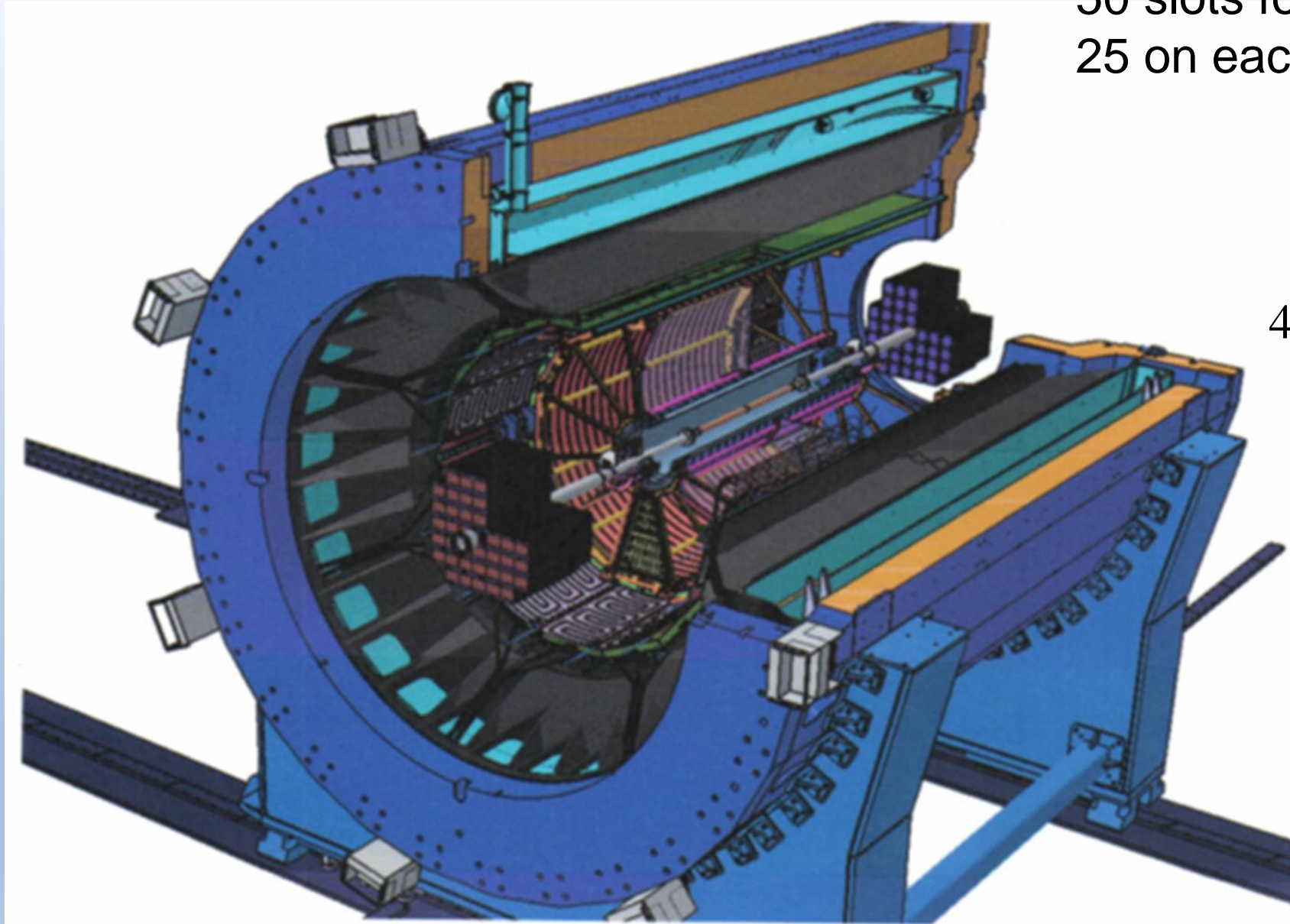


# Электромагнитный Калориметр

ECal status

08.11.2022  
ОИЯИ



50 slots for ECal baskets  
25 on each side



48 modules in each basket

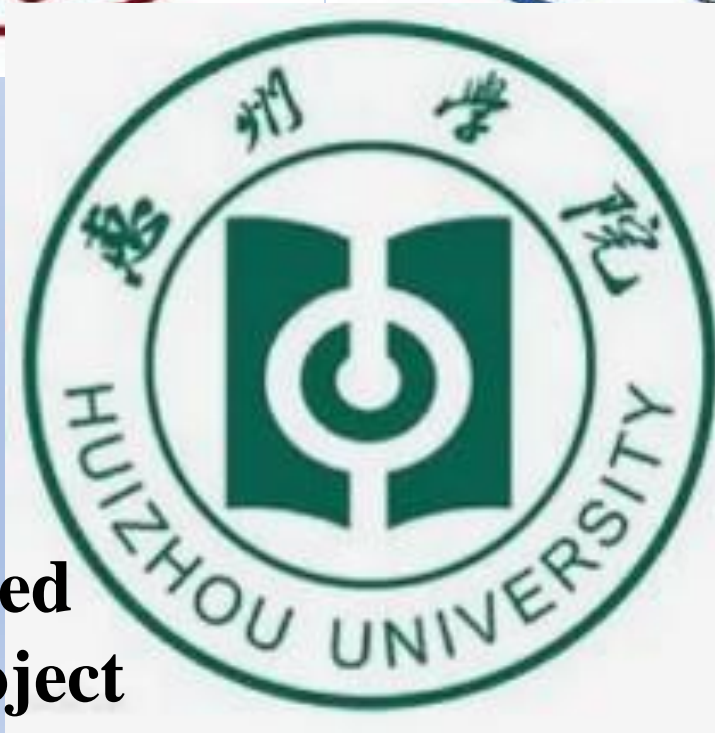


2400 modules in total  
About 70 000 kg



38400 channels





**Chinese universities involved  
in the of the calorimeter project**

**2400 modules**

**JINR responsibility**

**China responsibility**

1200 modules

1200 modules

**800 produced**

**800 produced**

500 delivered

**66%**

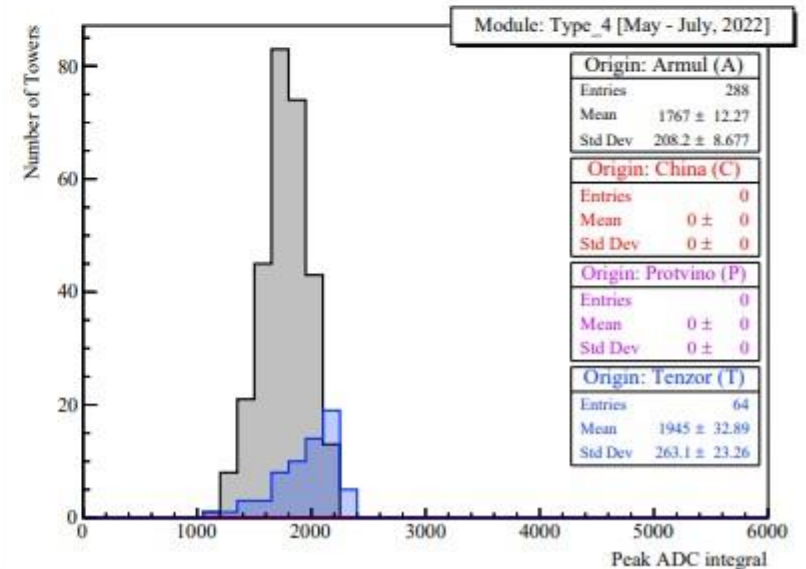
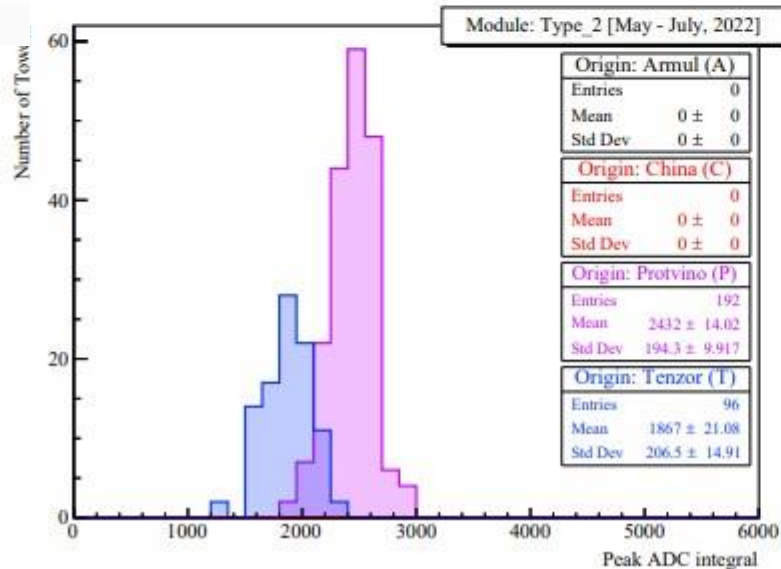
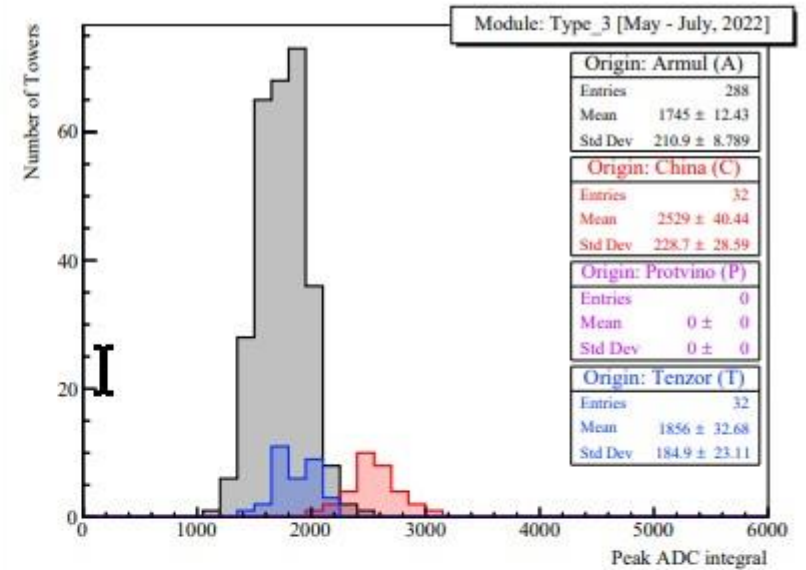
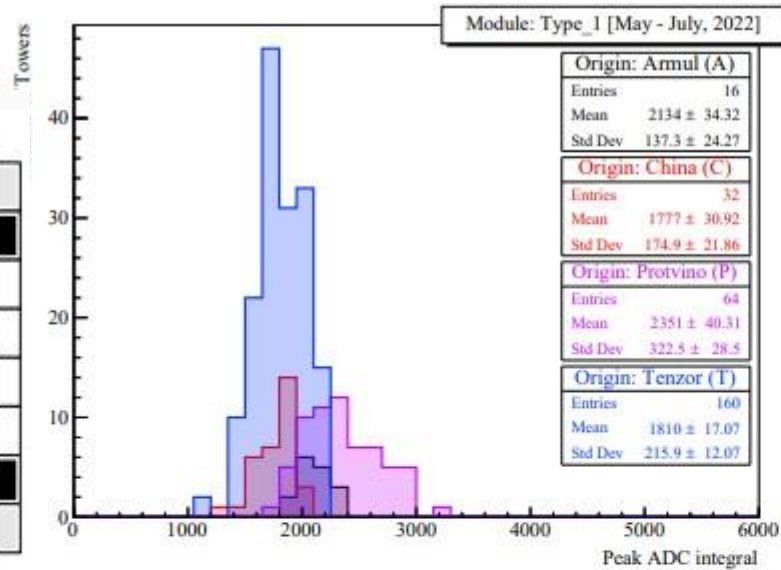
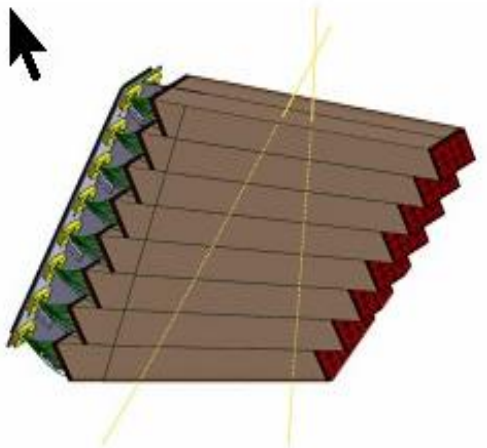
**83%**

Preparations are underway to start production of another 400 modules  
There are chances to make it by the summer of 2023

**Funding is not secured.  
No chances of making it by the summer of 2023**

**Problem – KURARAY WLS**

# First step in the calorimeter assembling is test of each module



Some modules  
have been fixed  
but none of modules  
is rejected



**Clusters production rate -1/day**  
**49 clusters a ready**  
**49 clusters – mid January**



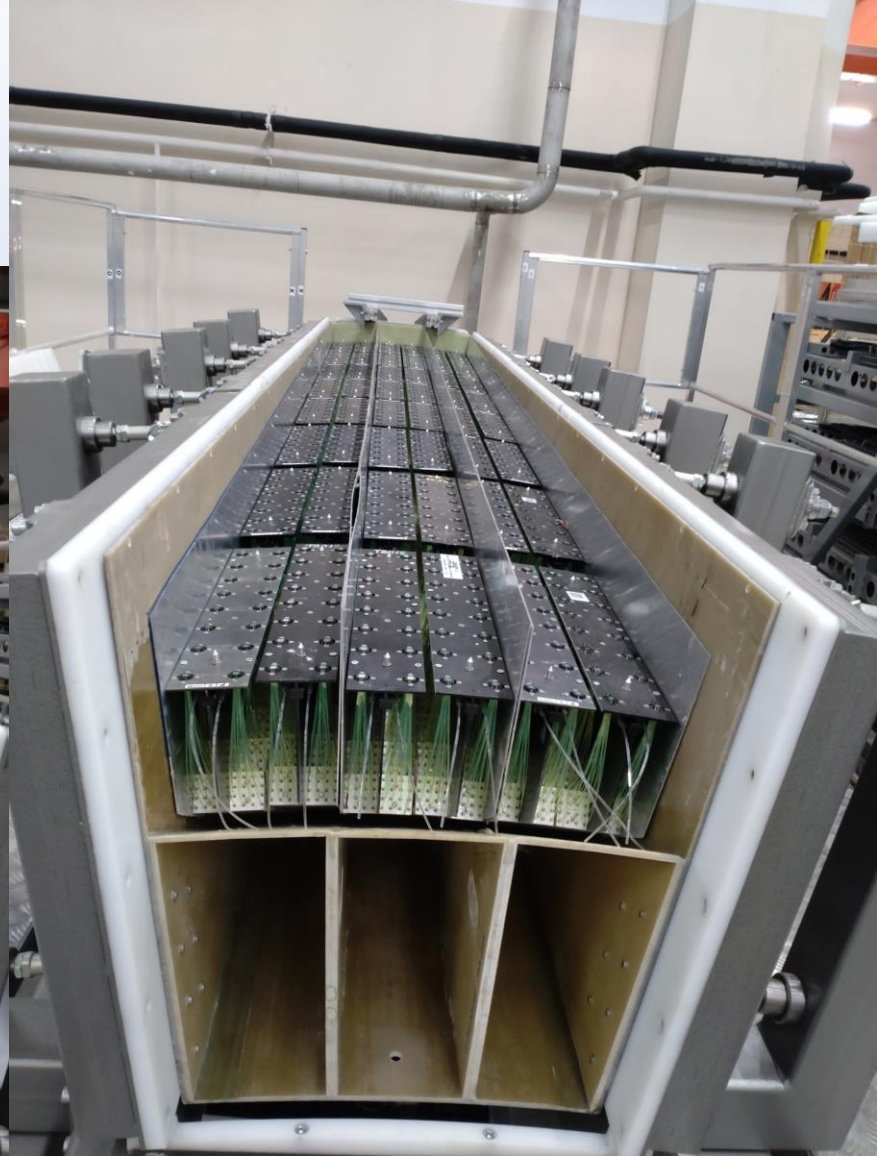
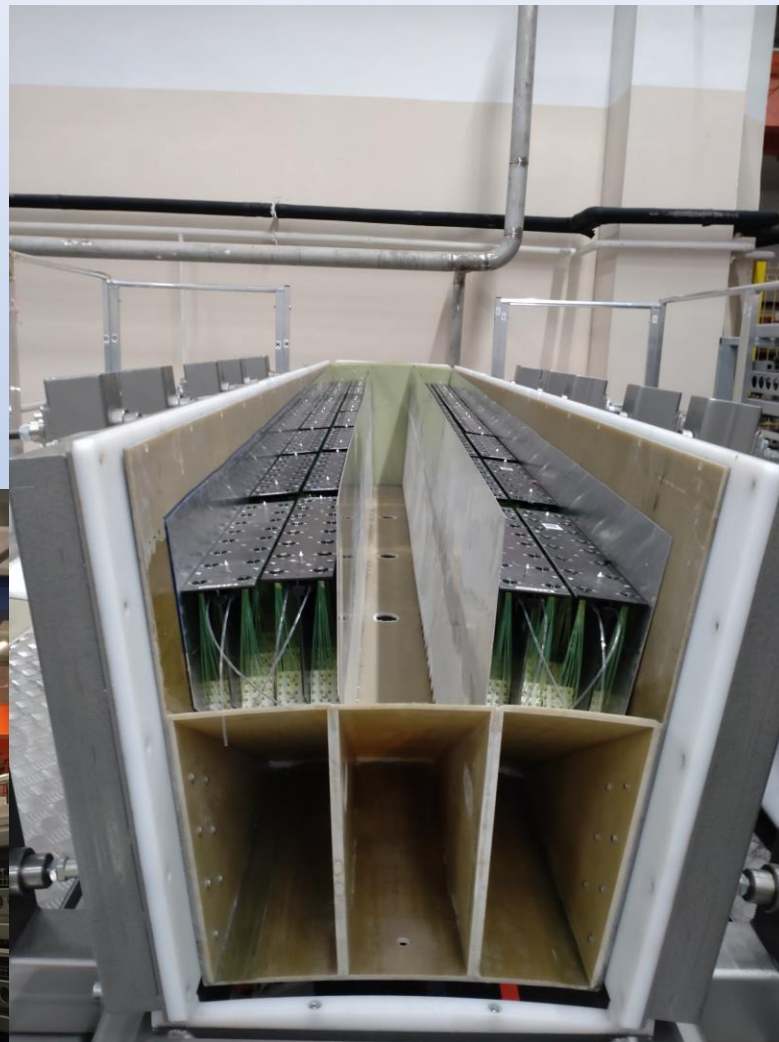
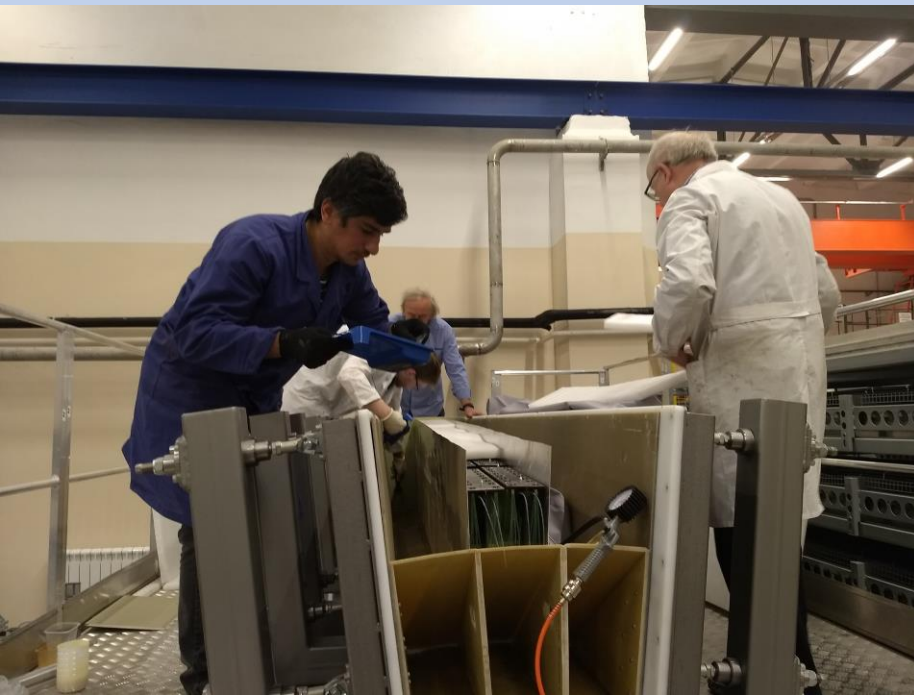
**Expecting production rate 2 half sectors per week.**

**Mass production January - March**

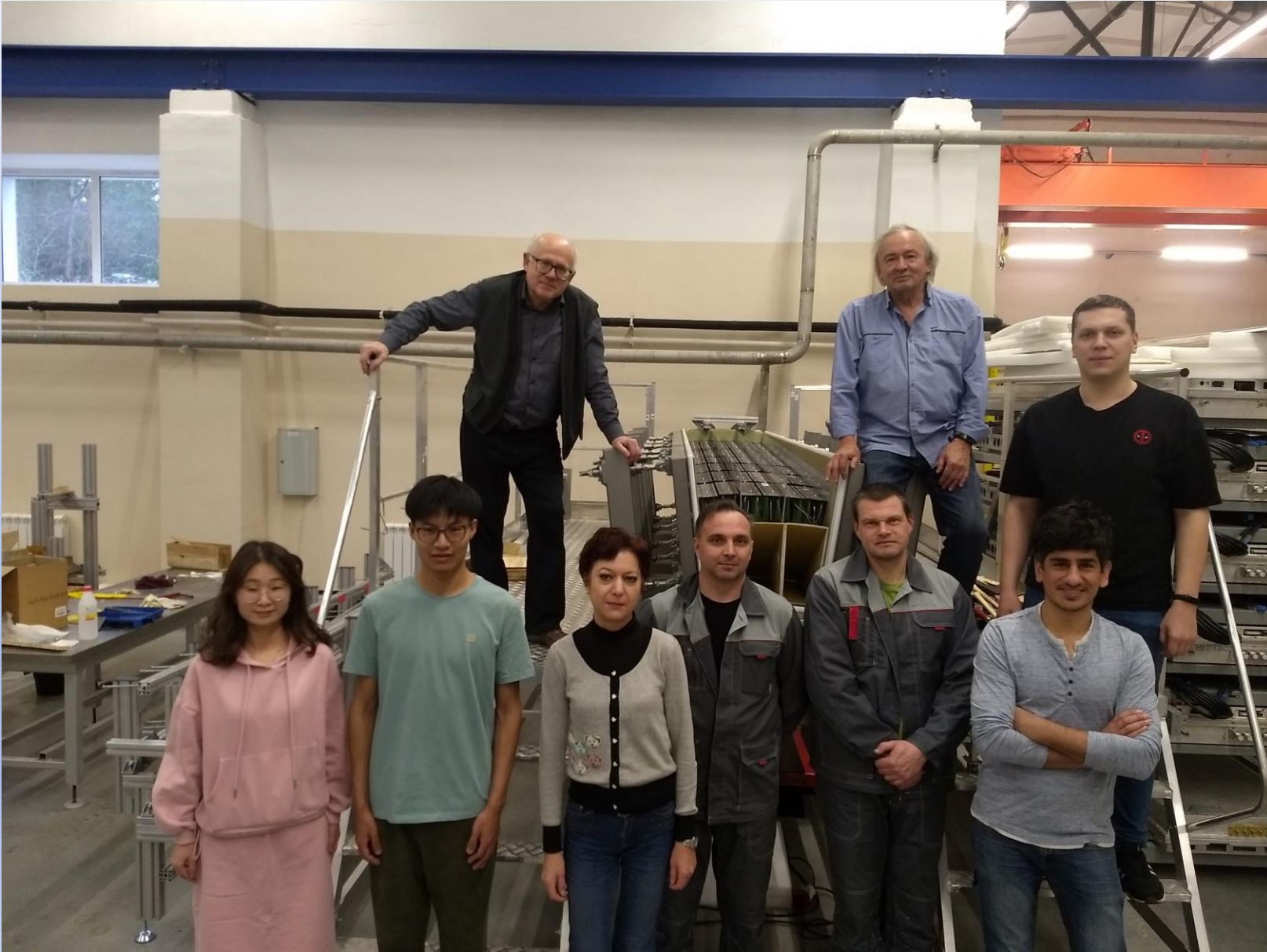


**Half sectors delivery rate promised by the producer is minimum 2 per month!!!**





# ECal International collaboration



**Russia**

JINR, INR, MEPHI

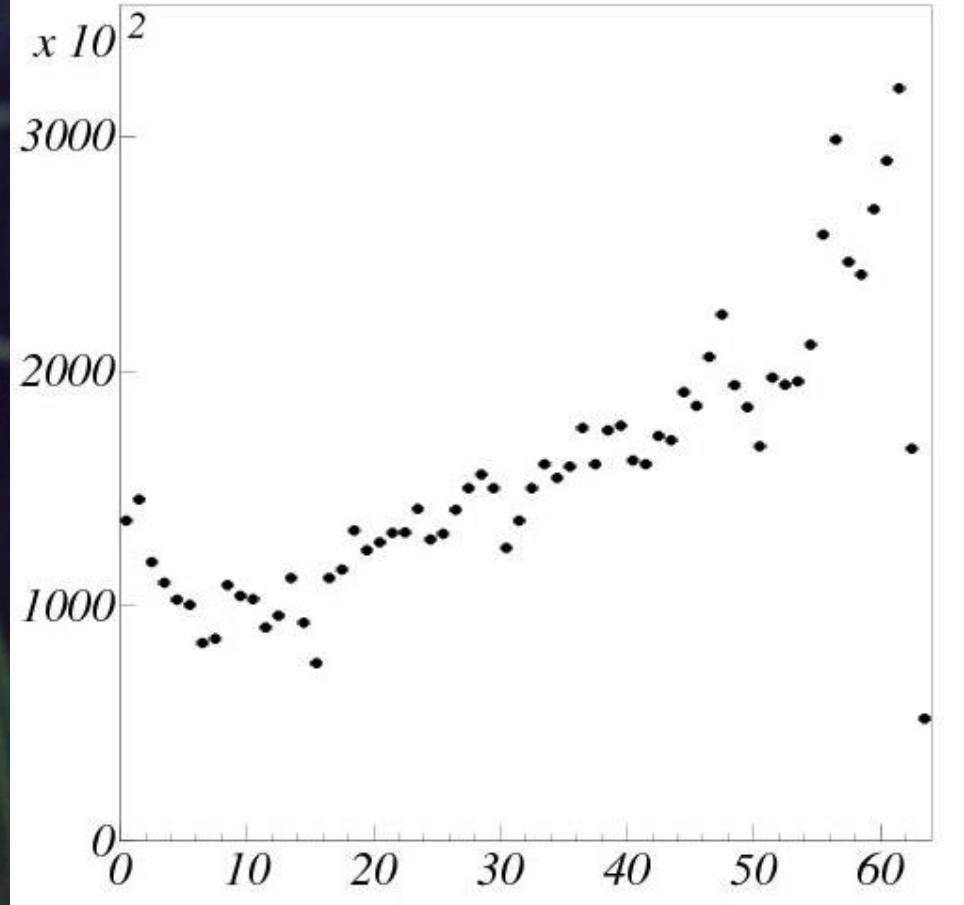
**Bulgaria**

**China**

Universities of  
Tsinghua,  
Shandong,  
Fudan,  
South China,  
Huizhou

**India**

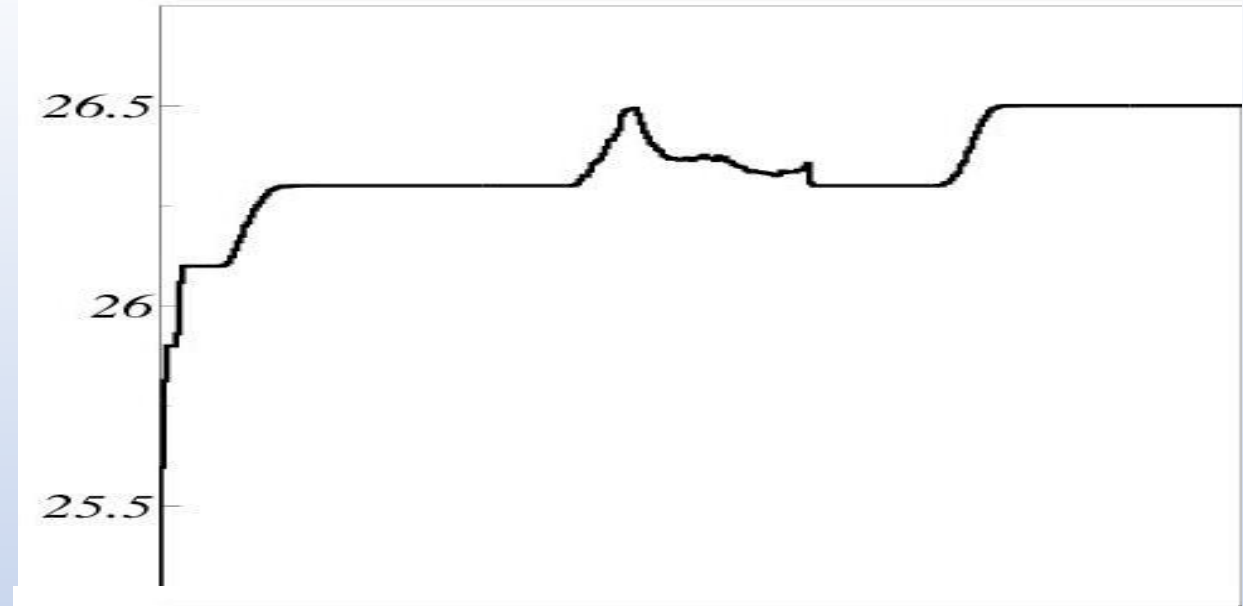
**Chili**



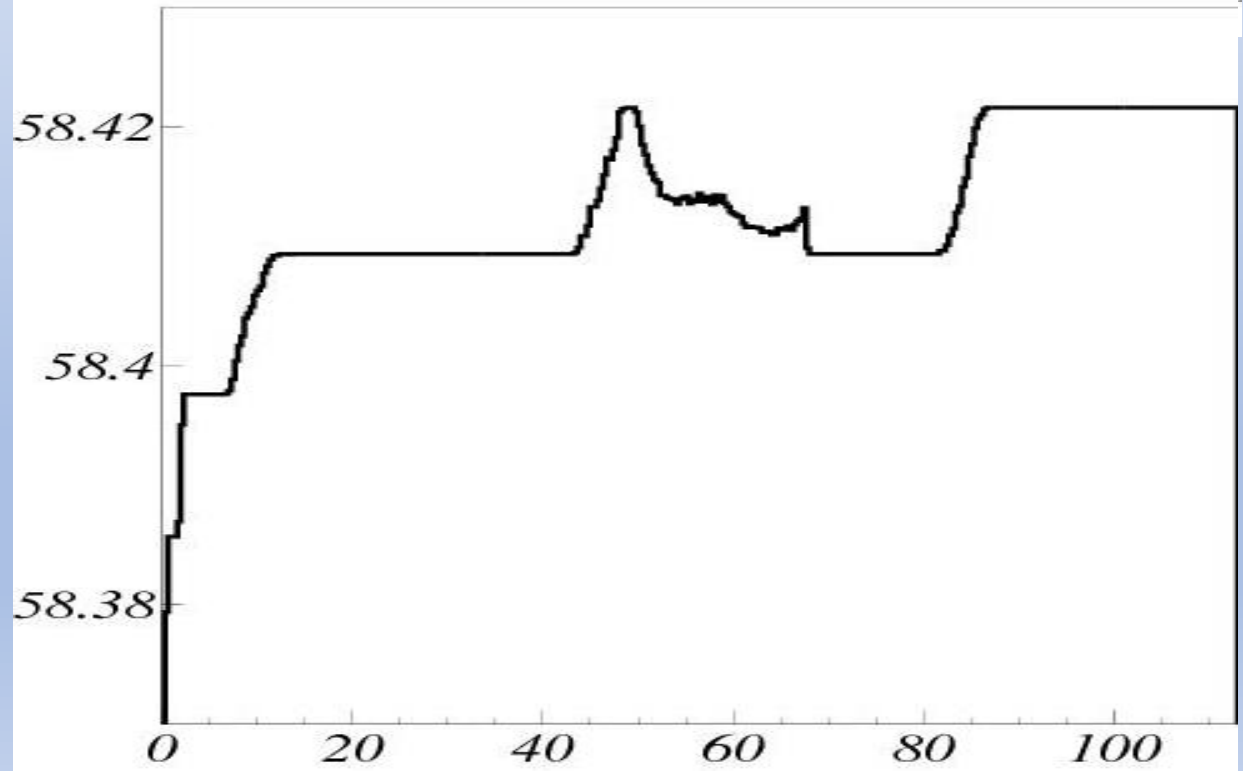
← 64 ch →



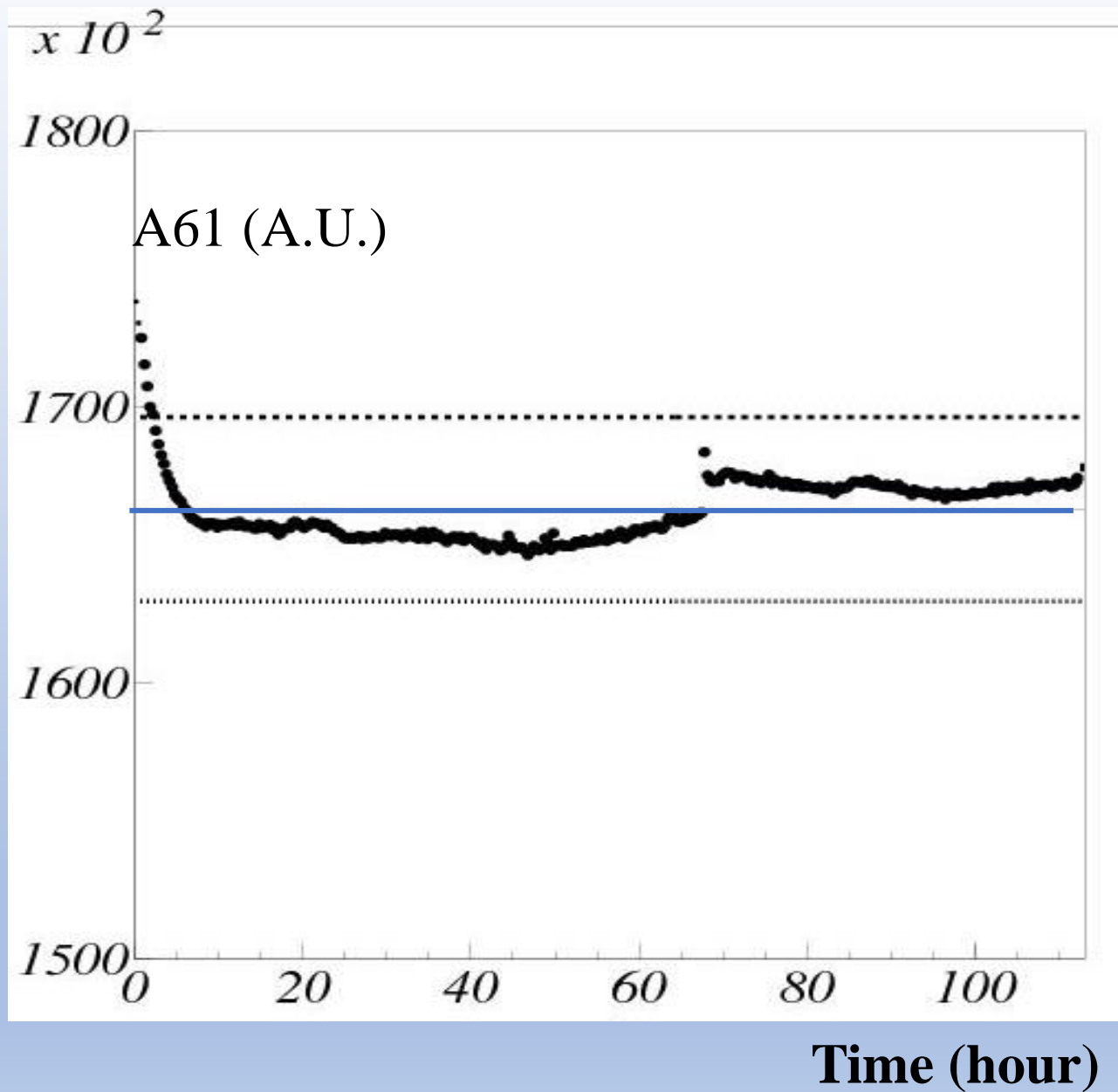
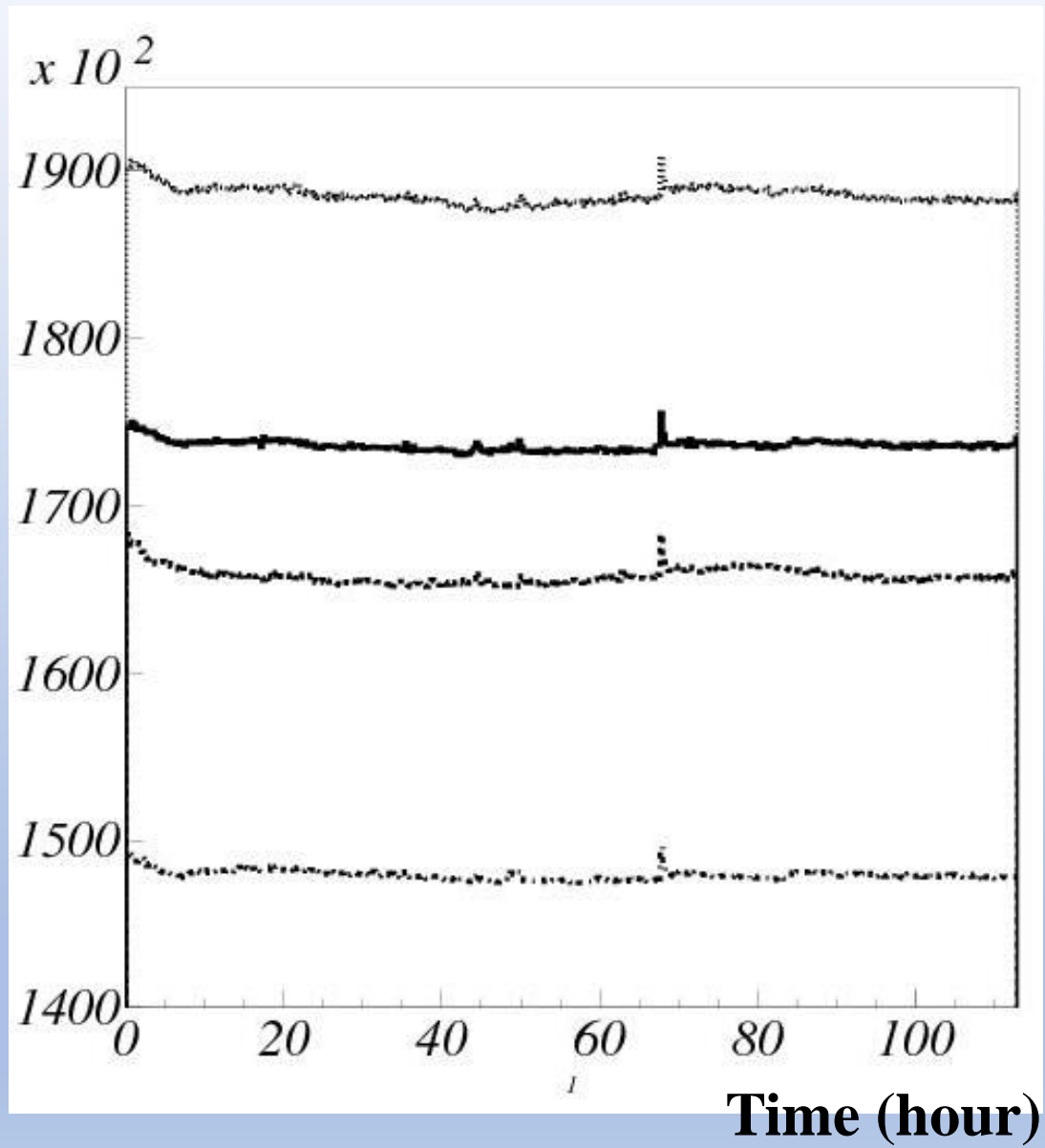
$t^{\circ}(\text{C})$

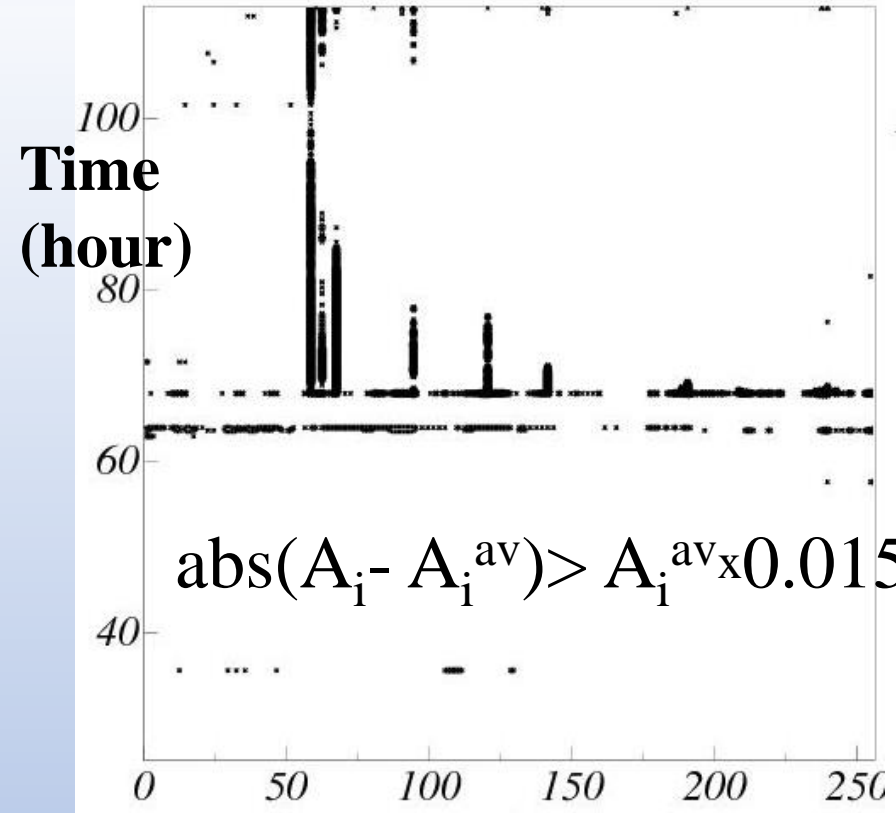


HV (v)



Time (hour)



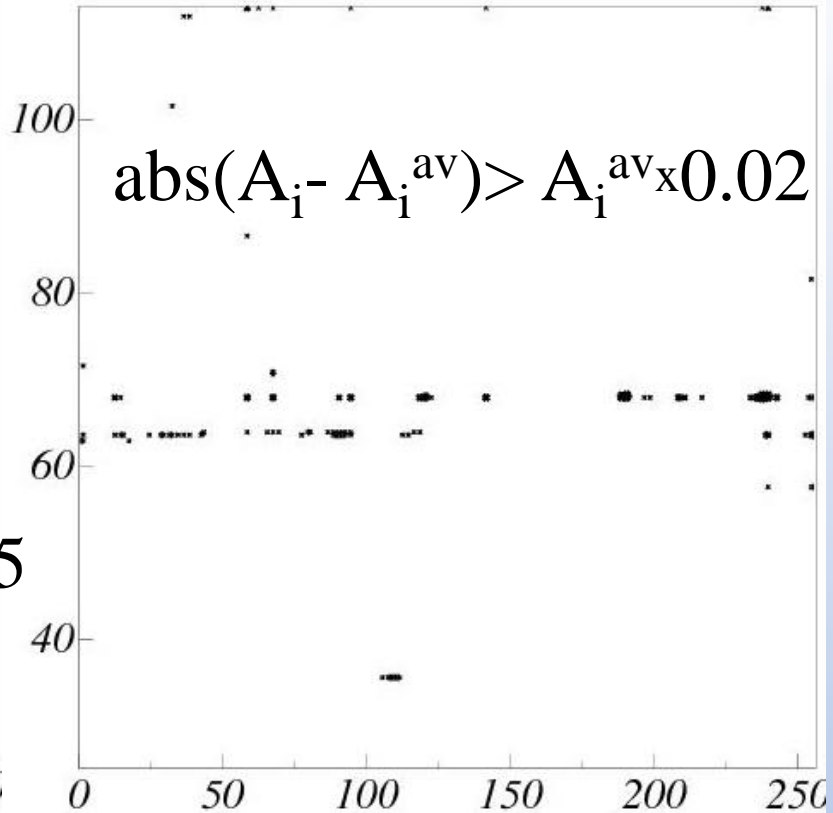


**N<sub>ch</sub>**

- 13
- 59
- 68
- 95
- 121
- 142
- 189
- 191
- 236
- 238
- 240

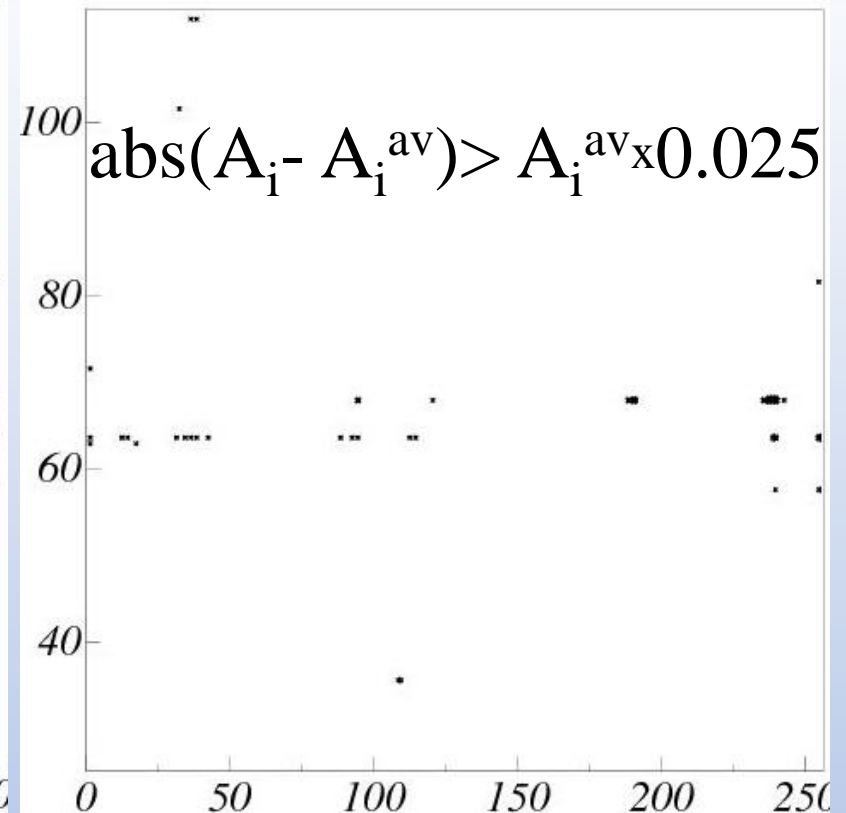
**N<sub>ch</sub>**

- 10
- 26
- 33
- 16
- 13
- 16
- 16
- 26
- 12
- 26
- 31



**N<sub>ch</sub>**

- 59
- 68
- 191
- 238
- 240



**N<sub>ch</sub>**

- 240
- 10

# Cooling system

Task is the evacuation of the heat from the calorimeter electronics.

Technically it can be done only from each half sector independently.

Inside half sector electronics concentrated in the three clusters.

Each cluster 50 Watt ADC power and 7 Watt HV electronics.

ADC modules located in the termoisolated box.

Heat from this box can be extracted either with the help of water cooling system, either by means of air ventilation. Heat from the HV system more reasonable to extract by the air ventilation due to small value of this heat.

Cooling system based on the ventilation by the air has been developed and tested in the scale of one cluster.

Temperature of the ADC processor stay in the region of 36-43 deg during hundreds of hours.

Temperature on the HV board stay below 27 deg in the same time period.

Elements of the cooling system located inside half sector basket designed and may be produced and installed in the basket. Power elements of the system should be located outside of MPD, preferably outside MPD hall. This part of the project is not developed yet.

- **1600 modules out of 2400 are produced**
- **400 more modules can be produced soon if KURARAY fibers will be delivered**
- **Clusters production is going smoothly and all clusters can be made before summer**
- **Half sectors baskets mass production procedure under development. Mass production will start in the tail of 2022 and may be finished in time**
- **ECal cooling system which is outside MPD barrel is under development**
- **Stability of the ECal operation is under long term test now. Preliminary results are in agreement with the expectations. Proposed LED based monitoring system promise to be a useful tool**