
CEPC MOST2 Project Annual Review

Internal Session on Task 3

Status and Progress Overview

Validation of the Imaging Hadronic Calorimeter Technology

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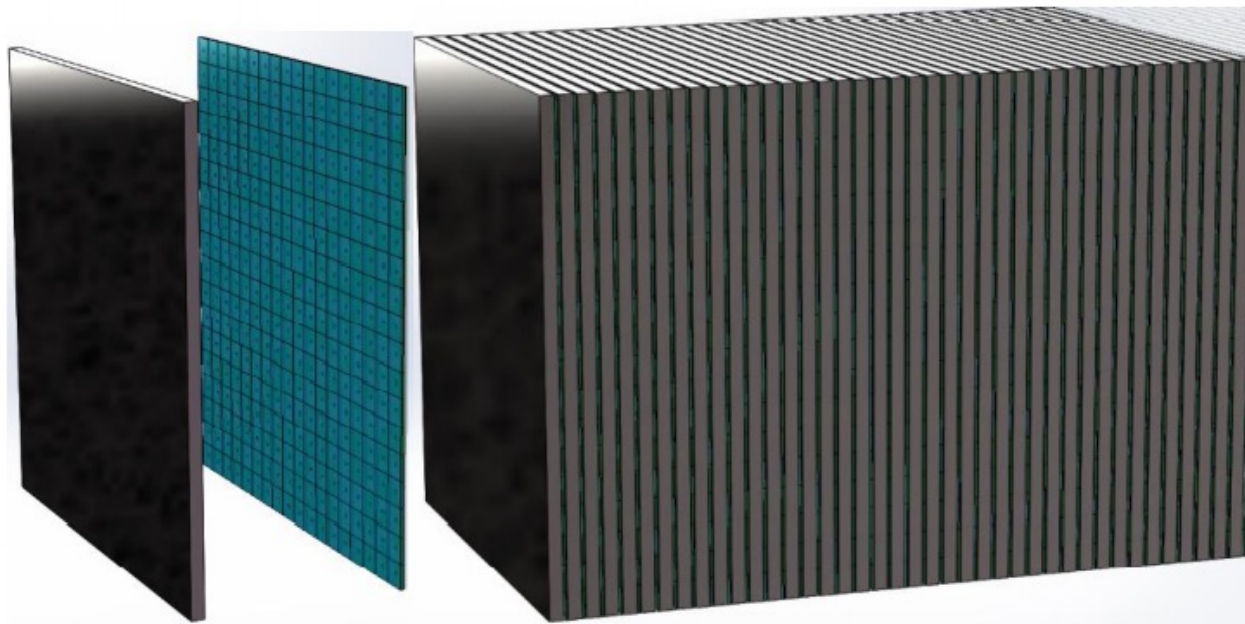
中国科学技术大学

北京, 高能所

2021年4月21日

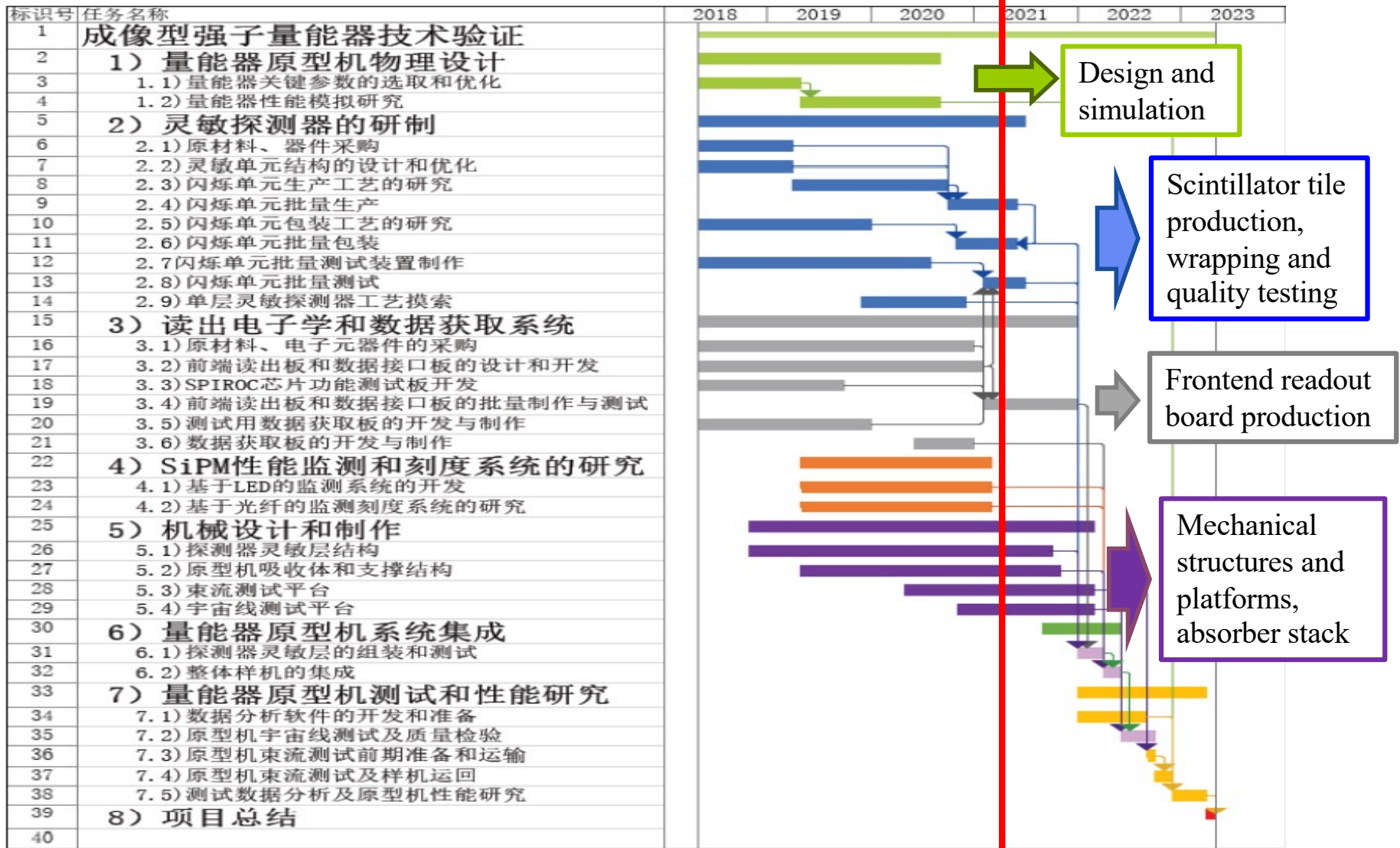
The CEPC AHCAL Prototype

The core of task 3: Development of a full-size AHCAL prototype



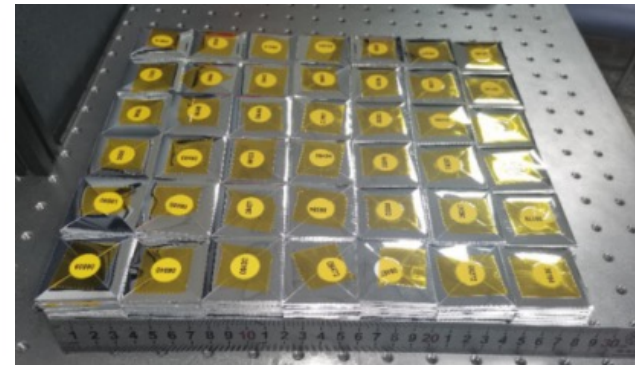
- Transverse size: $72 \times 72 \text{ cm}^2$, Cell size: 40mm
- 40 layers (plus 5 extra layers for backup): 20mm steel + 3mm scintillator + 2mm PCB for each layer
- Number of channels: ~ 13000

Where We Are ?



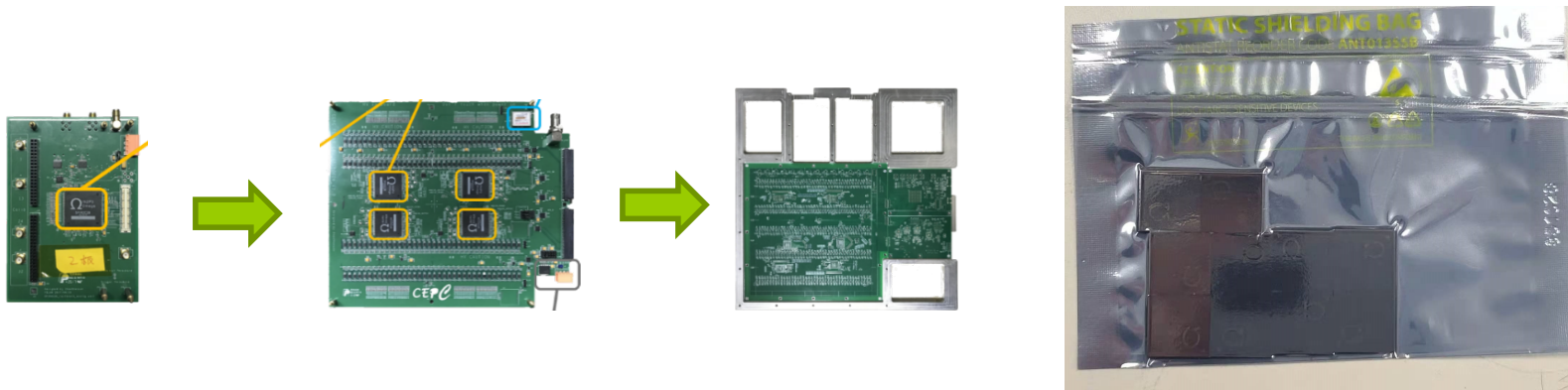
Scintillator Tiles

- 10144 scintillator tiles have been produced, wrapped and tested for light yield.
- 9700 tiles ($\sim 95\%$) passed quality control (light yield within $\pm 10\%$ of nominal)
- The latest batches are suffering low light yield. We are working through the issue and expect to make available the remaining ~ 5000 good tiles (our goal 15000 good tiles) required for the prototype construction in the next two months.



Readout Electronics

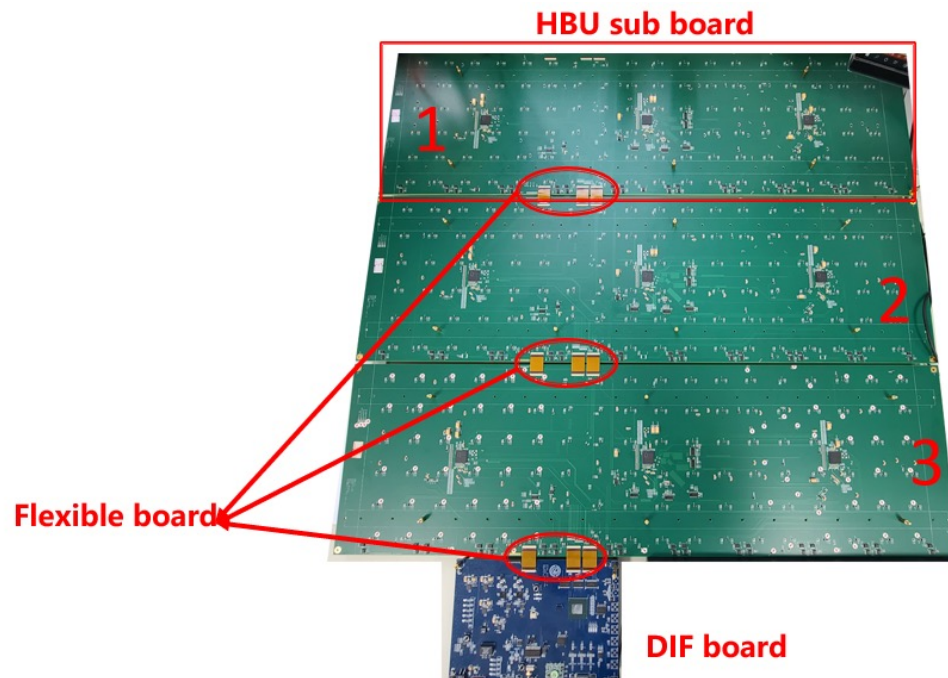
- The Omega group found a new packaging company for the SPIROC chips. As a result, they has resumed supply of the chips and are ramping up the capacity.
- We have ordered 400 chips with Omega and expect to receive them before this summer



New chips received in Nov. 2020

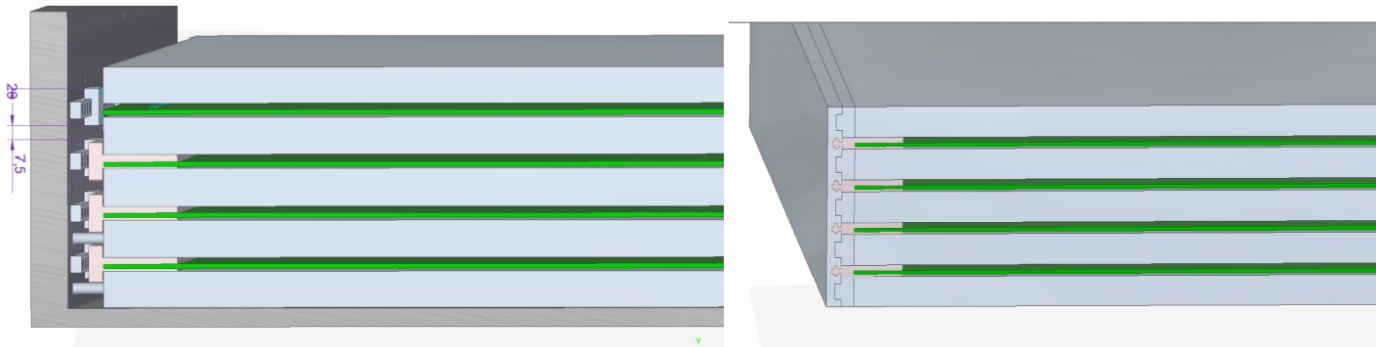
Readout Electronics

- The design of the front-end readout board (HBU) will be finalized by August.
- The mass production (45 layers) of HBUs will be launched in September and expect to finish by the end of 2021.



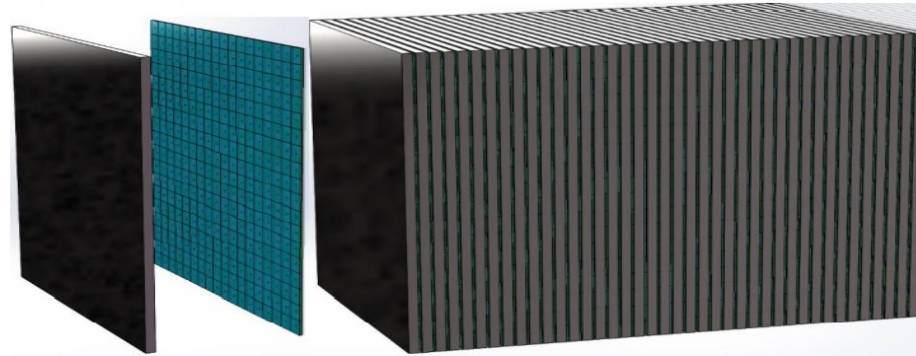
Mechanical Work

- Structure design of the prototype is ongoing
 - Sensitive layers (to be finished by June)
 - Absorber stack (to be finished by October)



- Design and manufacturing of support structures for the prototype hasn't started yet. But we aim to get everything done by February 2022 (a lot of work and challenge)
 - mechanical structure for moving and rotating the prototype
 - Support platforms for cosmic ray test and beam test

Summary



Design and simulation

Finished

Tile production

Mostly done. 5000 tiles remain to be produced. To be Finished in next 2 months

Readout electronics

Design validated. Mass production to launch in October and finish by the end of this year



Mechanical structures and platforms