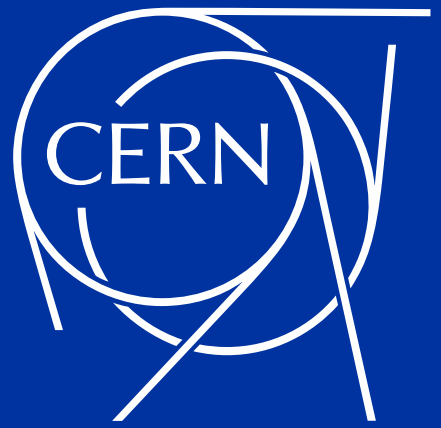


Twocryst Fiber Tracker (TFT) Status

Chiara Maccani – Sune Jakobsen, Gianluca Valentino, Krzysztof Korcyl

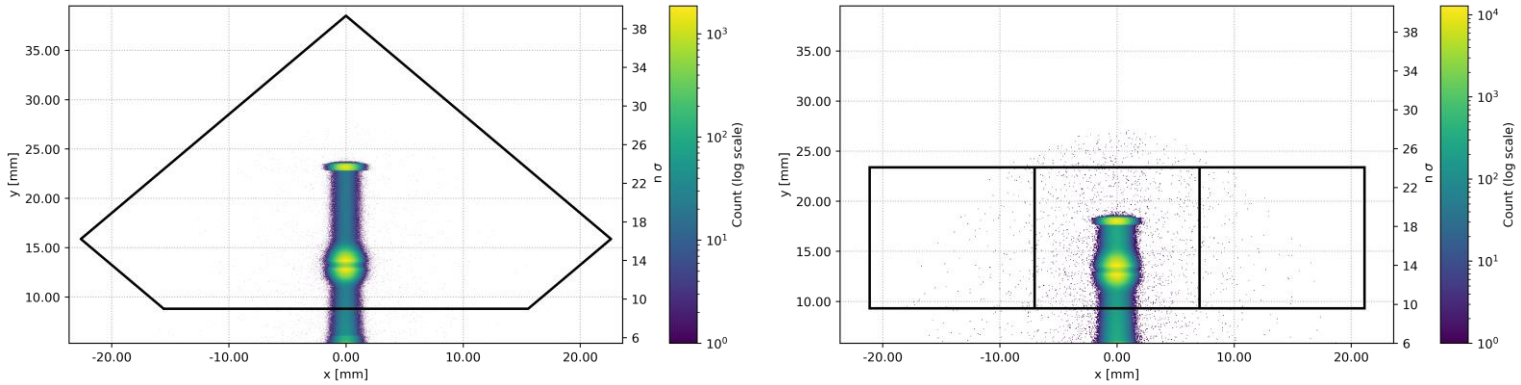
CERN BE-ABP-NDC

17/10/2024

TWOCRYST detectors

Pixel Detector

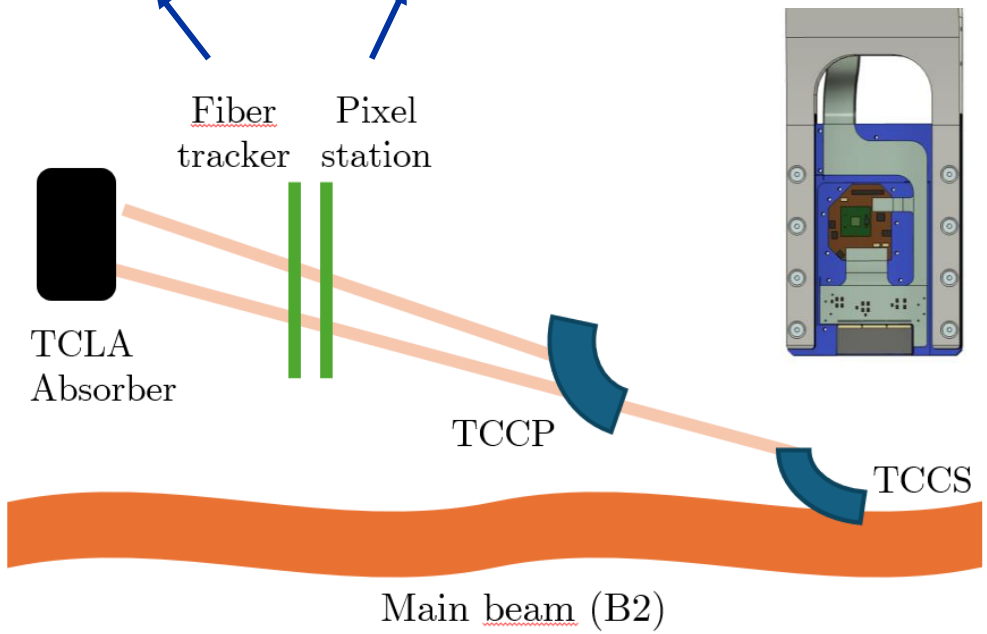
➜ currently under beam test (16 - 31 October)



Fiber Tracker (TFT)

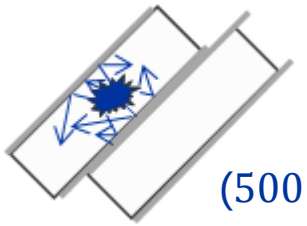
former ATLAS-ALFA detector (uninstalled in Nov 2023)

➜ needs to be tested and adapted to TWOCRYST purposes



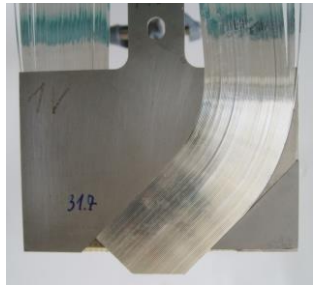
TFT Detector

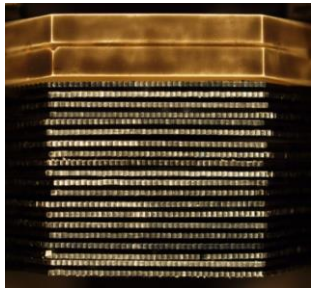
- Scintillating **fibers**



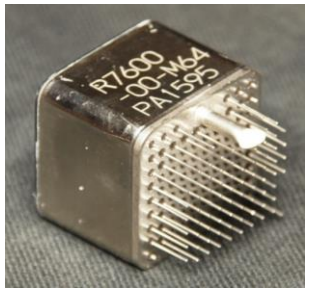
$(500\ \mu m)$

- Main detector plate

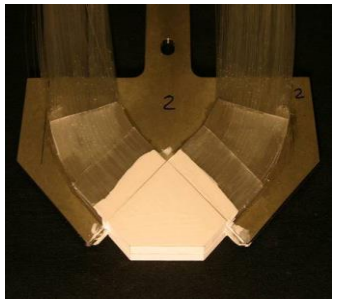


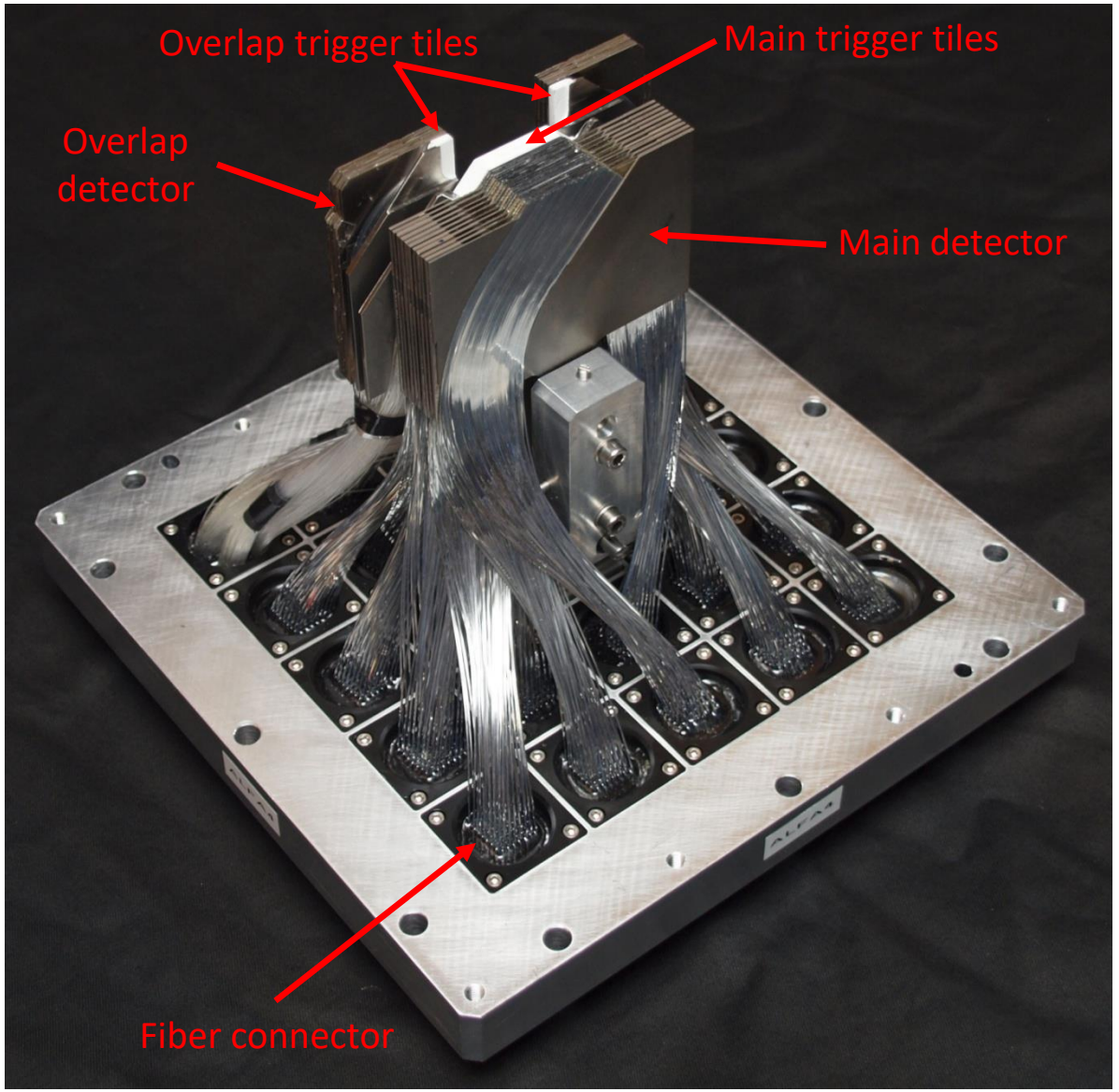


- MultiAnode PhotoMultiplier Tube (**MAPMT**)



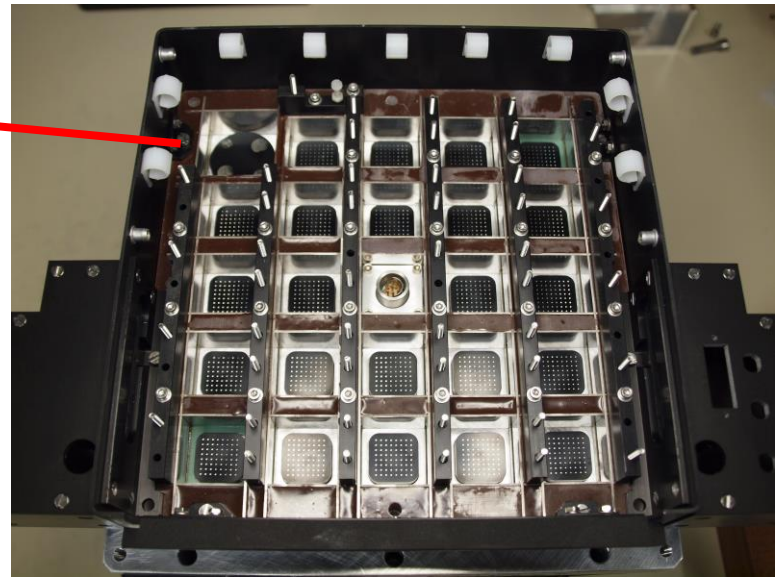
- Main **trigger** scintillator tile





TFT Detector – Blackbox

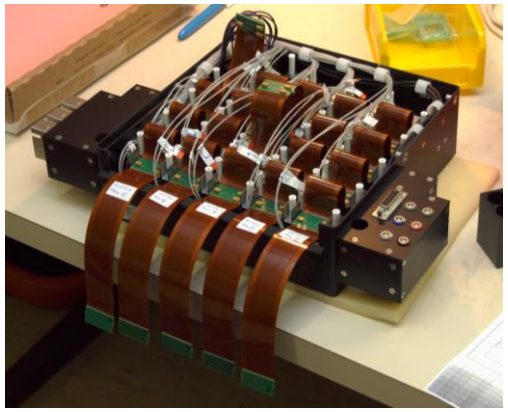
Trigger PMTs



23 MAPMTs (64 channels)
➜ 1472 channels

PhotoMultiplier FrontEnd (PMFs)

Kapton cables

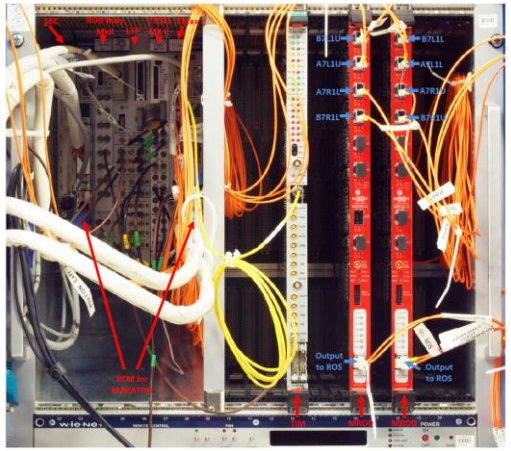


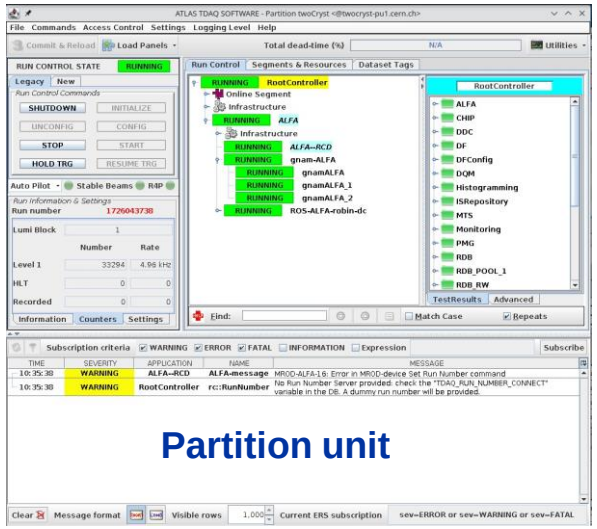
Motherboard

TFT Detector – Motherboard

DAQ system

- **BOBR** (LHC clock)
- **Timing / Trigger** system
- **Readout** (mROD)



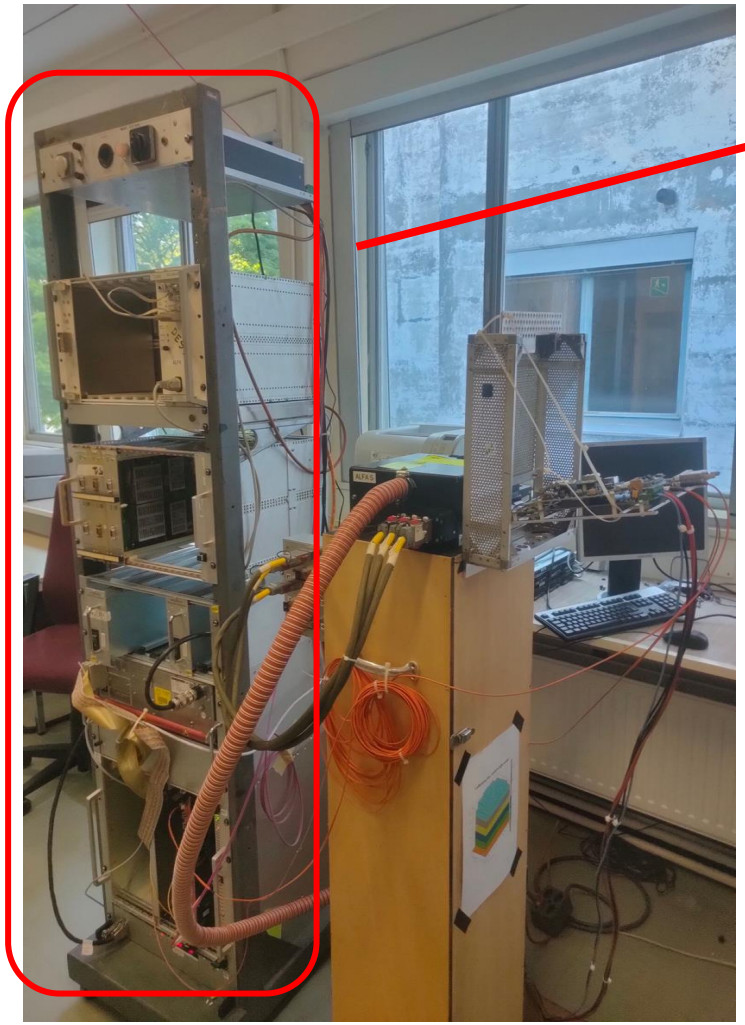


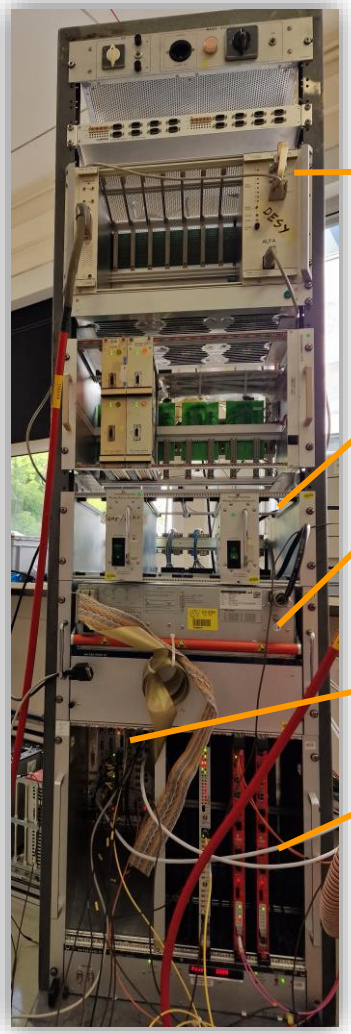
→ **Histograms!**

Detector control system (DCS)

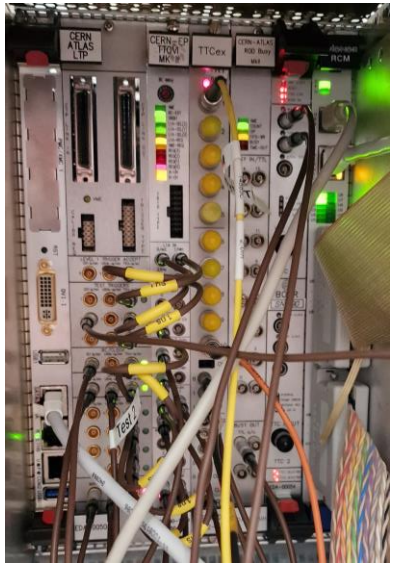
- Set MAPMTs high voltages (**HV**)
- Configure **PMF**
- Monitor motherboard
- Monitor movement

TFT Test Stand



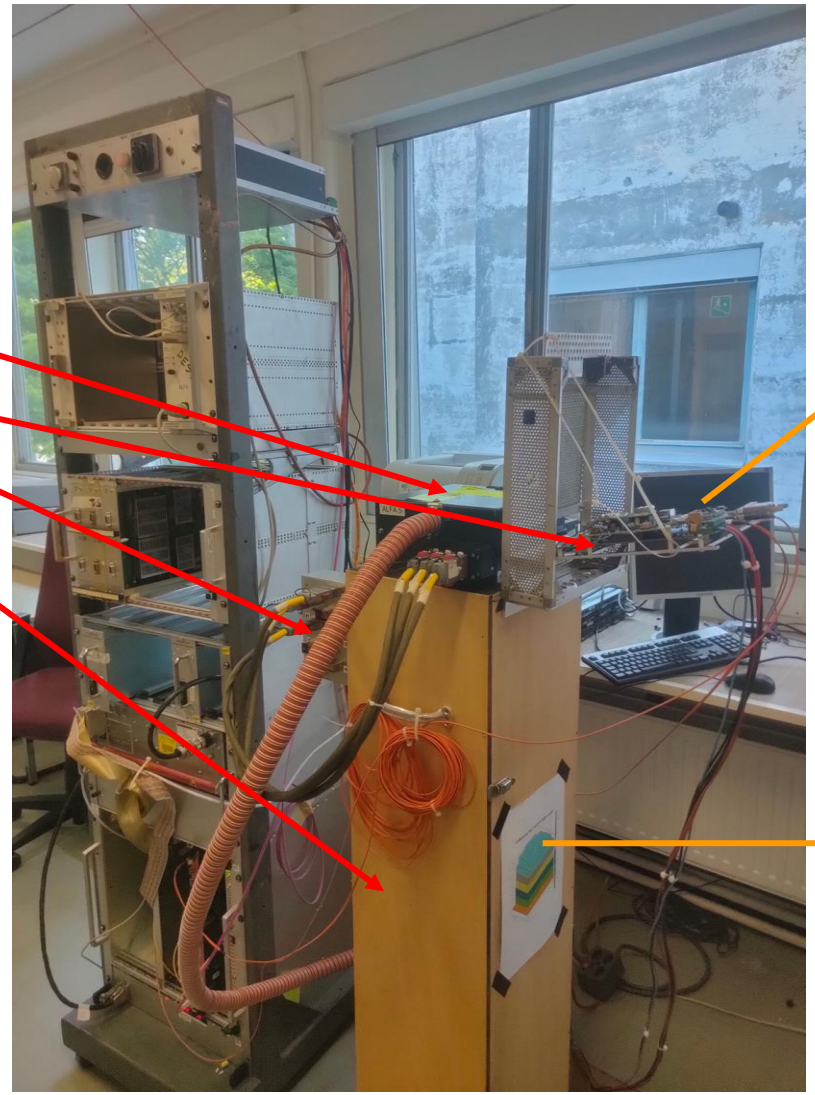


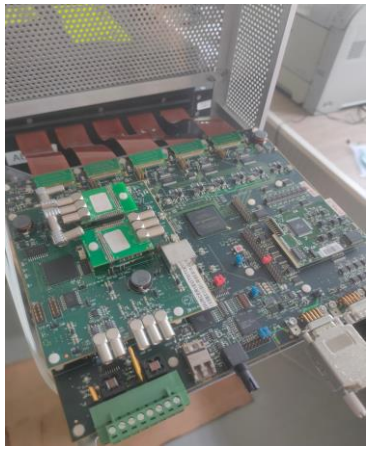
- **Power suppliers** units (PSU)
  - High Voltage PSU
  - CANbus PSU
  - Low Voltage PSU (Maraton)
- **DAQ** VME crate
  - Timing system
  - Readout

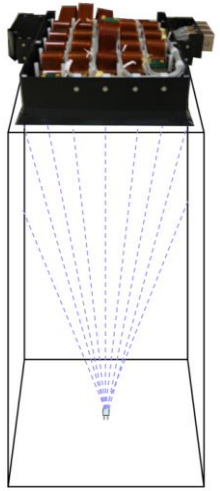


TFT Test Stand

- Power suppliers units (PSU)
- DAQ VME crate
- **Blackbox** containing photomultipliers
- **Motherboard**
- Air cooling for sensors and electronics
- Wooden box with **LED** at the bottom

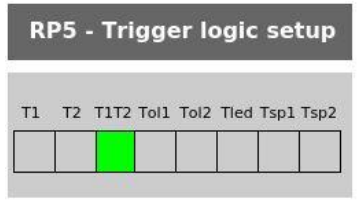


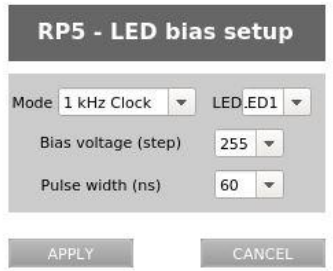


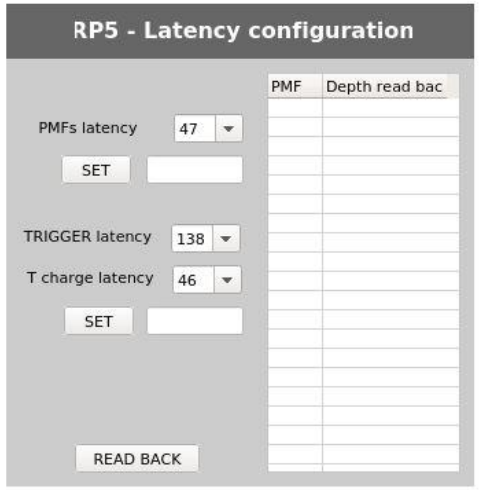


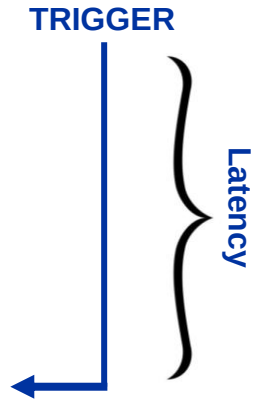
Detector Timing

Tests with **pulsed LED light** ($f = 1\,KHz, V_h = 3.3\,V, w = 20\,ns$)
➜ find correct latency to time-in the detector wrt LED light

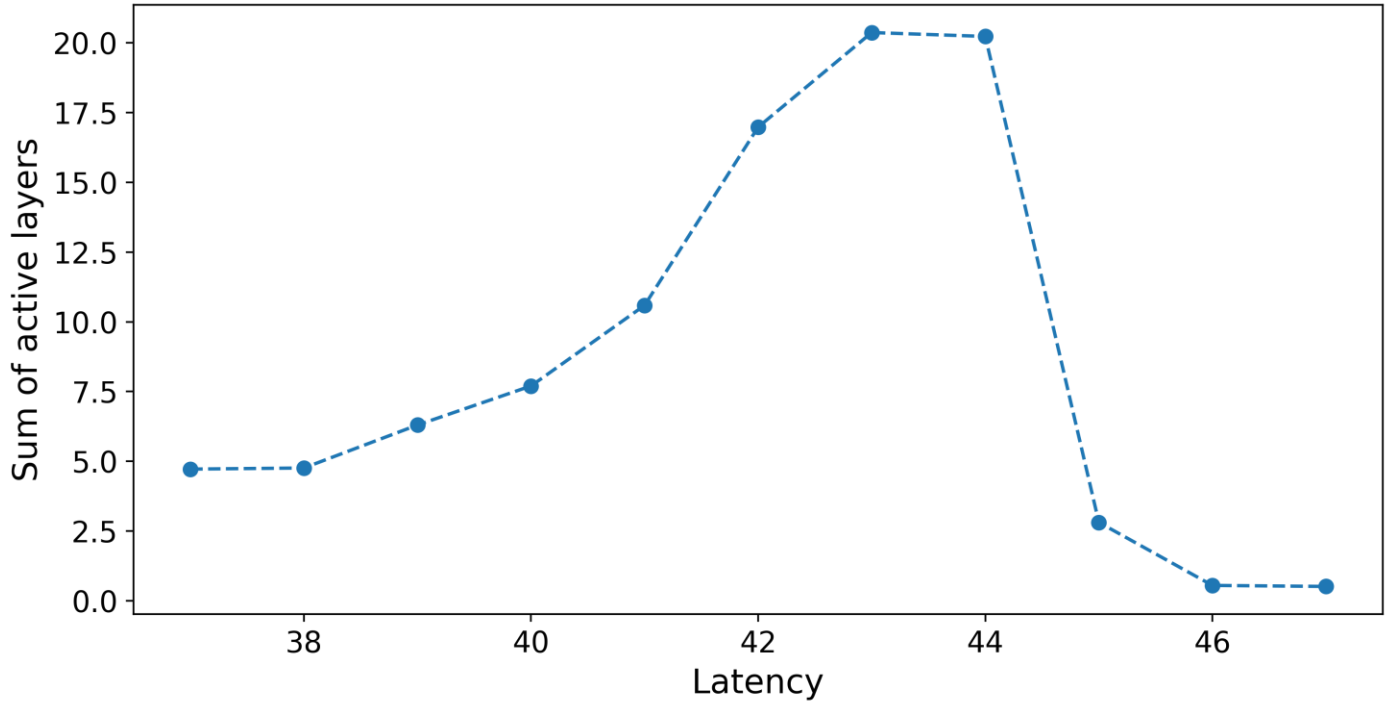




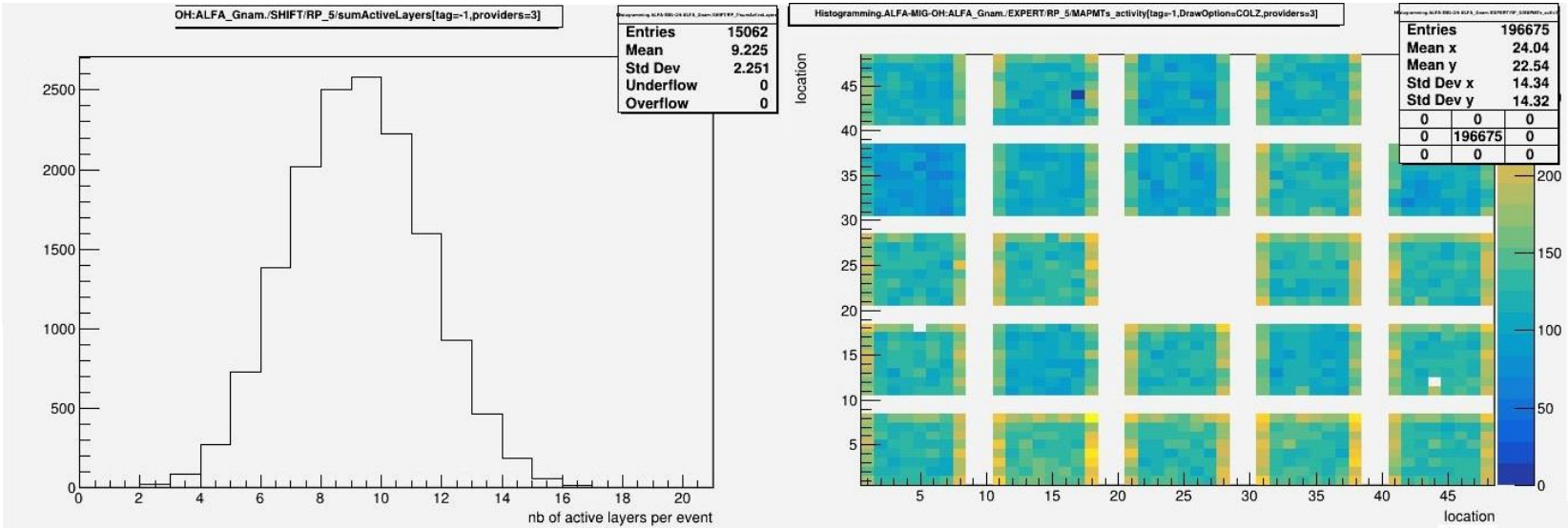


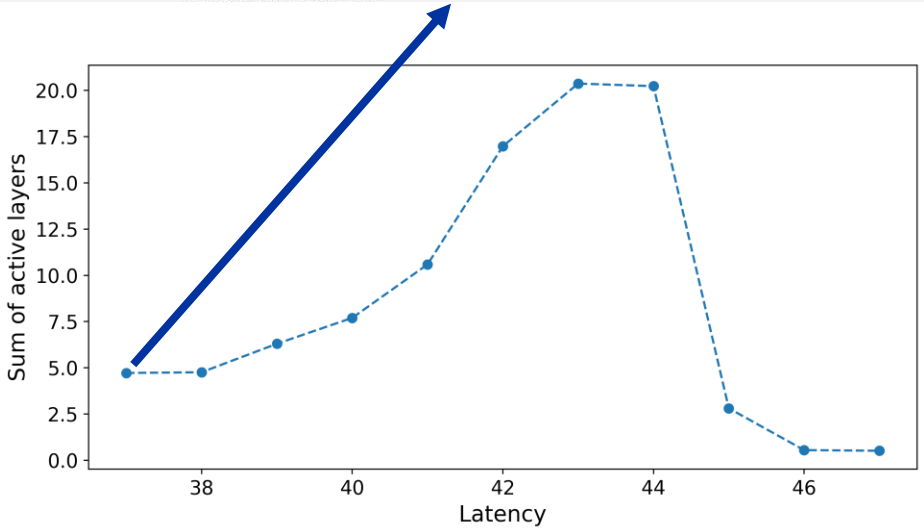


Slot 0	0
Slot 1	0
Slot 2	0
Slot 3	0
Slot 4	**DATA!**
Slot 5	0
Slot 6	0
…	…

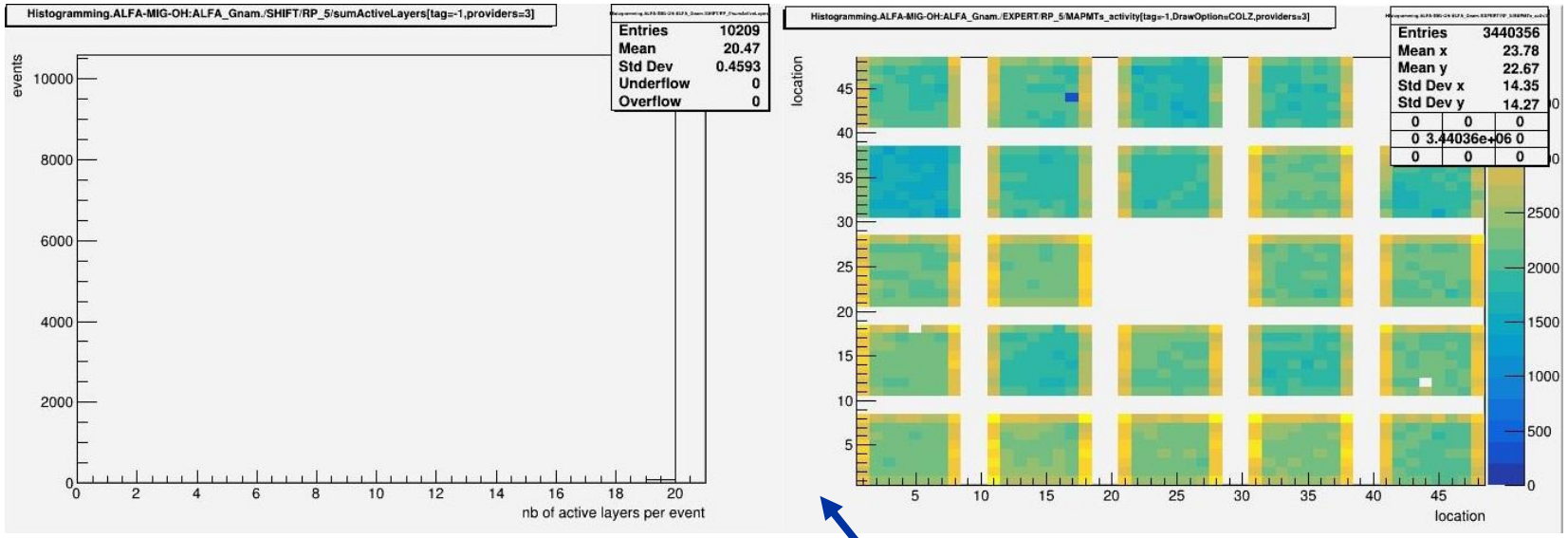


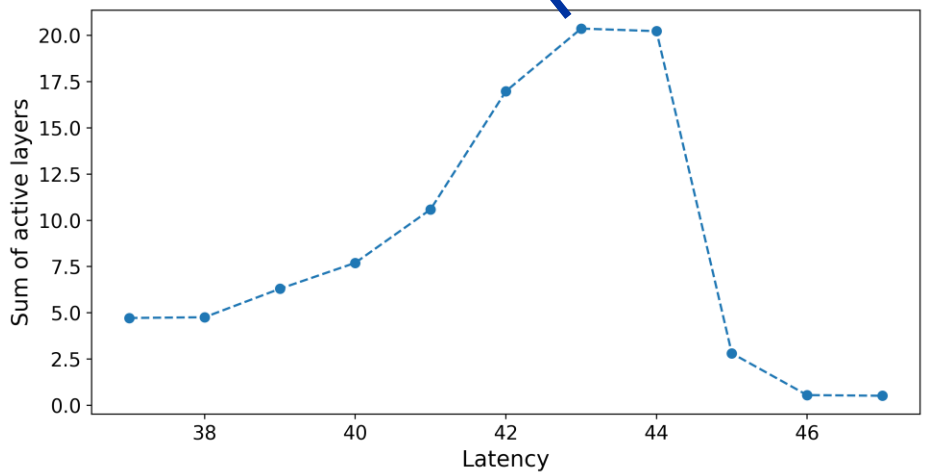
Detector Timing - Latency Scan



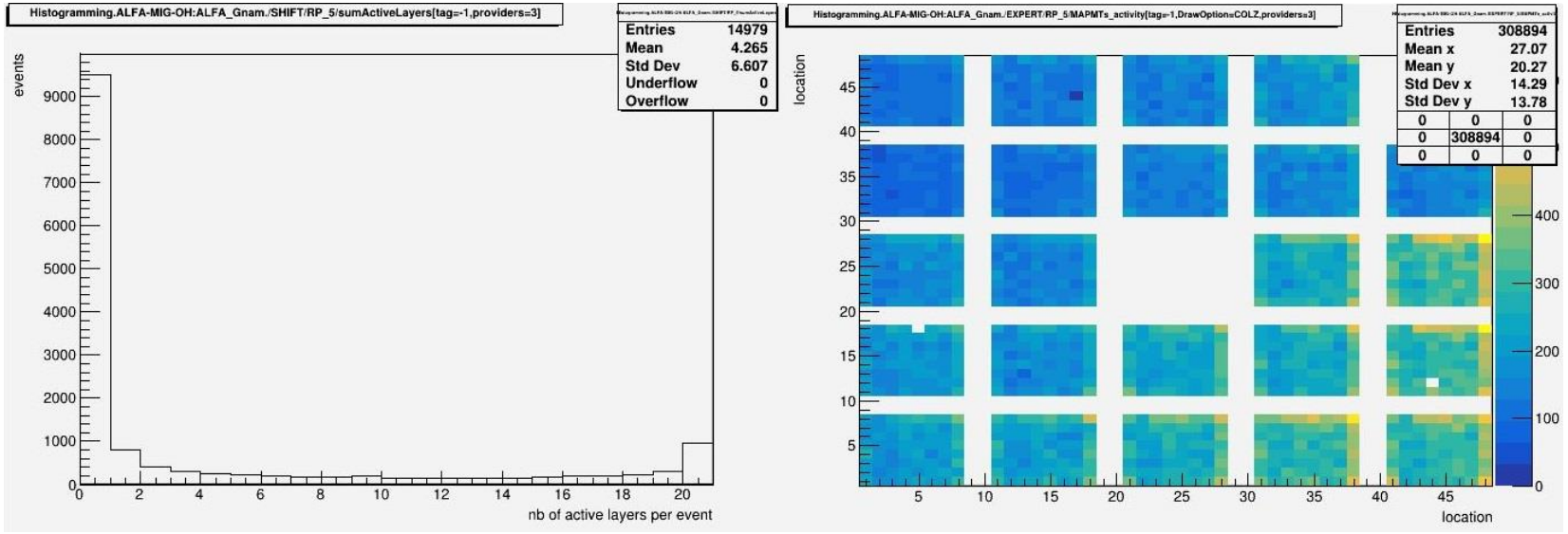


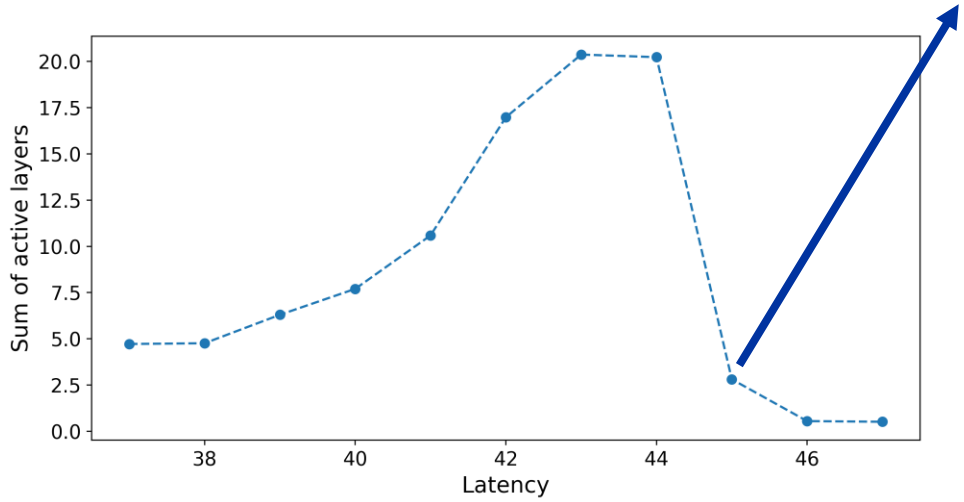
Detector Timing - Latency Scan



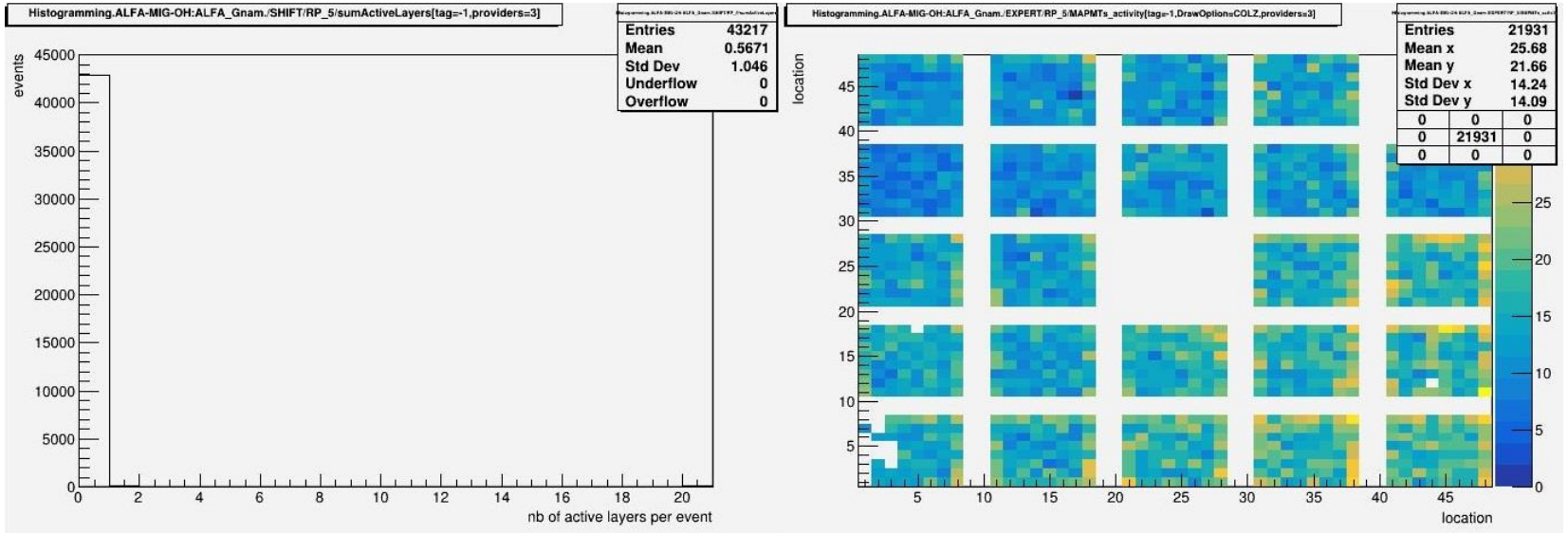


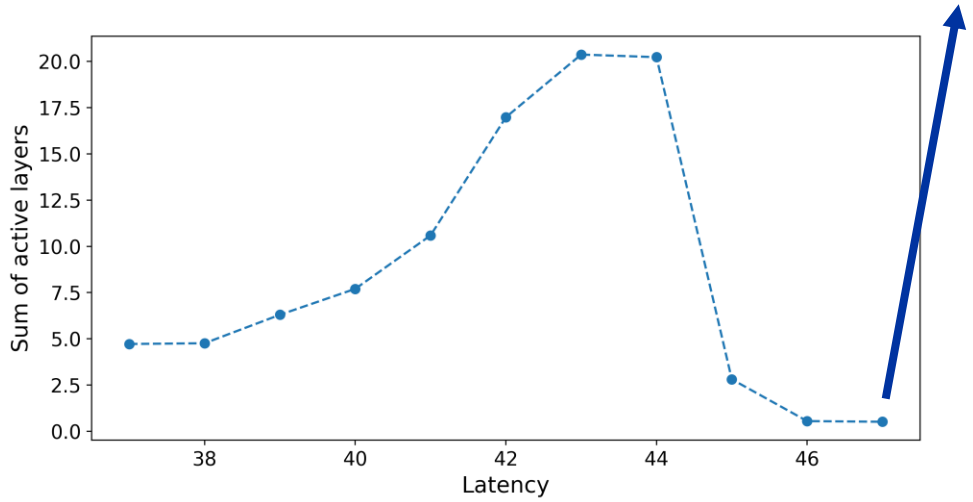
Detector Timing - Latency Scan





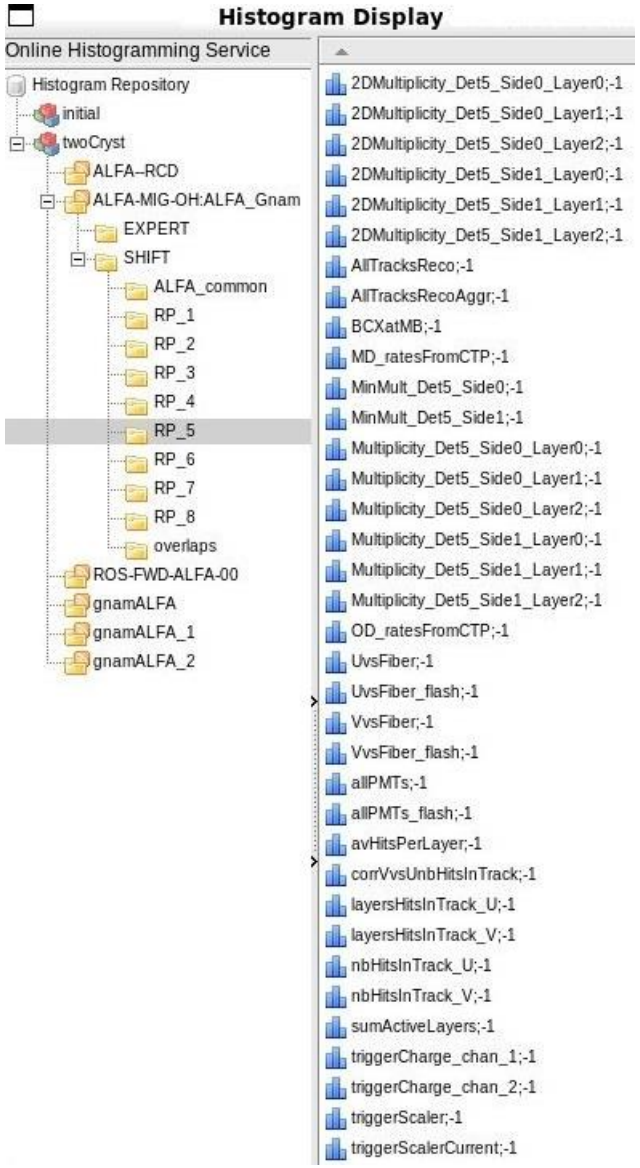
Detector Timing - Latency Scan

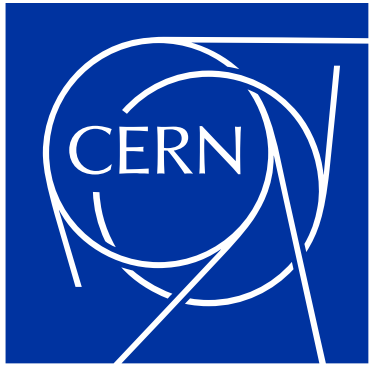




Next Steps

- Connection of DCS to Low Voltage (Ongoing)
- Check DAQ up to 50 kHz readout (maybe higher)
- Stability checks
- New implementation of using LHC clocks for the setup
- Finalize High voltage implementation in the Detector Control System
- Clean up the Detector Control System
- Minor hardware preparations for installation
- Adapt online histograms to TWOCRYST purposes





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