (32 ch in X & 32 ch in Y) x 2
 - Trigger signal output for combined analysis with W-Si layers with independent DAQ system

Backup Slides

RARiS user preparation

- Every RARiS user is required to submit the following two forms
 - User registration
 - Register before the date of the visit, only once during the fiscal year
 - <https://forms.gle/2dnSp4uhwArR7N4W7>
 - Registration of the date of visit
 - Registration for each visit
 - <https://forms.gle/7gP1xenRUMoWNfnK8>
 - Contact person for our experiment: Miyabe-san
- All users are required to take:
 - E-learning training (40 minutes video)
 - For e-learning training, after the user registration, you will receive an email with instructions on how to take the training
 - Onsite training (15 minutes)
 - In addition to the above education, foreign users will be required to watch a 15-minute DVD on the Japanese RI Law at the site
 - If we work on weekend 2/15-16 it would be preferable to have the training on 2/14, or we can have it specially arranged on the weekend
- RARiS will provide personal dosimeters to those who come from abroad, since there are differences in policies regarding radiation exposure control in different countries
 - They may also bring their own if their organization's policy requires them to do so