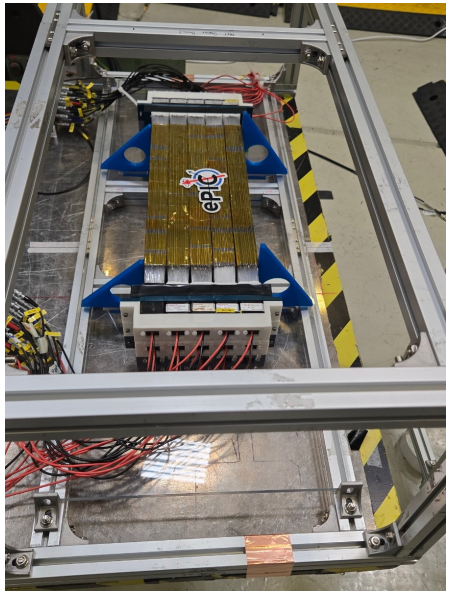
T10 Main:
EIC BARREL ECAL (Week 32)

8th/Aug/24 PS/SPS User Meeting

Jeongsu Bok (Pusan National University)

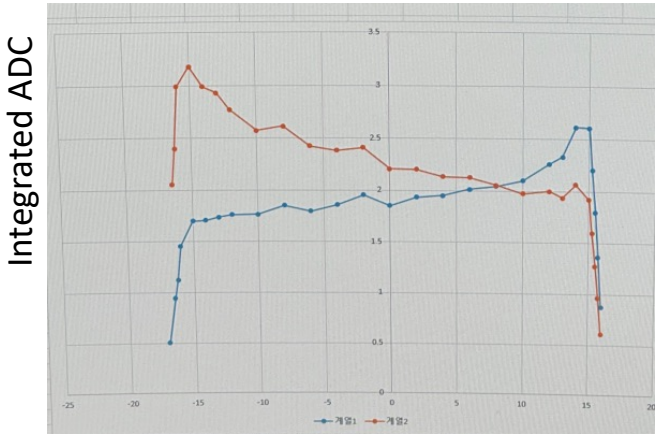
Status: Setup



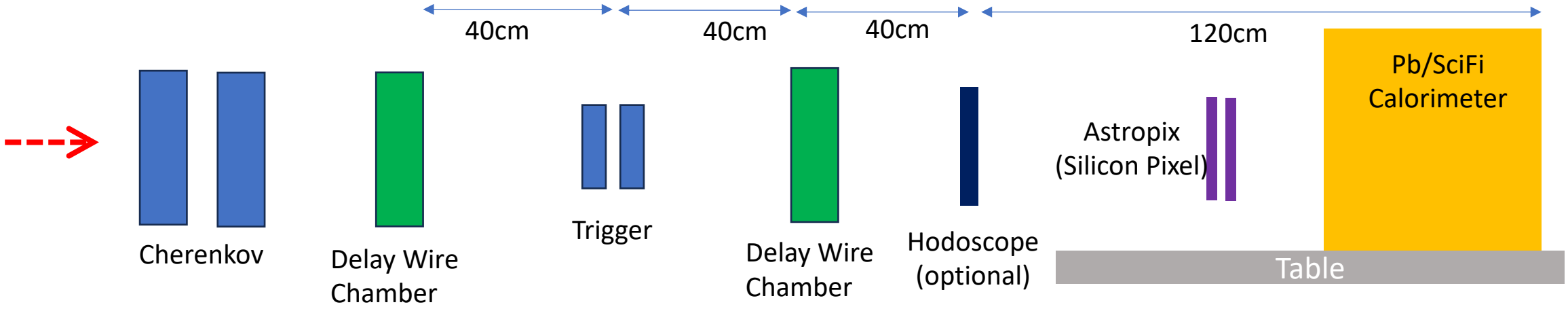
- Yesterday. DWC is being setup

Status: Program

- ✅Calibration study for prototype modules
  - ✅ Equalization of calorimeter modules using muon beam
  - ✅ Tuning HV for each module to get similar response
- Energy resolution and linearity study using electron beam 0.5~5GeV
  - Tilt the calorimeter to study various effect for more shower containment
  - Beam on the side of calorimeter to study edge effect (e.g. effect of shower leacakge on PMT) and effect on timing.
  - Response from pion beam
- Study of different geometry (4x4) including a module with SiPM
- Study of Astropix Silicon pixel.
  - Energy deposit and dE/dx for various energy.



Backup: Detector Configration

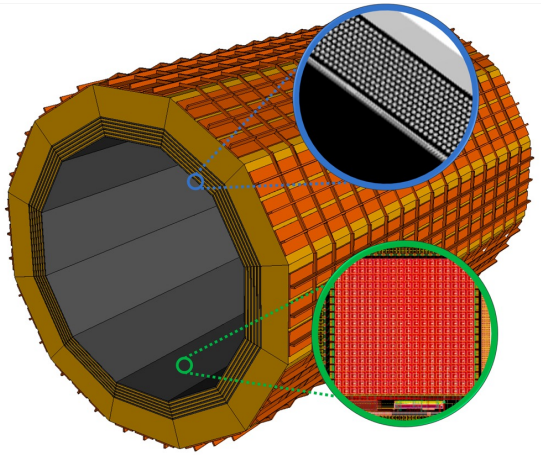


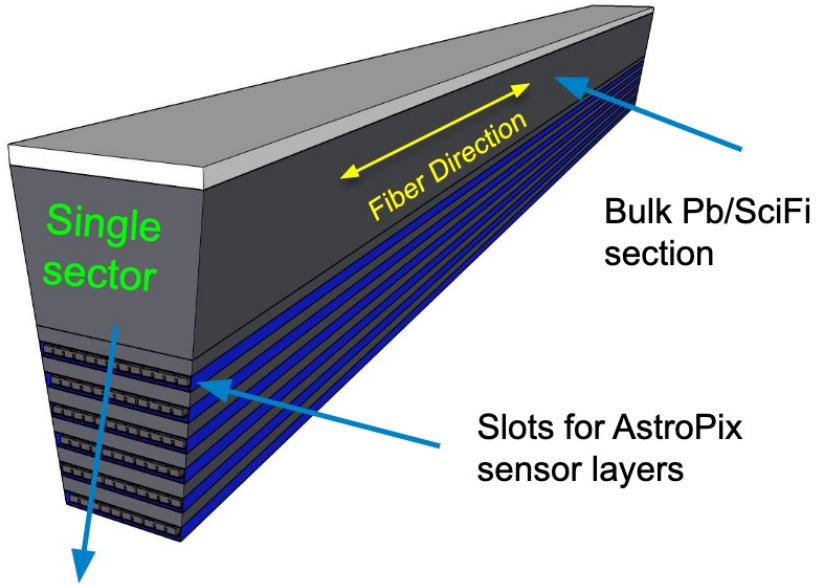
- Auxiliary Detectors from us:
  - Trigger: ((finger) Scintillator + PMT) x2
  - Optional: SciFi Hodoscope: (1.6x1.6cm active area, 15x15cm size)
- Auxiliary detector request:
  - 2 Cherenkov Counters + 2 Delay Wire Chambers
- Setup: Pb/SciFi only → + AstroPix → + Hodoscope(optional)
- Table over 80cm is better to put AstroPix board and Pb/SciFi together
- DAQ, power supply will be installed in the side of detectors

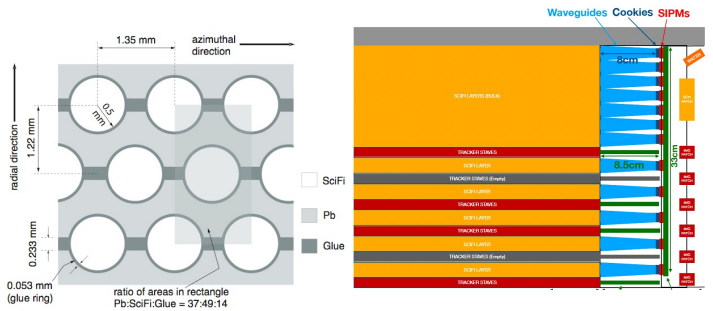
DAQ from Dual Readout Calorimeter team

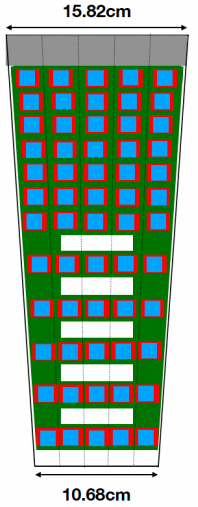
Example of other team

Backup: Introduction of EIC Barrel Electomagnetic Calorimeter





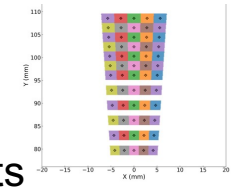




Pb/SciFi Layer

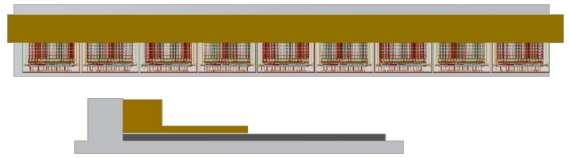
- 2-sided SiPM readout
- Lightguides on sector sides
- Measure energy

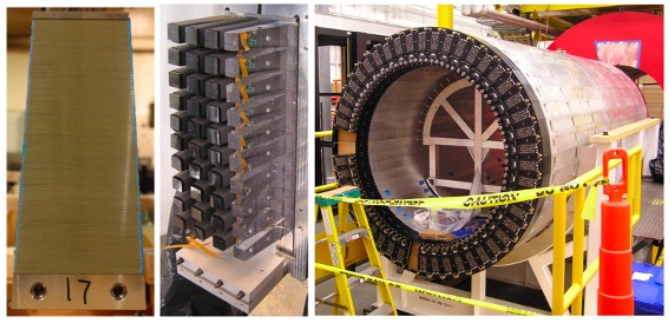
- Length: 432.5 cm
- Radius: ~ 80 cm radius
- Structure: 48 sectors
- $-1.71 < \eta < 1.31$
- EIC Barrel Ecal Requirements
  - Detection of electrons/photons to measure energy and position
  - Require moderate energy resolution $(7 - 10)\%/\sqrt{E} \oplus (1 - 3)\%$
  - Require electron-pion separation up to 10^4 at low momenta in combination with other detectors
  - Discriminate between π^0 decays and single γ up to ~10 GeV
  - Low energy photon reconstruction ~100 MeV



Imaging Layer (Silicon Pixel)

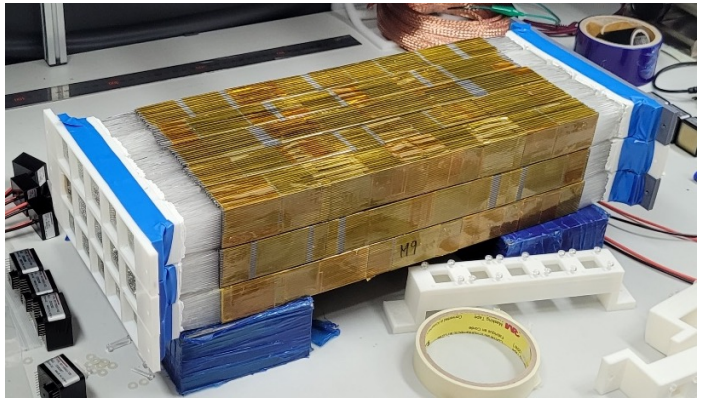
- AstroPix tracking layers to capture 3D image of shower development



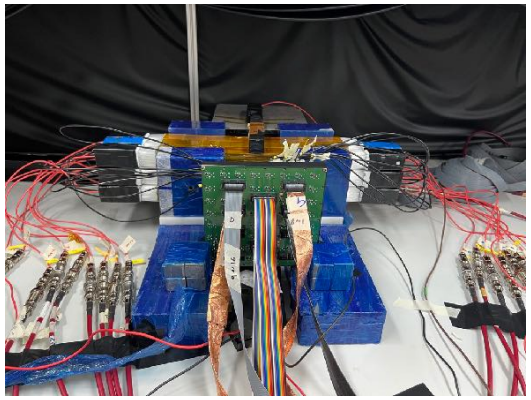


GlueX Pb/SciFi sampling calorimeter

Backup: Prototype of EIC Barrel Electromagnetic Calorimeter

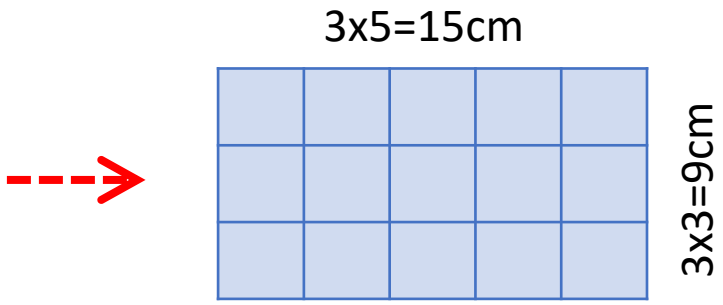


Pb/SciFi module 3x5 array

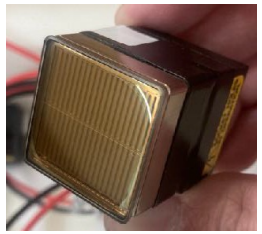


DAQ test of
Pb/SciFi module

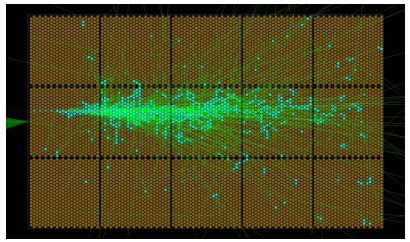
- Pb/SciFi Module
  - 3x5(4x4) of unit module(32x3x3cm^3)
  - Dimension: 32x15x9 cm^3
  - Readout with PMT (R11265-100)
  - One additional module with SiPM will be used for 4x4 setup
- AstroPix Module (Silicon Pixel)
  - Dimension: 2x2 cm
- Detectors will arrive at CERN tonight



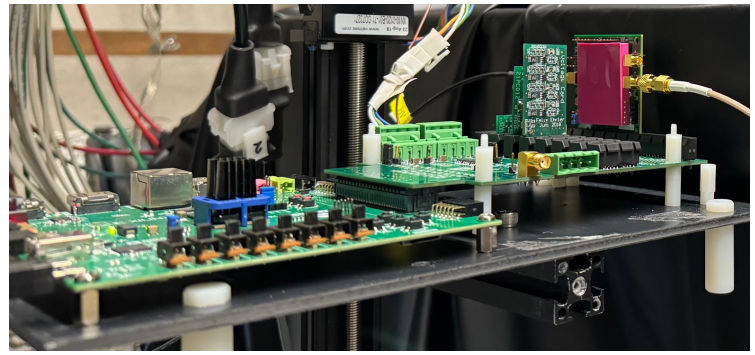
Side view



PMT



Simulation



AstroPix Chip + Carrier Board