

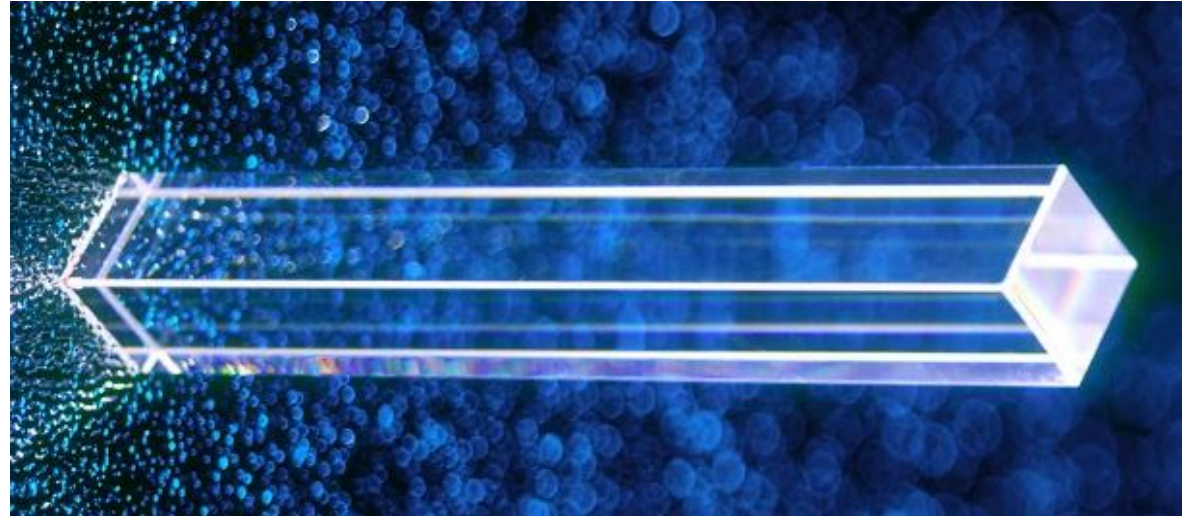


ALICE/PHOS H2 beam test 2024

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for the ALICE/PHOS team**



ALICE



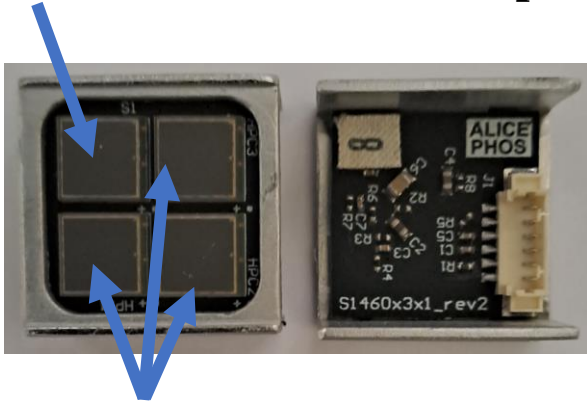
PHOS (PHOton Spectrometer- is an electromagnetic calorimeter in ALICE. Base elements: PbWO_4 crystals with APD readout. Working temperature -25°C

Main goals of the test PHOS SPS H2 test in 2024 were:

- 1) Measurements of the system linearity and energy resolution curve**
- 2) Test of the prototype of the 32-channels PHOS readout card (FEC32)**
- 3) At one energy do intensity scan to understand SiPM and FEC32 rate capabilities**

ALICE/PHOS channel and new photodetectors

1 x S14160-6010PS MPPC (10 um pixel)(High Energy)



3 x S14160-6015PS MPPC (15 um pixel) (Low Energy)

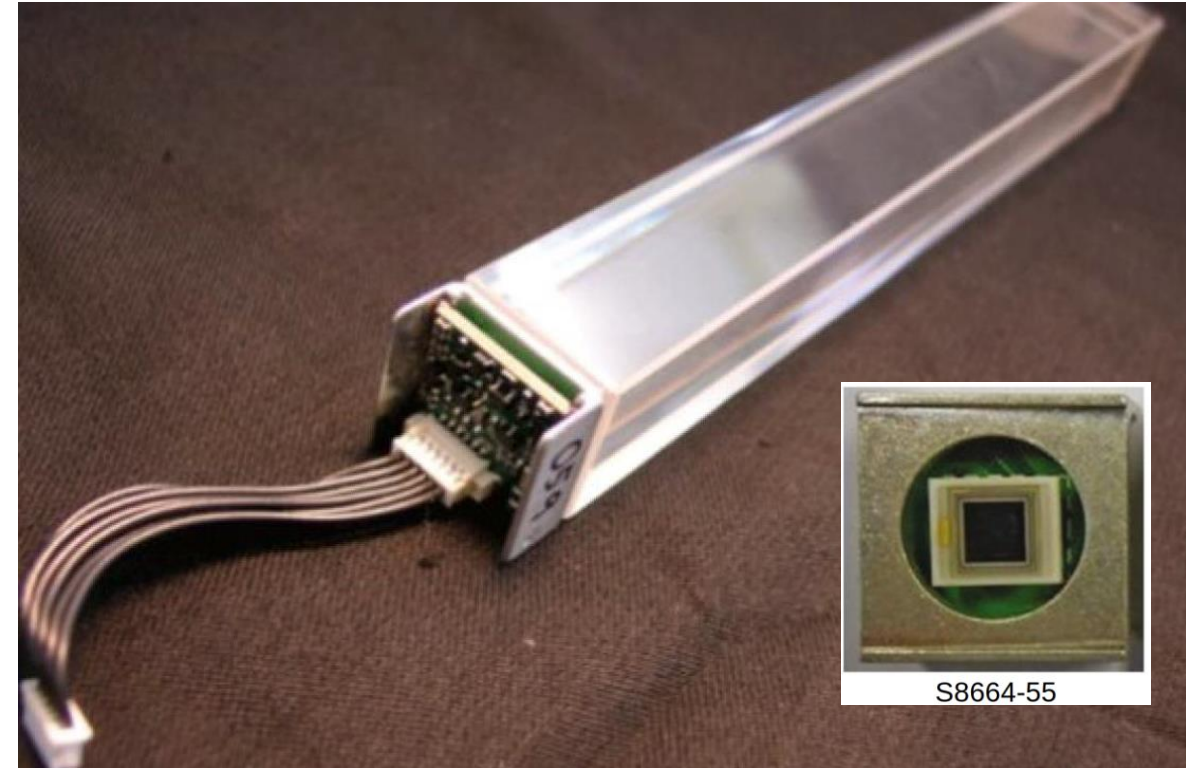
Hybrid SiPM connection - signal –serial, voltage – in parallel.

All PHOS photodetectors
produced by HAMAMATSU, Japan

Two arrays inside detector:

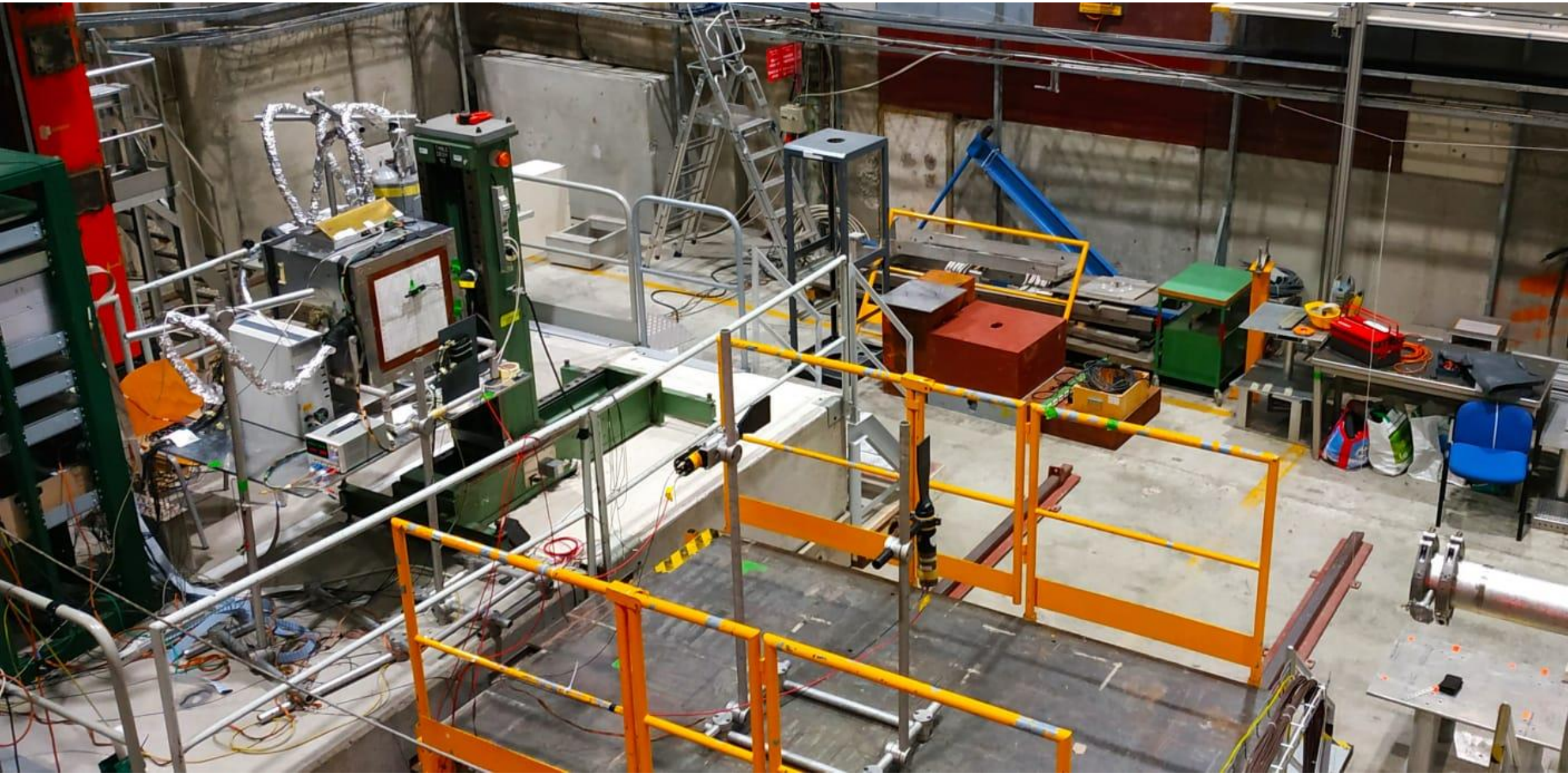
- 1)3x4 DU (tested on PS) DAQ based on VME electronics
- 2)5x5 DU for SPS test with FEC3

Detection Unit



Current PHOS photodetector and PbWO4
Crystals size 22mm x22mm x180 mm

Data for VME system is presented.



Temperature control

1 -29.04. Installation

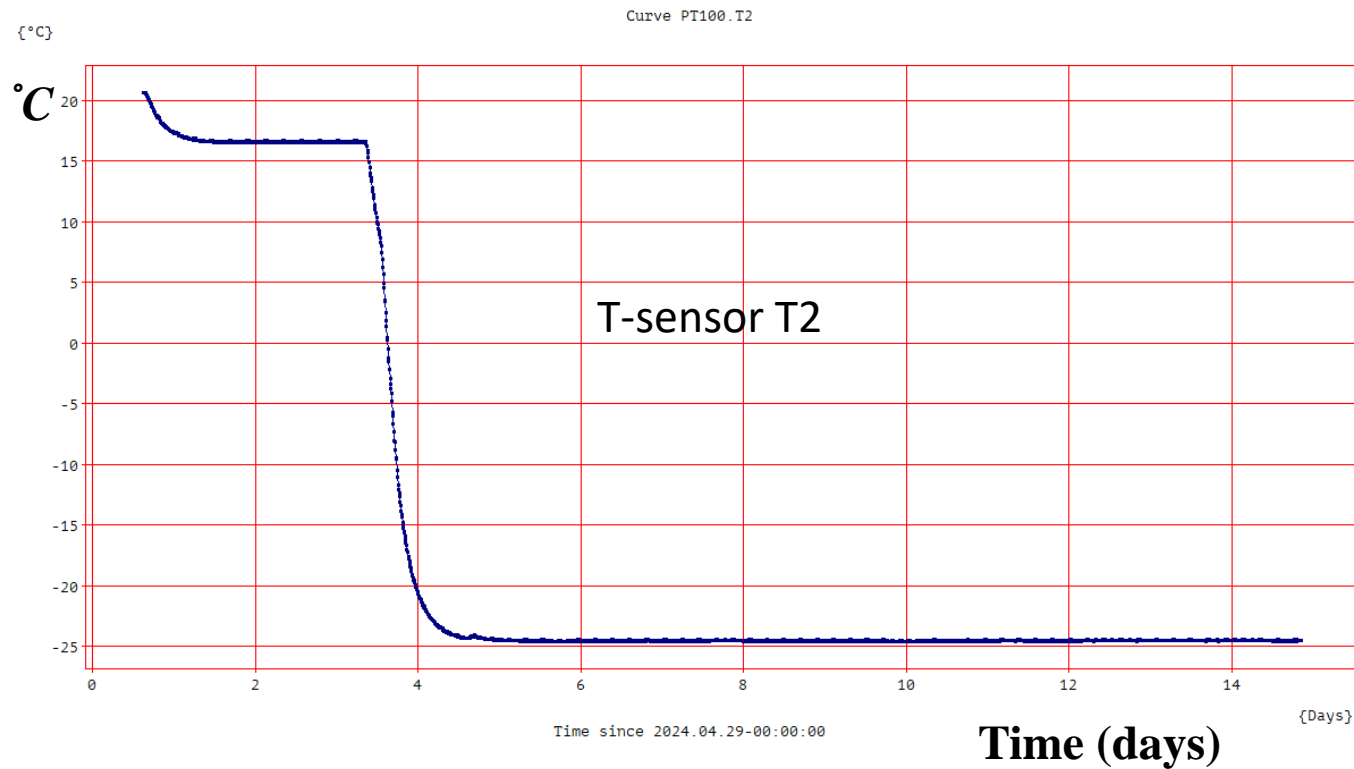
2 -30.04. Thermostabilization at +16.5

Debugging, data taking

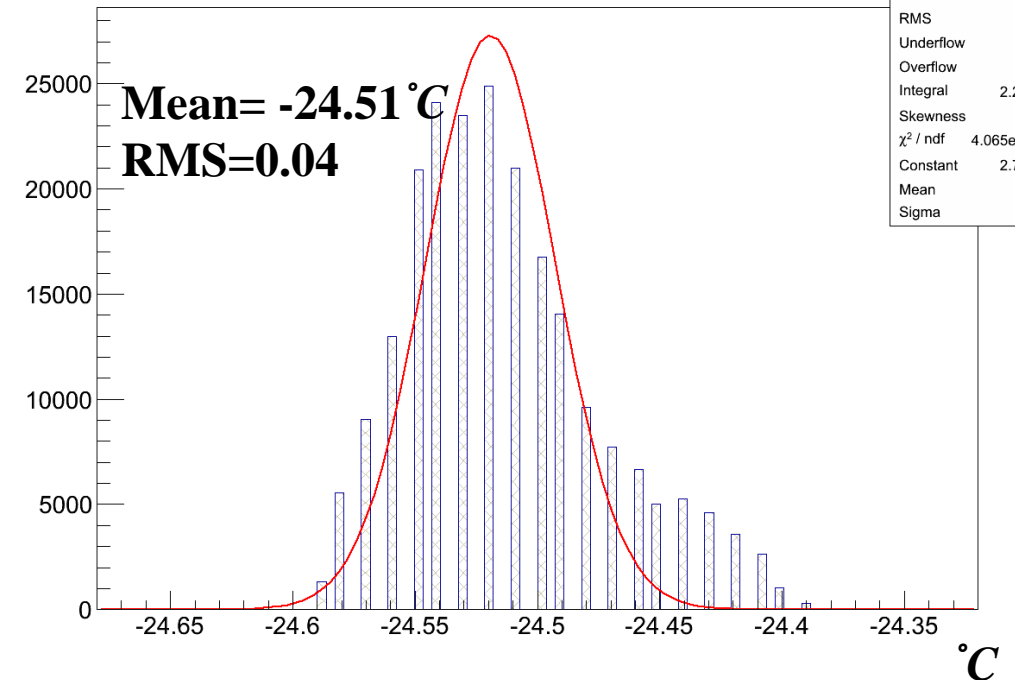
3 - 02.05.08:00 Start cooling.

4 – 03.05.16:00 Thermostabilization at -24.5

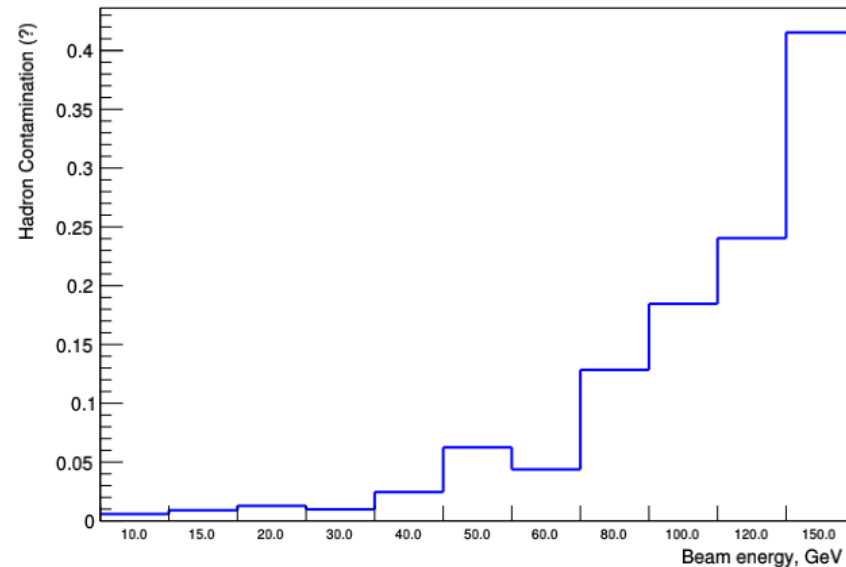
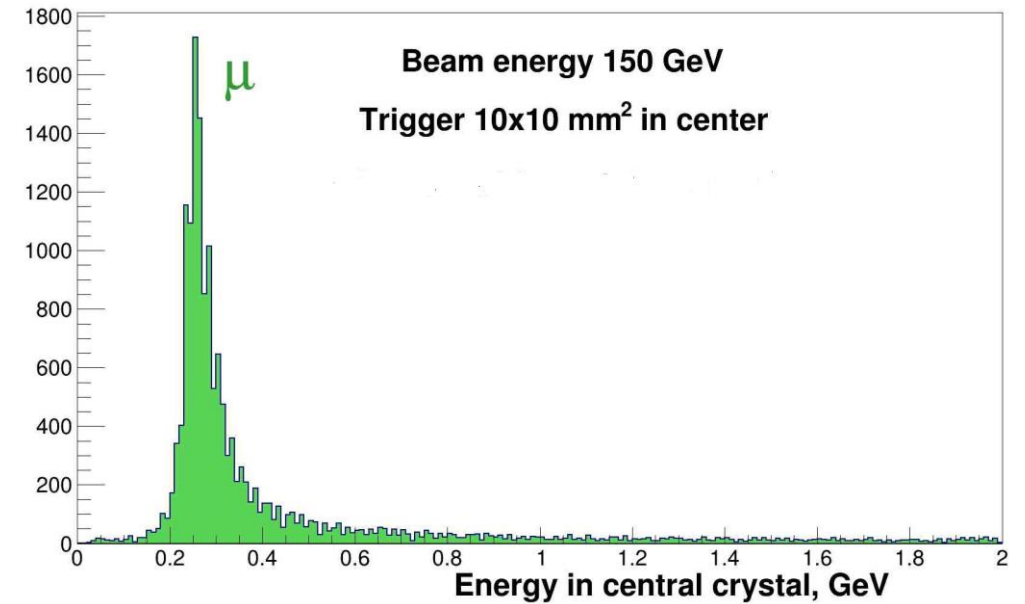
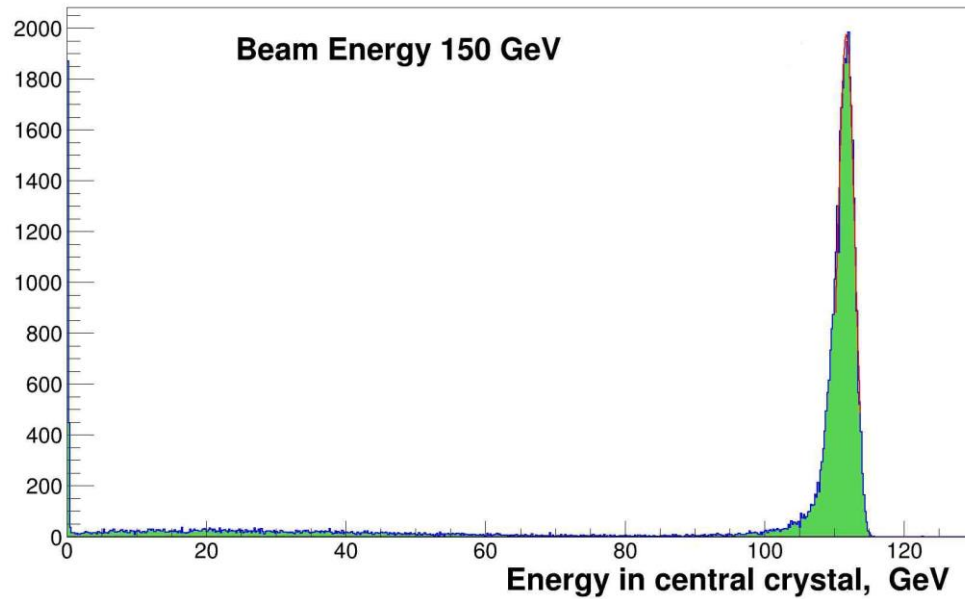
5 – 14.05.10:30 Start warming up. 16-00 Stop data taking



Distribution of Value + gaus fit

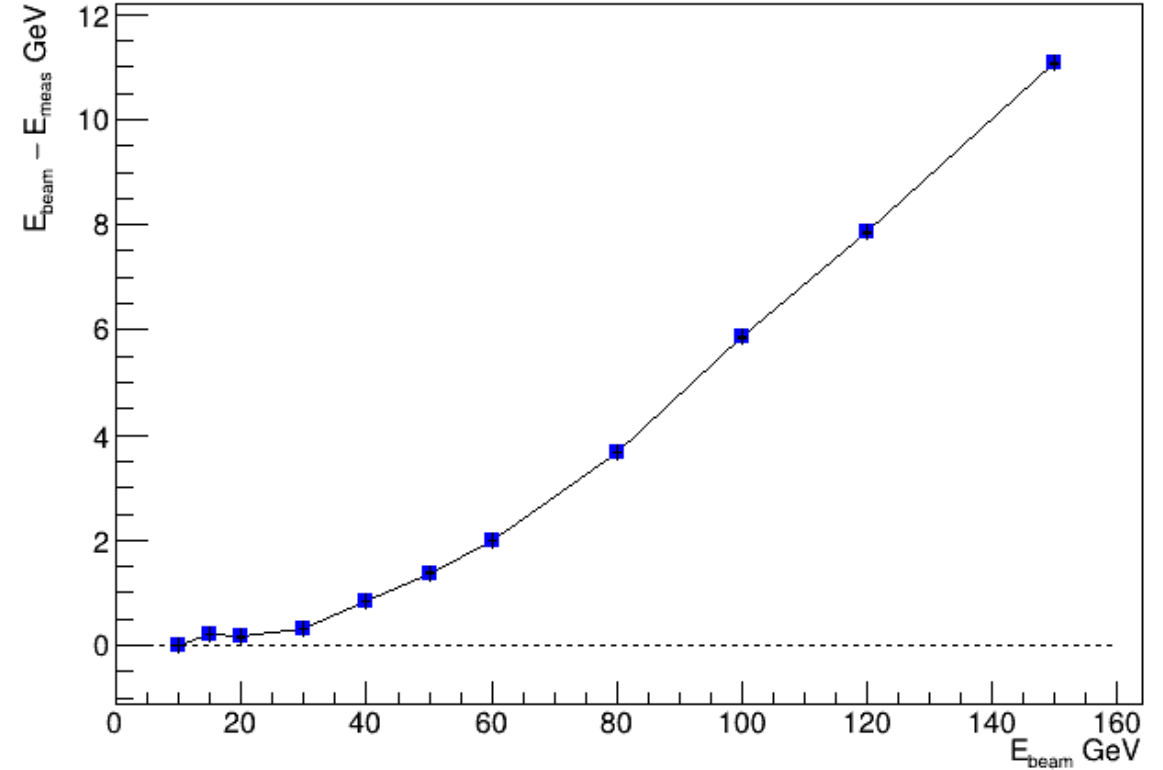
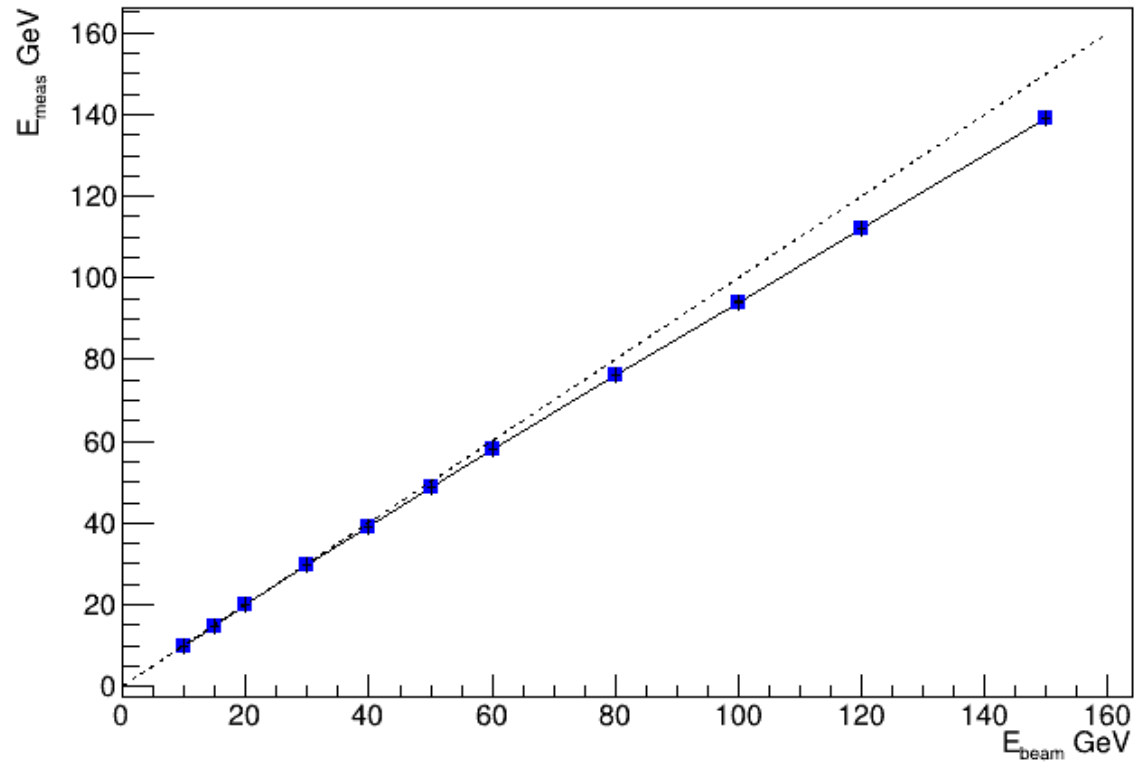


Beam composition



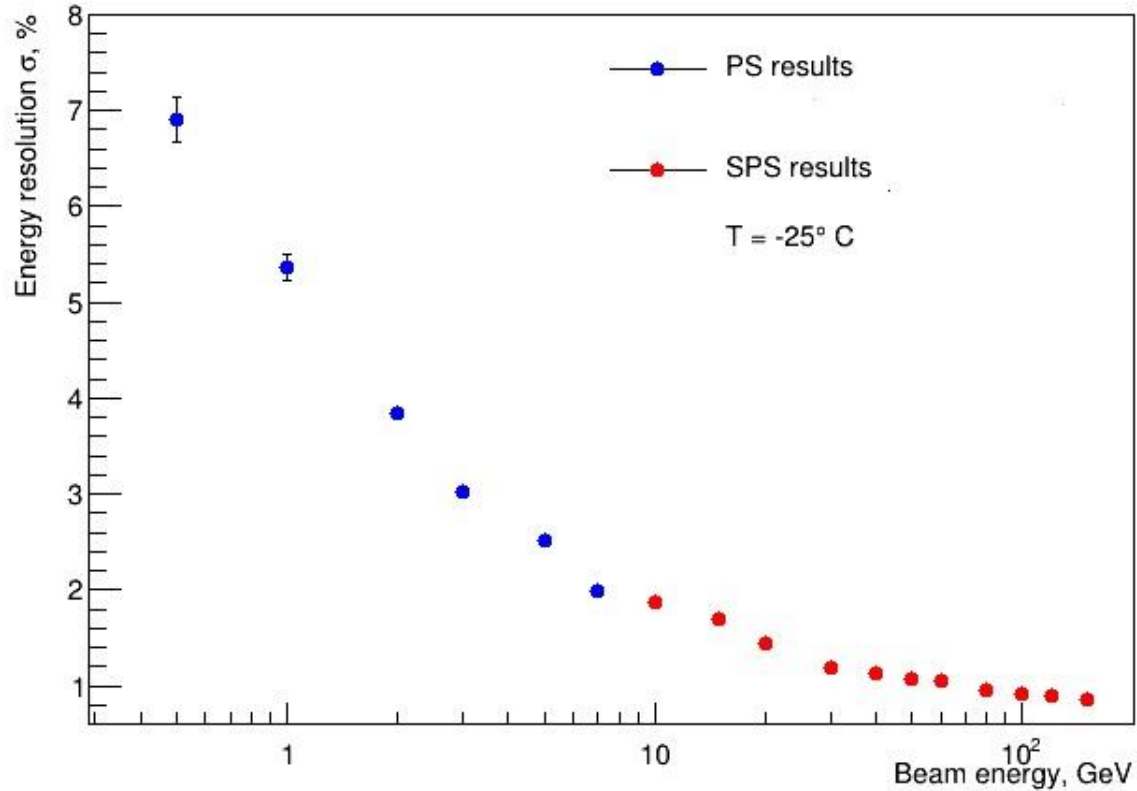
Very good pure electron beam $E < 60$ GeV
Small hadron contamination contamination

Linearity

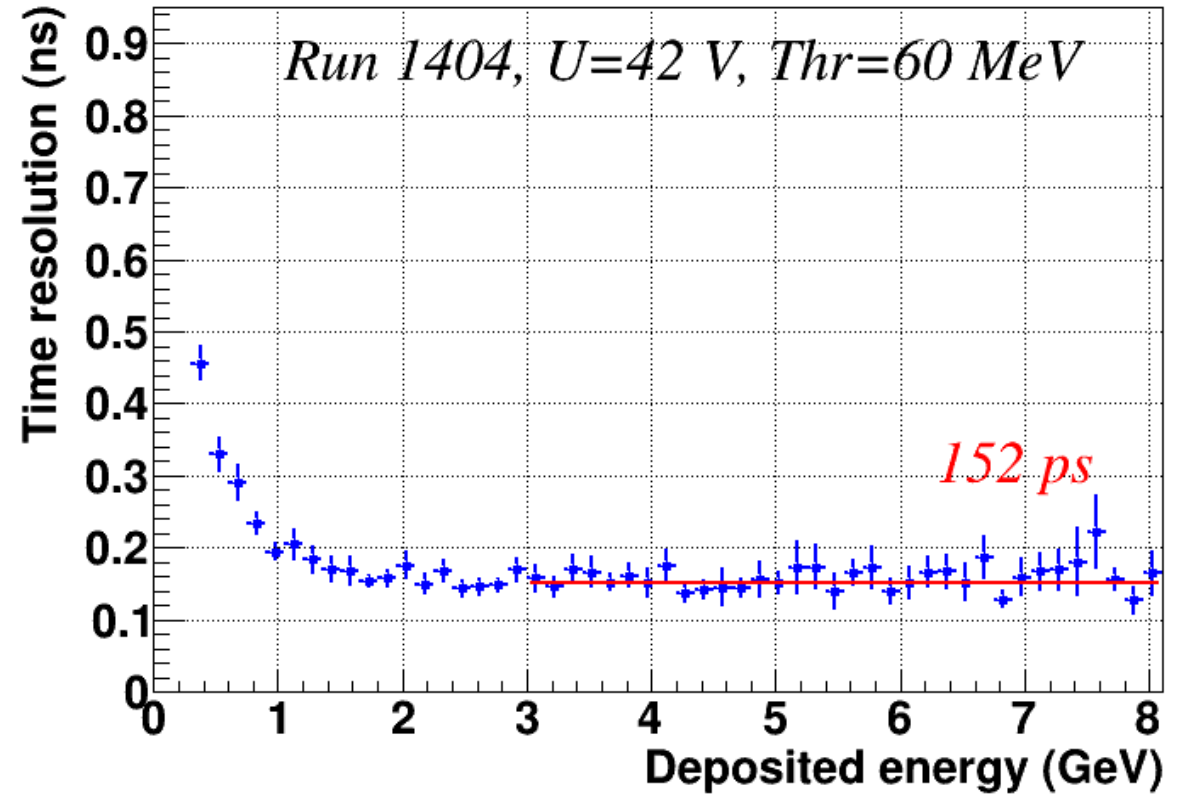


Deviation from beam energy is less than 12 GeV.

Energy resolution and time resolution curves



Good matching PS and SPS results



No correction for the start counter

Conclusions

In period 30.04-15.05.2024 on H2 SPS ALICE/PHOS have been taken measurements of energy and time resolution, linearity for VME and FEC32 electronics. Measurements done in energy points 10, 15, 20, 30, 40, 50, 60, 80, 100, 120, 150 GeV.

Rate characteristics of theALICE/PHOS detector were measured at 10, 50 and 100 GeV (FEC32).

Tests of the electronic card were done, the card meets all technical requirements.

The final version of the photodetector was tested.

We have got big amount of data for future analysis.

Thank you to all teams working on the SPS NA beams, personally to Nikolaos Charitonidis, Bastien Rae, Michael Lazzaroni and the people who helped us during the test.

