

# Progress of the CEPC Sc-ECAL R&D

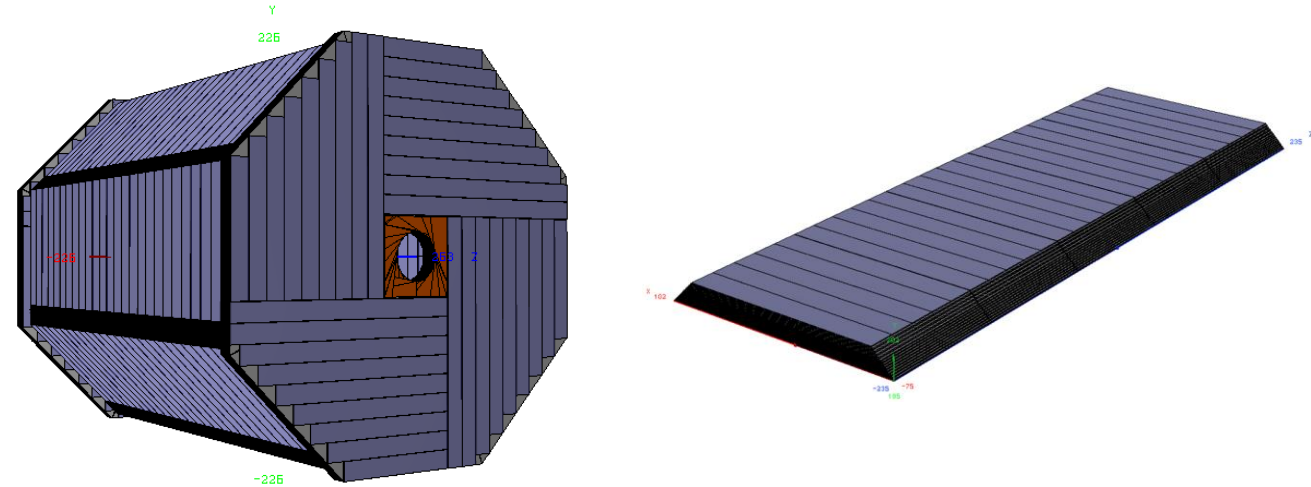
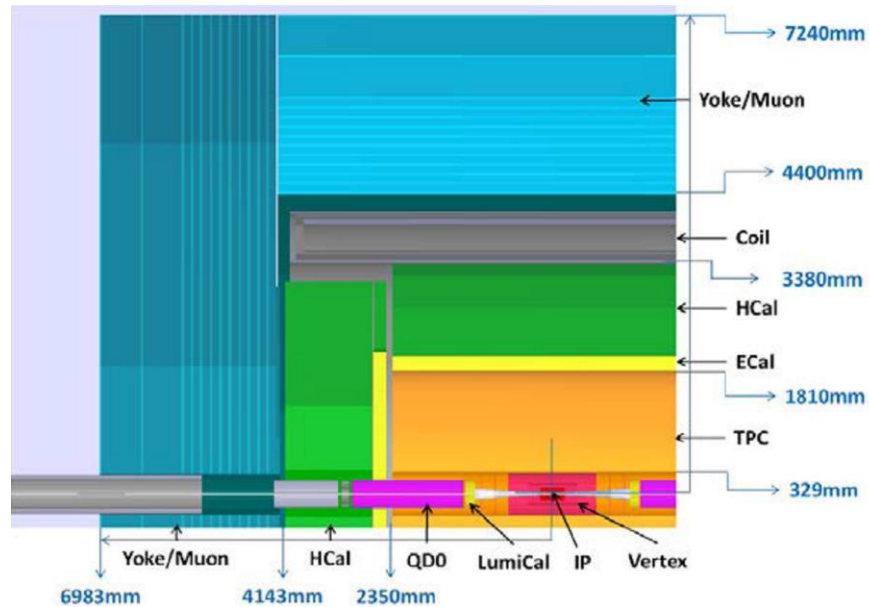
**Yazhou Niu**

**On behalf of the CEPC Calorimeter working group**

CEPC Physics & Detector Plenary Meeting  
July, 2020

# CEPC baseline calorimeter

## CEPC baseline detector concept



CEPC ECAL layout

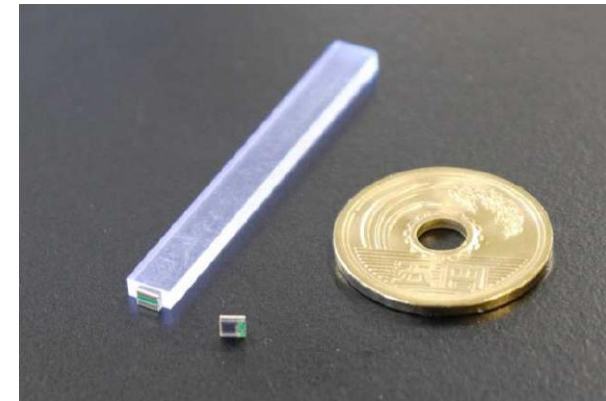
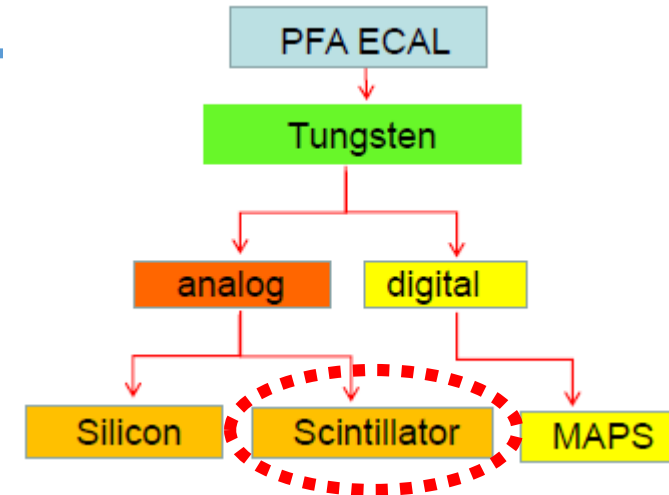
- Baseline detector concept based on the particle flow approach
- High granularity and good energy resolution are required for calorimeter

# Sc-ECAL prototype

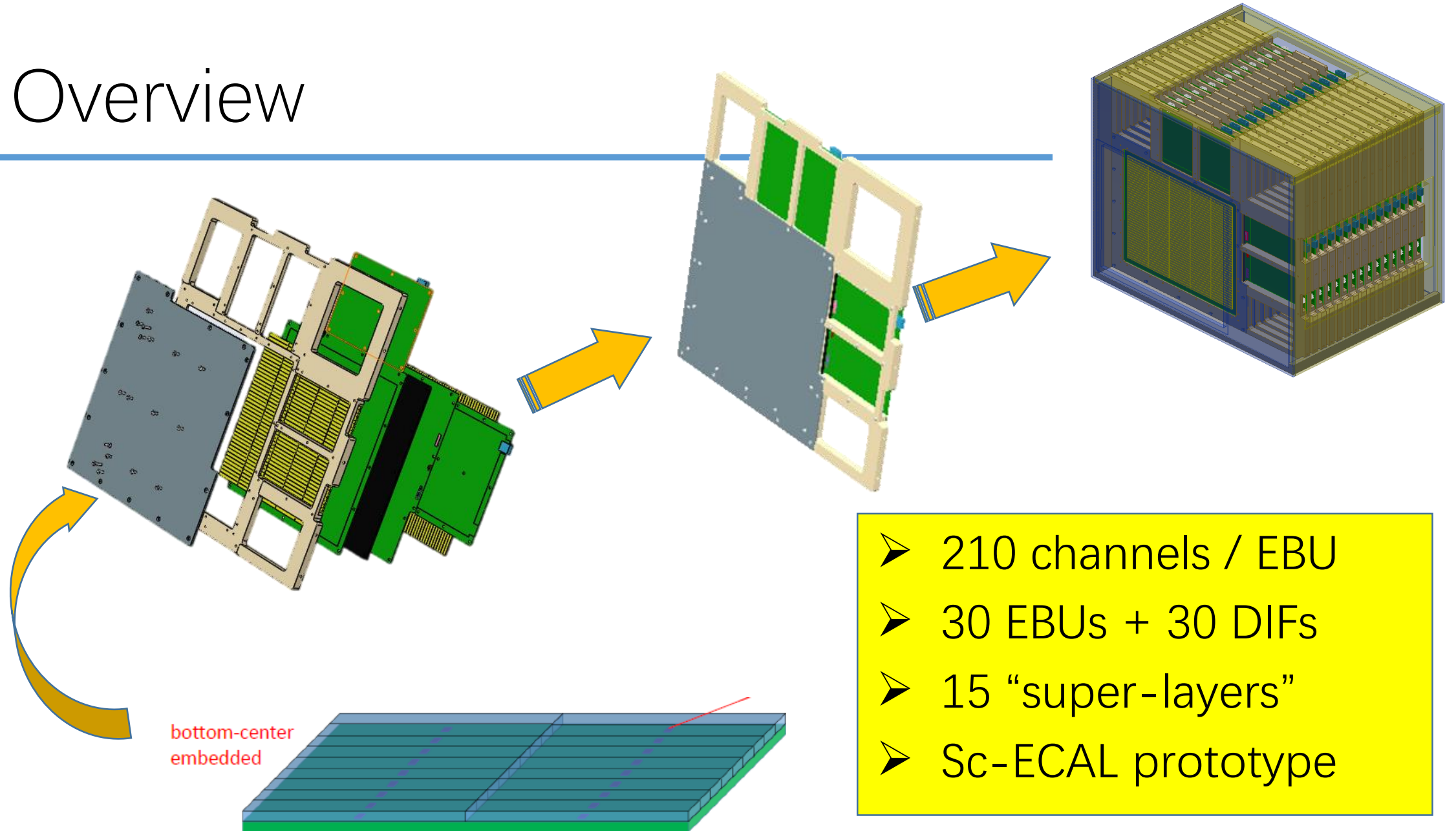
- PFA oriented electromagnetic calorimeter
- Scintillator-tungsten sandwich structure
- SiPM readout with SPIROC2e

## Sc-ECAL prototype parameters:

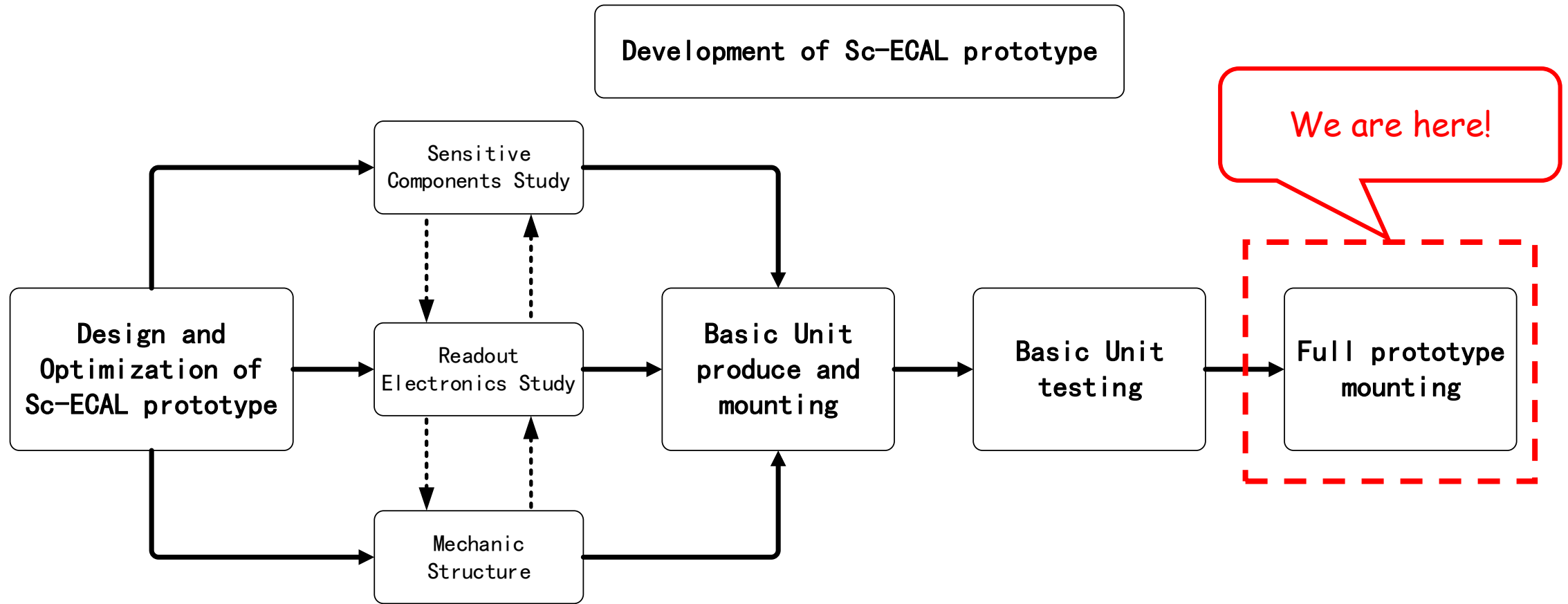
- Layers number : 30 layers
- Absorber : 3.2 mm W – Cu(85:15)
- Scintillator strip : 2mm × 5mm × 45mm
- SiPM : 10000 pixels & 4489 pixels



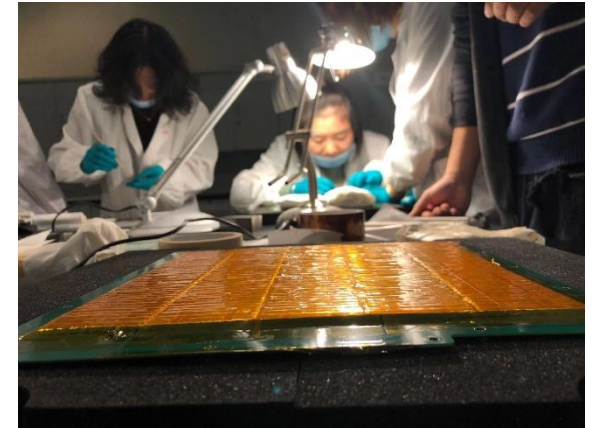
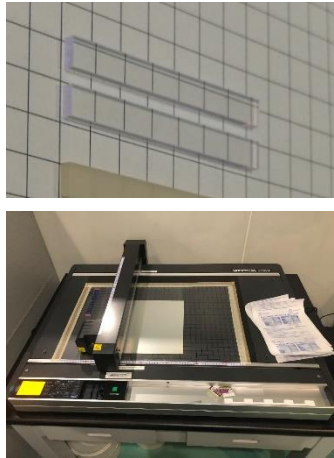
# Overview



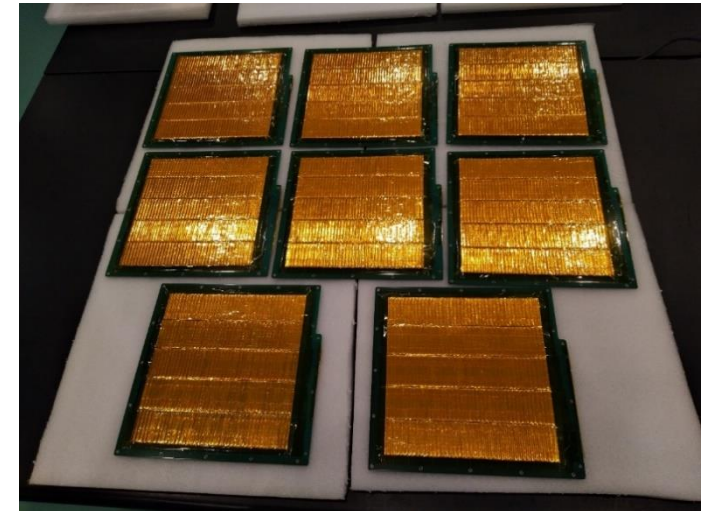
# Overview



# Ecal Basic Unit mass produce

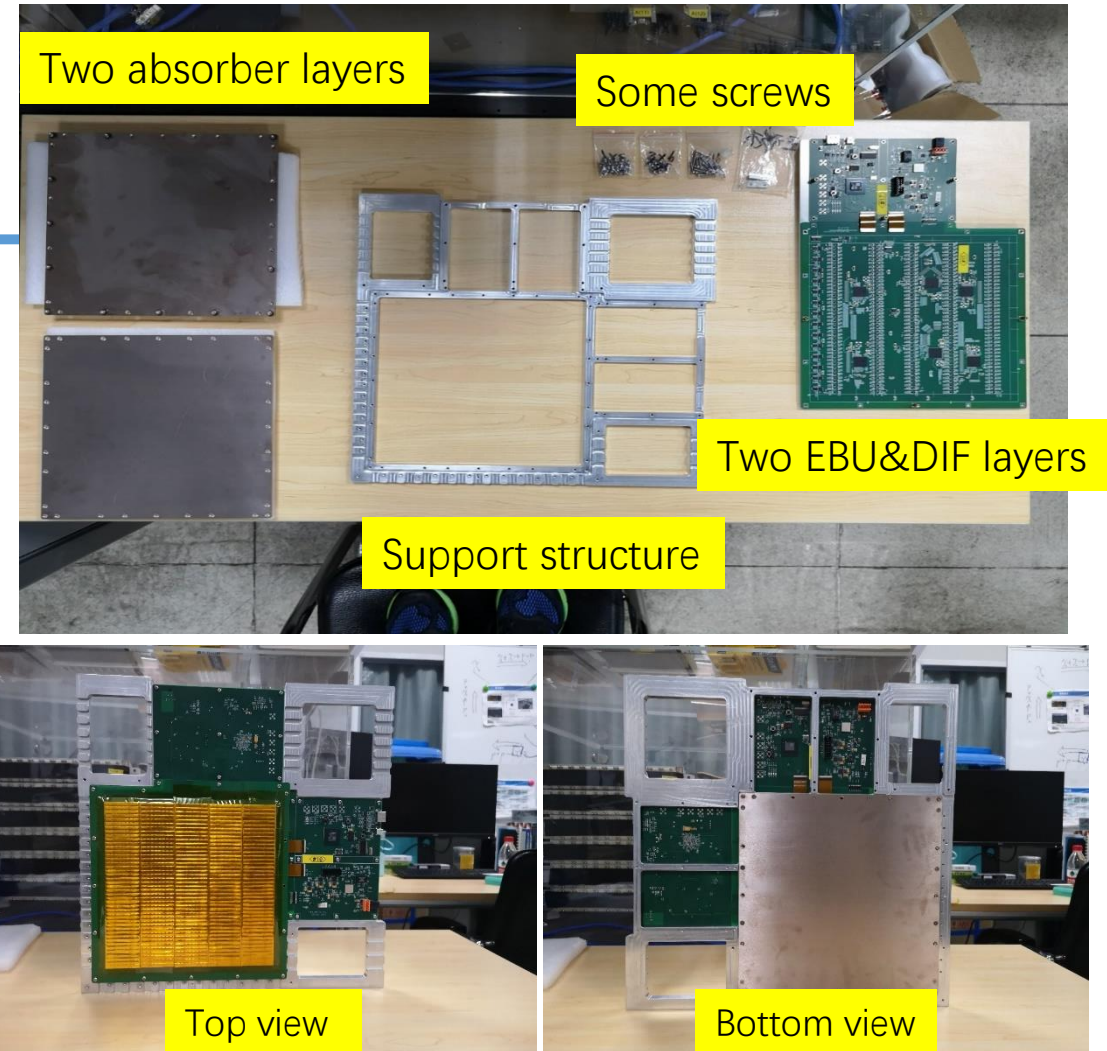
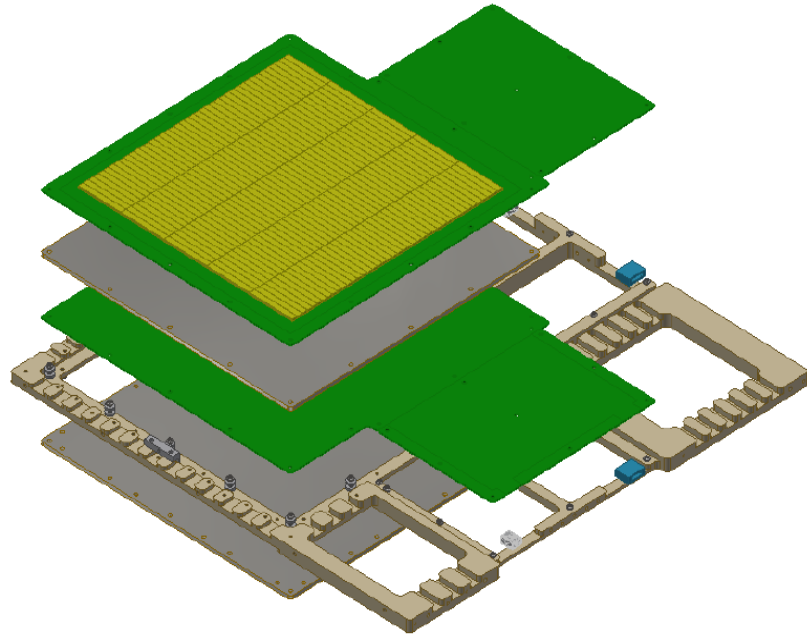


- Ecal Basic Unit mass produce
  - Scintillator strip and ESR cutting and machining
  - Scintillator strips wrapping
  - PCB soldering and testing
  - Ecal Basic Unit assembly





# Super-layer mounting

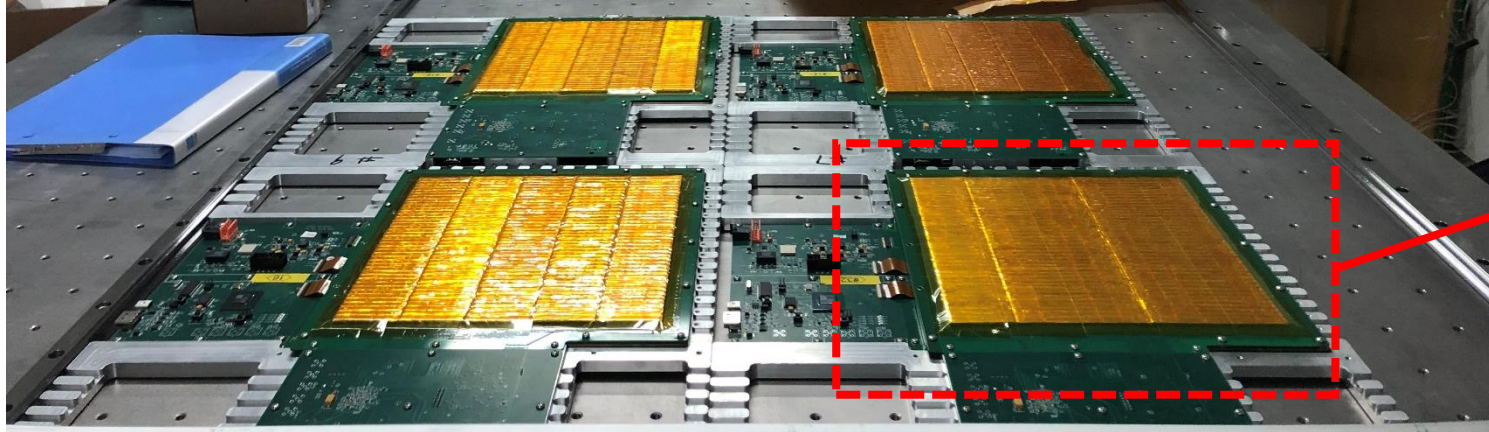


- One super-layer is an independent unit
- One super-layer consists of two EBU and inserted by two absorber layers



# Super-layer mounting

- 16 super-layer in total

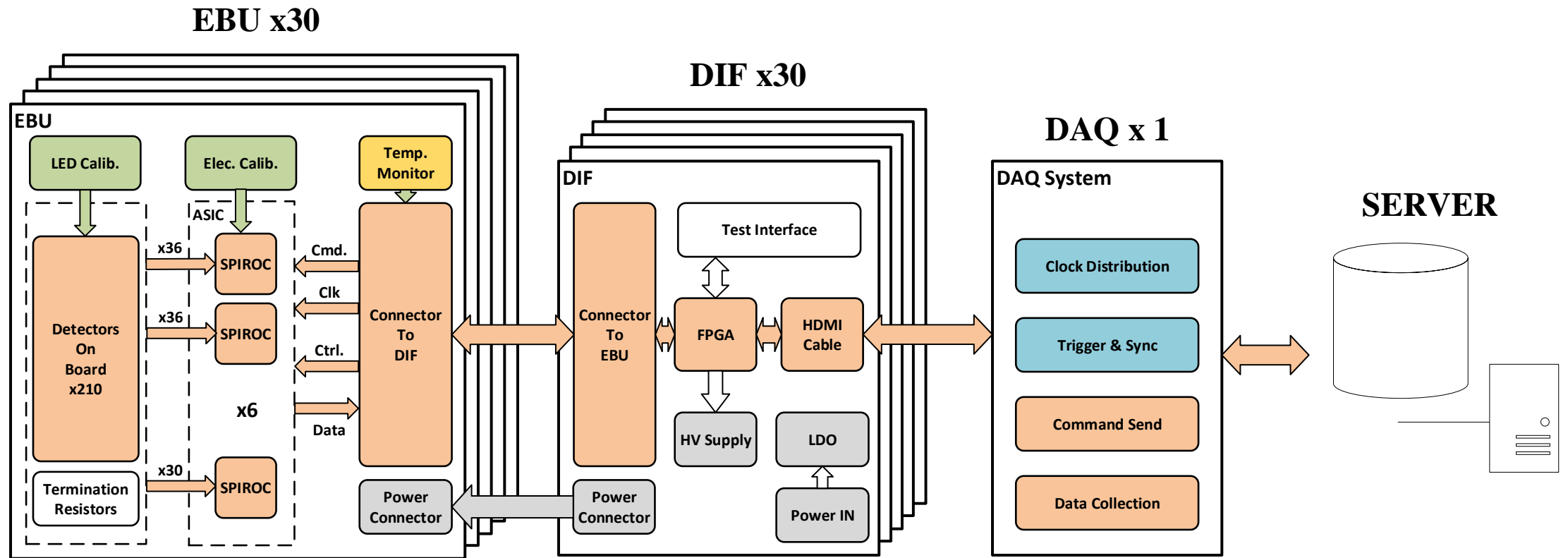


Double-side readout  
for Wataru's group



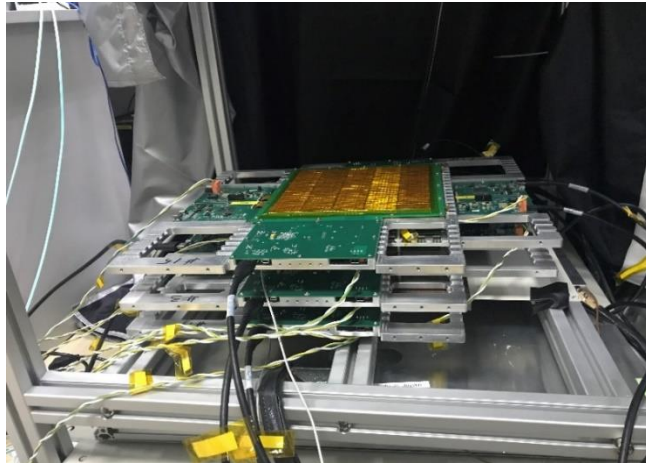


# Data acquisition



# 5 super-layers combined commissioning

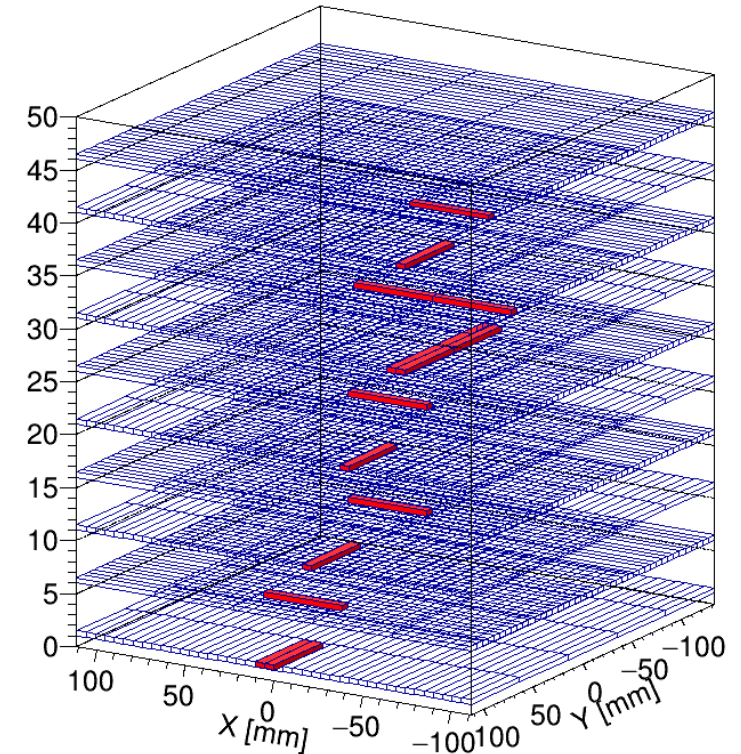
Cosmic ray test platform



Shield the light



Tracking reconstruction

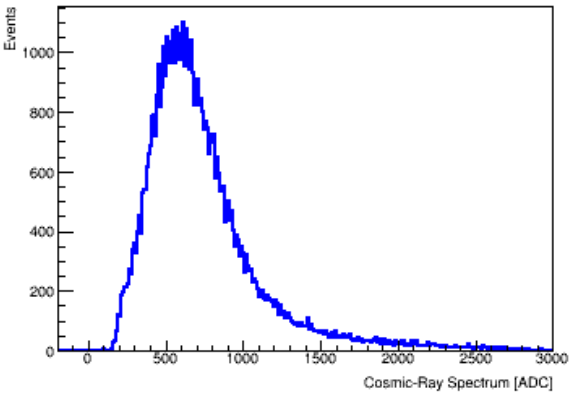


- The combined test system worked
  - Data acquisition and transmission properly
  - Event build correctly for 10 EBU layers
  - More than 95% events hit for more than 5 layers

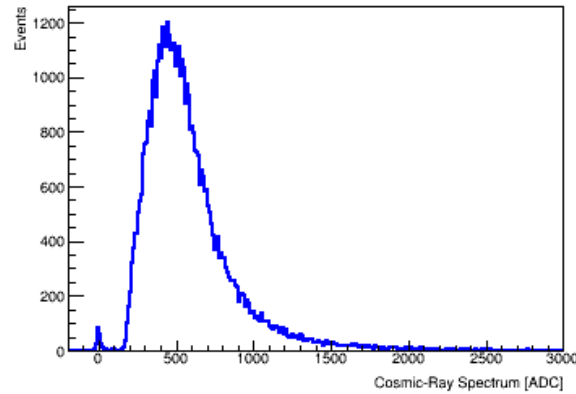
# Cosmic ray test results

## EBU with 15 $\mu\text{m}$ SiPM

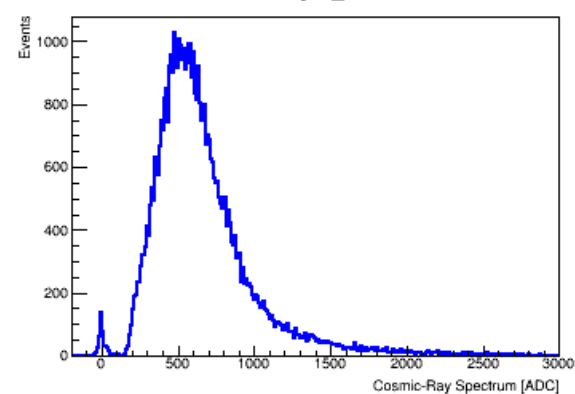
Layer\_0



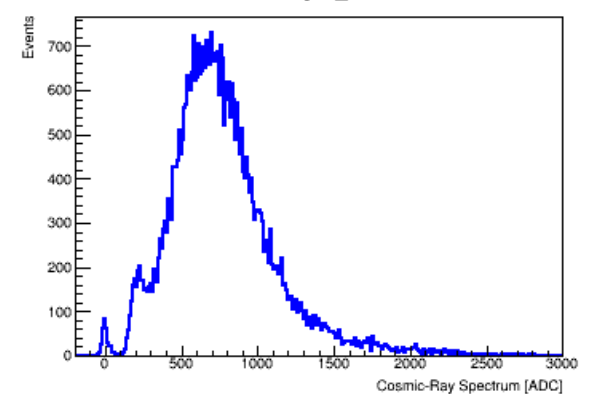
Layer\_1



Layer\_8

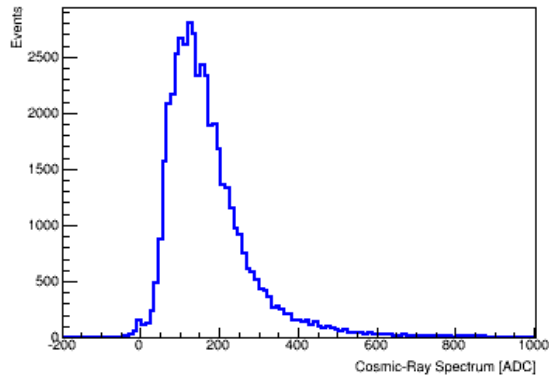


Layer\_9

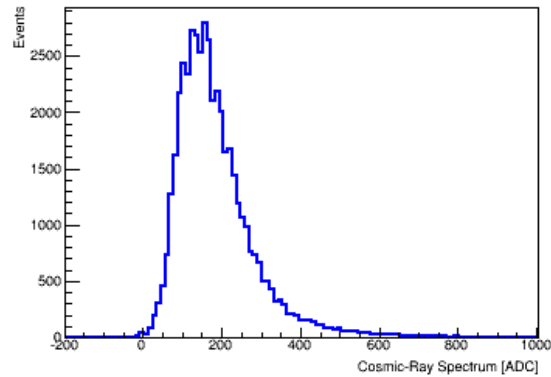


## EBU with 10 $\mu\text{m}$ SiPM

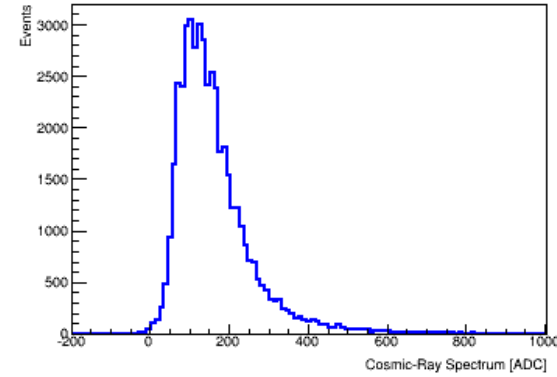
Layer\_2



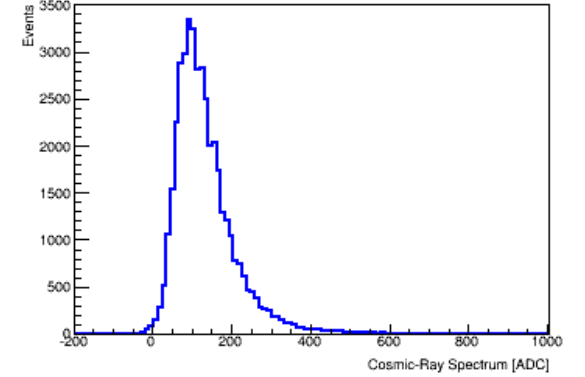
Layer\_3



Layer\_4

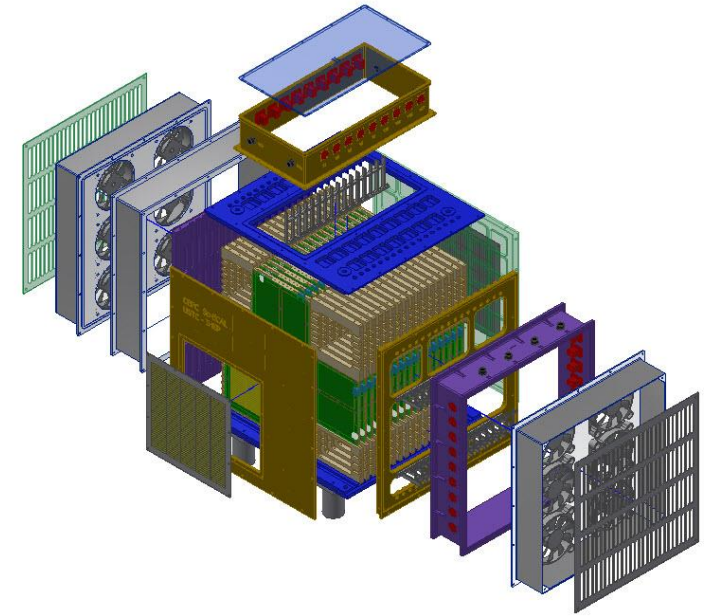


Layer\_5



# Mechanic structure of the prototype

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- The mechanic structure is manufactured, hold at most 17 super-layers
- The Sc-ECAL prototype assembly is ongoing



# Summary and future plan

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- All 16 super layers
  - Mounting with support structure finished
  - Grouping cosmic ray test work properly
  - Some cosmic ray results need to understand well: ADC, TDC, ...
- Sc-ECAL prototype
  - Assembly with mechanic structure ongoing
  - Cosmic ray test would be performed in the near further

Thanks !