

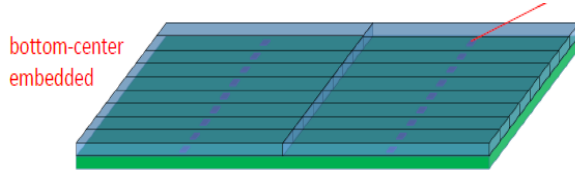
CEPC Sci-W ECAL R&D status

Zhigang Wang, IHEP

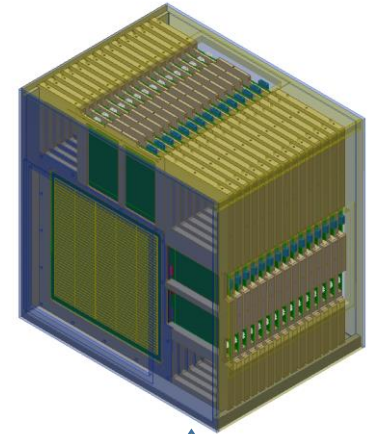
On behalf of the CEPC calorimeter working group

14/Feb./2020

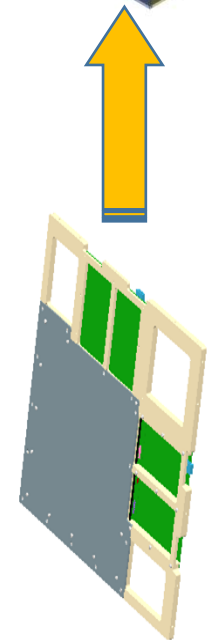
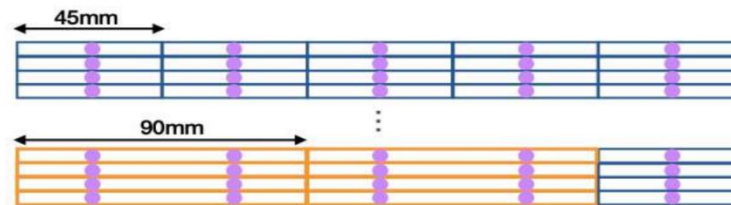
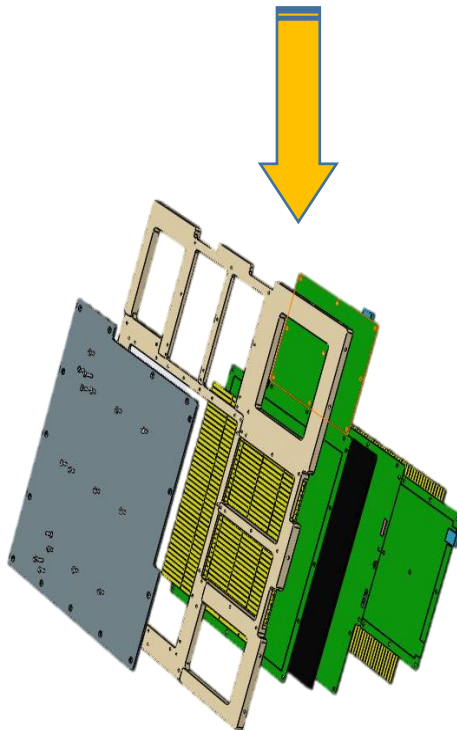
Overview of Sci-W ECAL prototype



- 6300 channels
- 30 layers
- 15 “active layers”
- Full ECAL prototype



Additional 2 layers contributed
by Japanese group(ILC) with
double readout strip









EBU mass production





- 32 layers EBU for full prototype
 - 24 layers EBU-C with 10um SiPM
 - 6 layers EBU-C with 15um SiPM
 - 2 layers EBU-J with 15um SiPM

All 32 layers EBU production Finished, 6720 channels.

- Electronics test

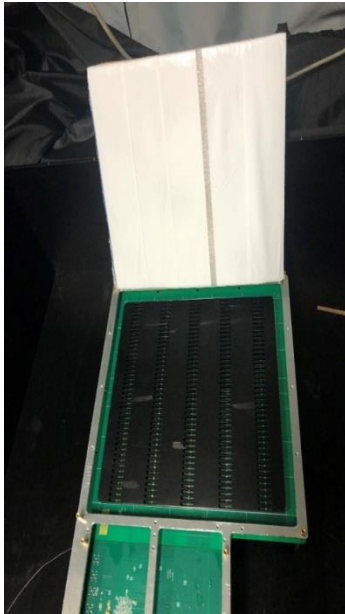
- Pedestal and electricity test  
- IC calibration  
- Temperature  

- SiPM and LED test

- Dark count  
- LED DAC scan  

All 32 layers EBU test finished.

EBU test



Test setup



Finished test

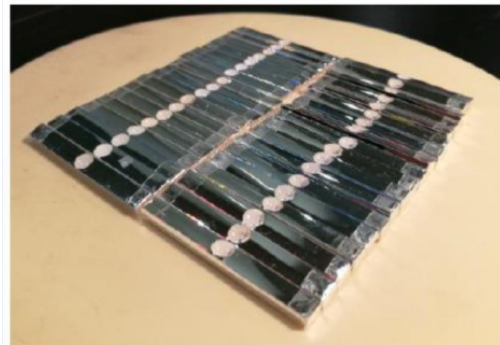
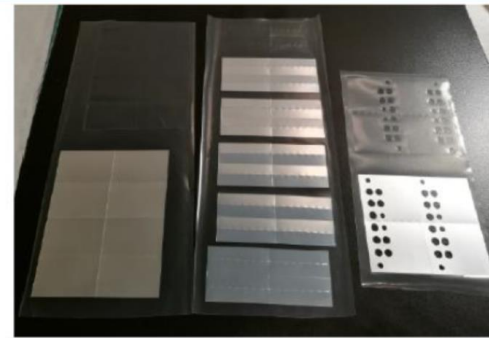
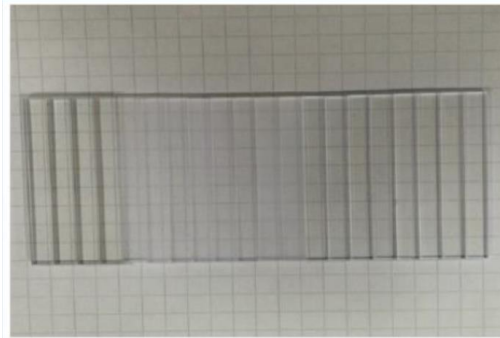
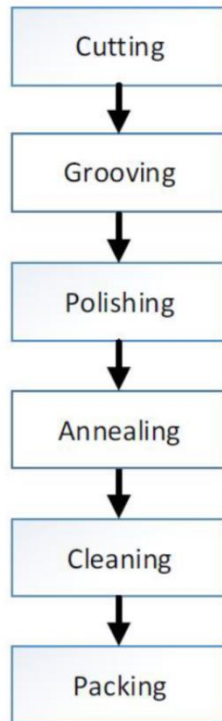
EBU aging

- Burn-in 48 hours with 50°C
- SiPMs without high voltage
- Record electricity parameters for each layer every hour
- DAC calibration and temperature access every 3 hours
- Power down half hour every 12 hours



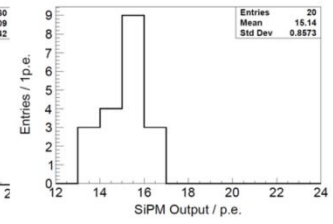
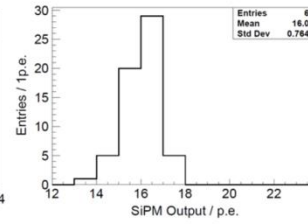
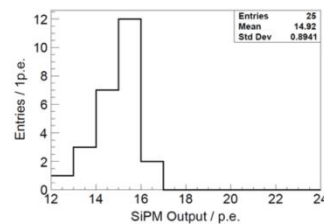
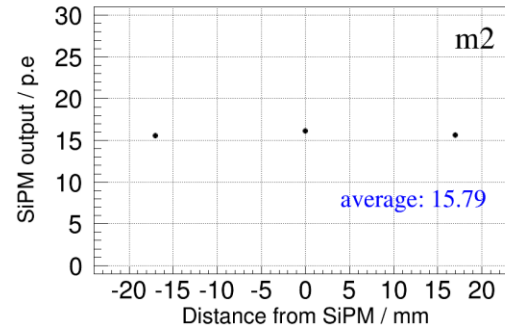
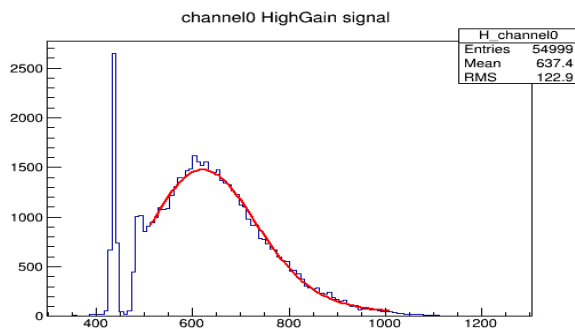
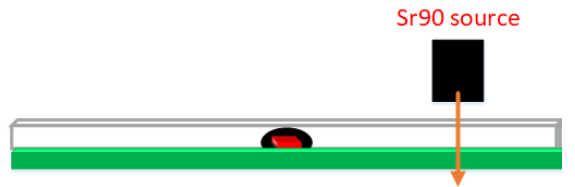
After aging, no obvious changes from EBU and SiPM are measured.
But a few of LEDs became unstable caused by the drive circuit, have been replaced.

Scintillator strip mass production



- 7k scintillator strips produced (6300 channels).

Scintillator strip status

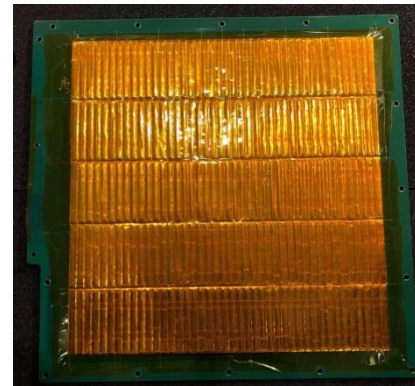


Strip light output with different thickness

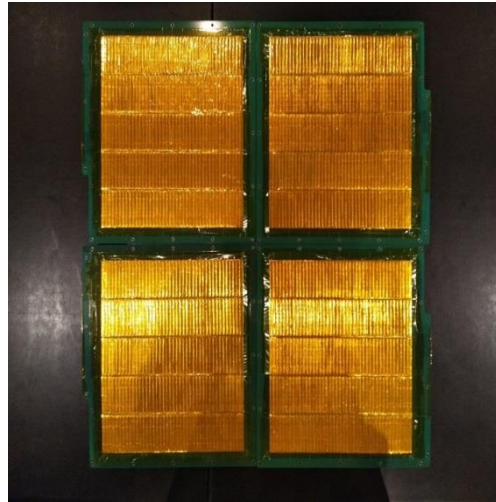
- About 20% of the strips are randomly selected and tested to monitor the performance.
- The last 200 strips will be tested this week and sent to SIC.

Scintillator strip assemble

The scintillator strips are wrapped and assembled into the EBU boards in SIC.

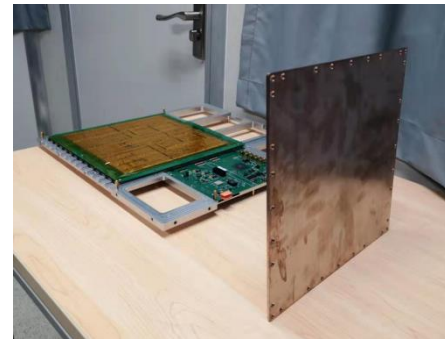
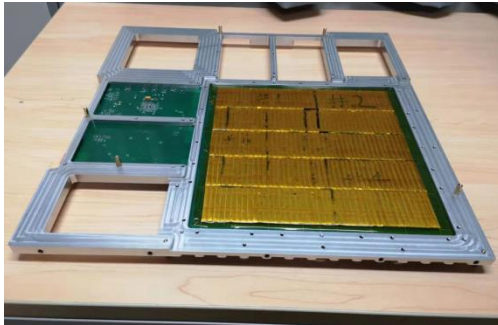
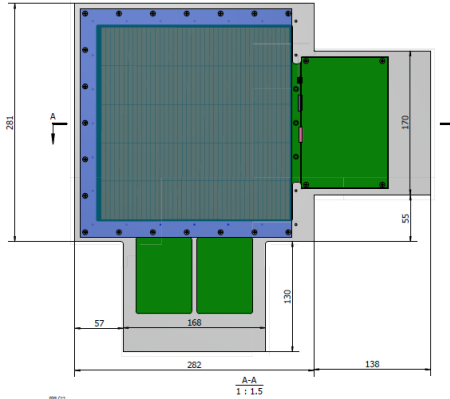


Strip assemble status



- Up to now, 27 layers EBU-C assemble finished.
- All 30 layers EBU-C will be finished by the end of February.
- 2 layers double length strips provided by the Japanese group will be finished at the first half of March and sent to SIC to assemble.

Mechanical status



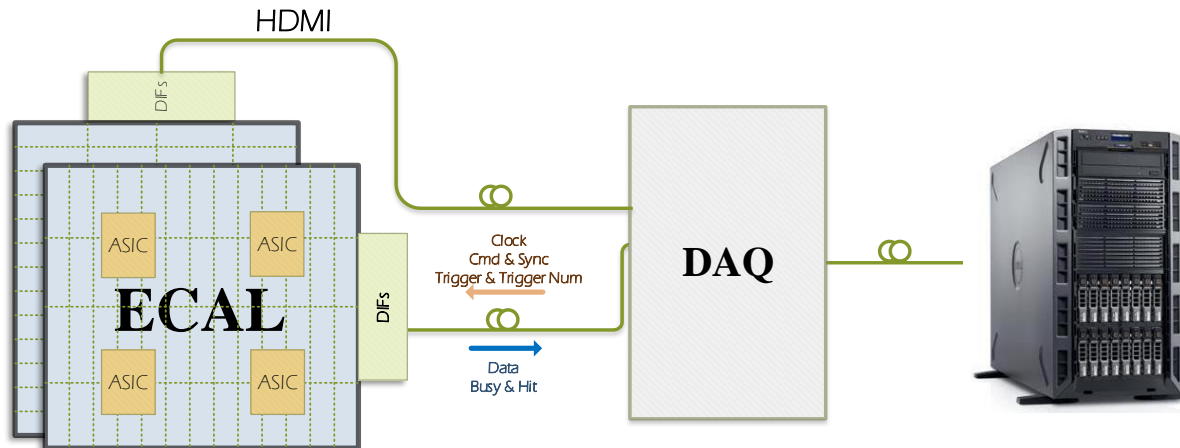
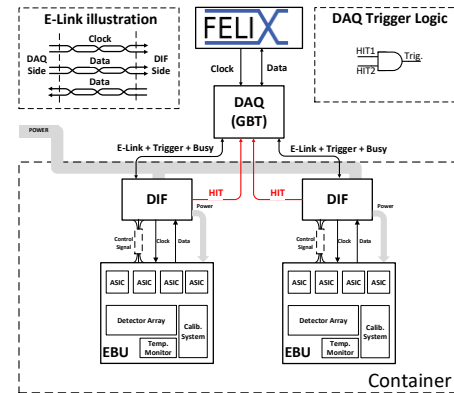
Two layers of support structure and one tungsten plate produced.
Trial assembly of EBU and tungsten plate into support structure is completed,
and the final parameters is confirmed.

The support structure and tungsten plate are ready for mass production.

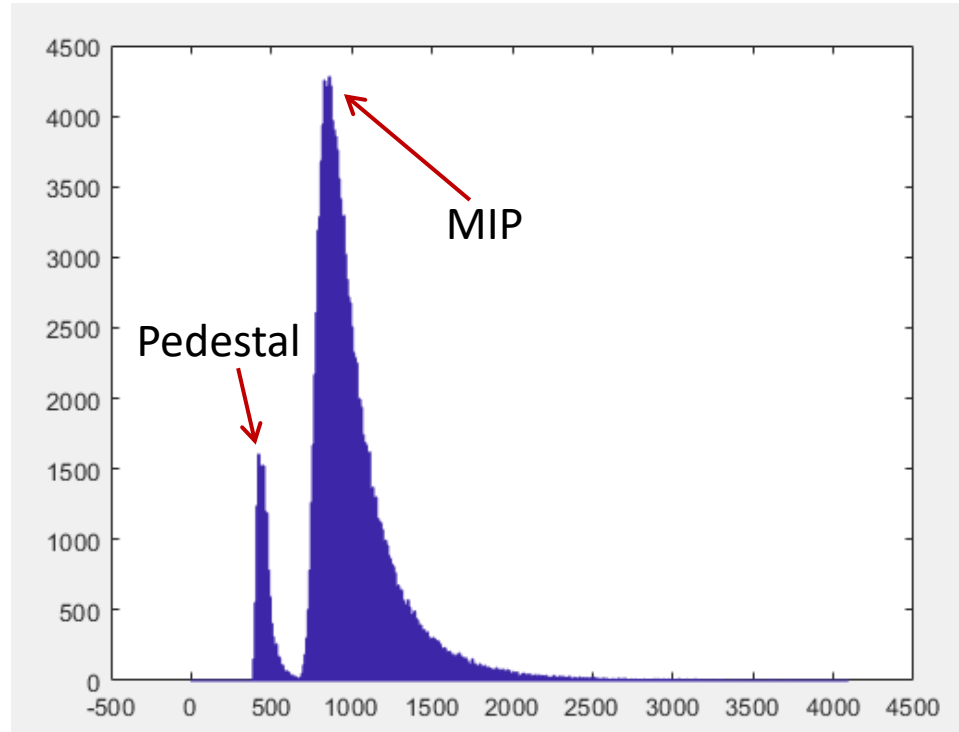
But the two factories are waiting for permission to start work.

Cosmic ray test

Two sensitive layers used to do cosmic ray test



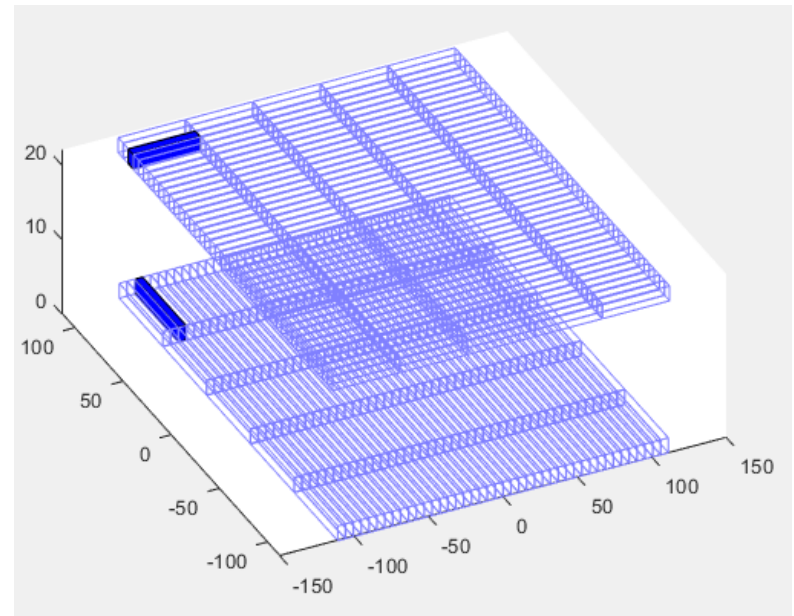
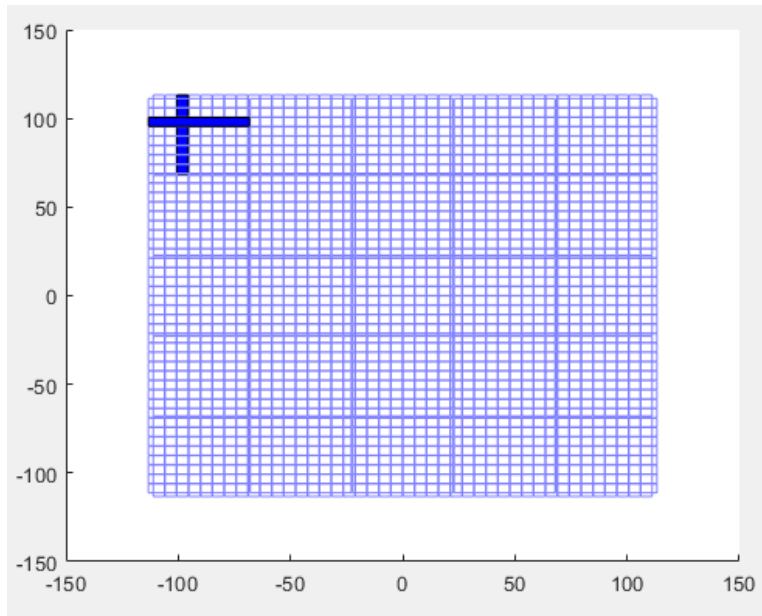
MIP Spectrum



MIP spectrum of all 420 channels(15um SiPM)

Preliminary cosmic ray results shown the peak of the MIPs is well separated from the pedestal.

Cosmic ray reconstruction



Hit positions of MIP event can be determined by the strips of adjacent layers.

DESY Test Beam Schedule 2020

25-May-20	22			Setup Time					
1-Jun-20	23	MBI	X	ATLAS-ITk-Strips	X			CALICE AHCAL	X
8-Jun-20	24	CLIC Pixel	X	ATLAS-ITk-Strips	X	CEPC-TPC			
15-Jun-20	25	CMS-Pixel-Phase2	X	Mu3e	X			TOTEM	X
22-Jun-20	26	CMS-Pixel-Phase2	X	ATLAS-HGTD	X			NICA-SiPM	
29-Jun-20	27	ELAD	X	ATLAS-HGTD	X			NICA-SiPM	
6-Jul-20	28	Summer Shutdown							
13-Jul-20	29								
20-Jul-20	30								
27-Jul-20	31	BL4S	X	Belle-II PXD	X			AFP-TOF	
3-Aug-20	32	CMS OT 2S	X	Belle-II PXD	X	LCTPC-Pix	X		
10-Aug-20	33	MBI	X	Summer Students	X	LCTPC-Pix	X		
17-Aug-20	34	ATLAS-ITk-TJCMOS	X	CEPC-ECAL	X			CALICE AHCAL	X
24-Aug-20	35	CLIC Pixel	X	CEPC-ECAL	X			CEPC-STCF	X
31-Aug-20	36	CMS-Pixel-Phase2	X	MUonE	X			CEPC-STCF	X
7-Sep-20	37	CMS-Pixel-Phase2	X	ELAD	X			BCGS	X
14-Sep-20	38								
21-Sep-20	39	BL4S	X	ATLAS-HGTD	X			CMS-Pixel-Phase2	X
28-Sep-20	40	BL4S	X	ATLAS-HGTD	X			CMS-Pixel-Phase2	X
5-Oct-20	41	ELAD	X	ATLAS-ITk-Pixel	X	T2K			
12-Oct-20	42	Mu3e	X	ATLAS-ITk-Pixel	X	T2K			
19-Oct-20	43	CMS Outer Tracker	X	CALICE AHCAL	X			HEP for Teachers	
26-Oct-20	44	CMS Outer Tracker	X	ATLAS-ITk-TJCMOS	X			Mimosis	

ANNOUNCED

Two weeks beam time allotted for CECP ECAL experiment, in the middle of August.

The detector performance study should be finished and ready for transport at the end of July.