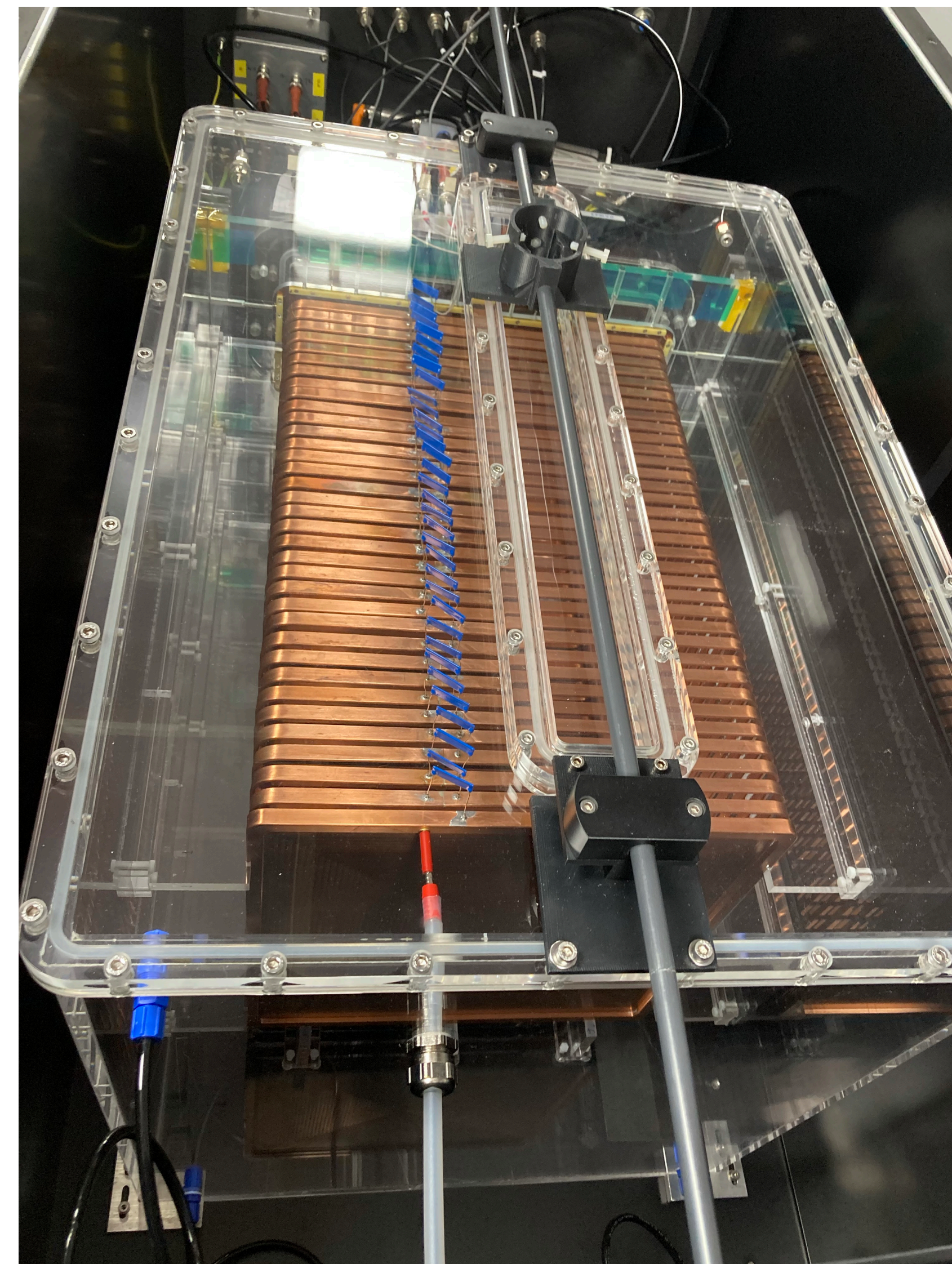


LIME underground DAQ updates

Stefano Piacentini, Davide Pinci

General Meeting

13/07/2023

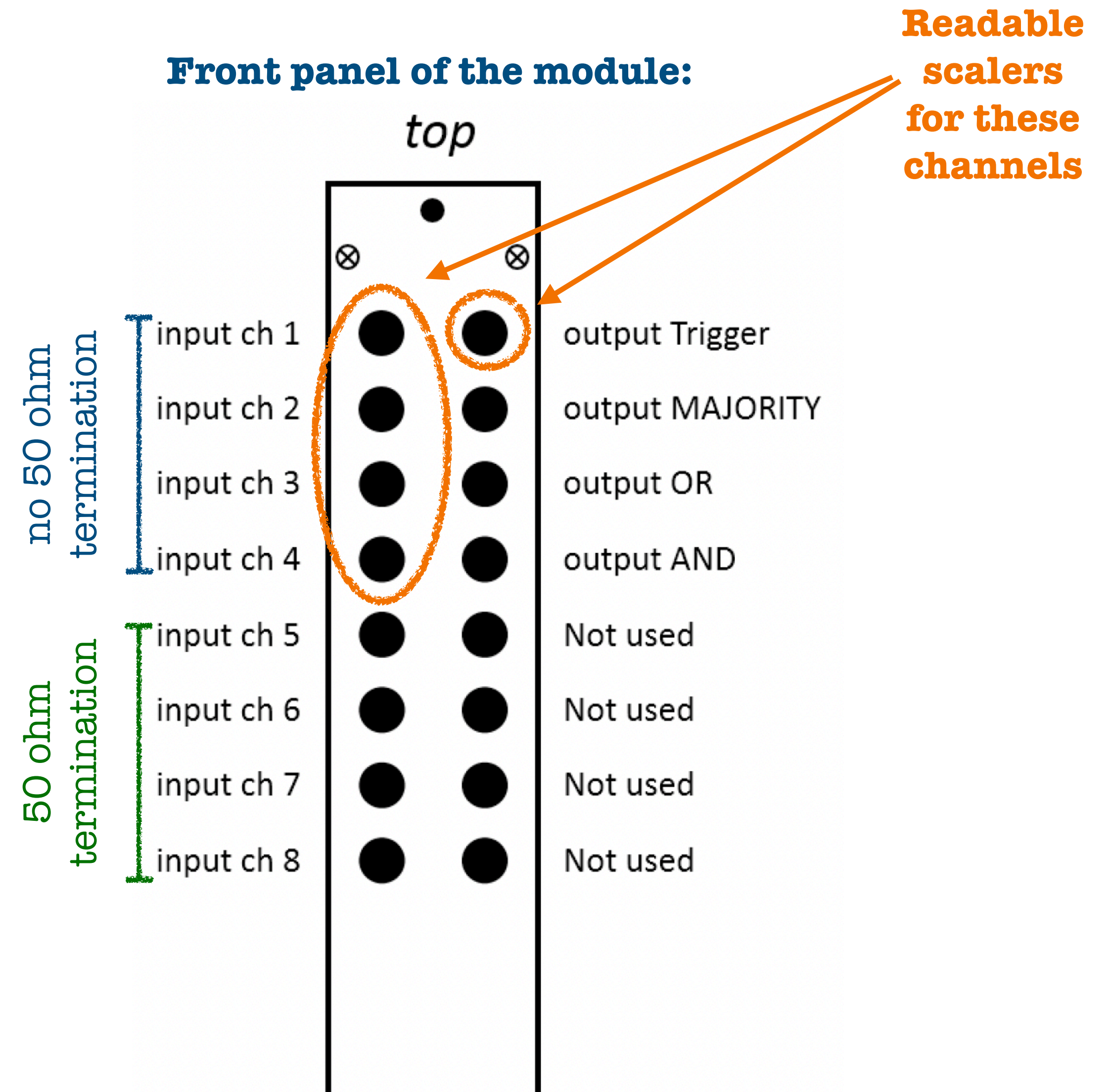


Introduction

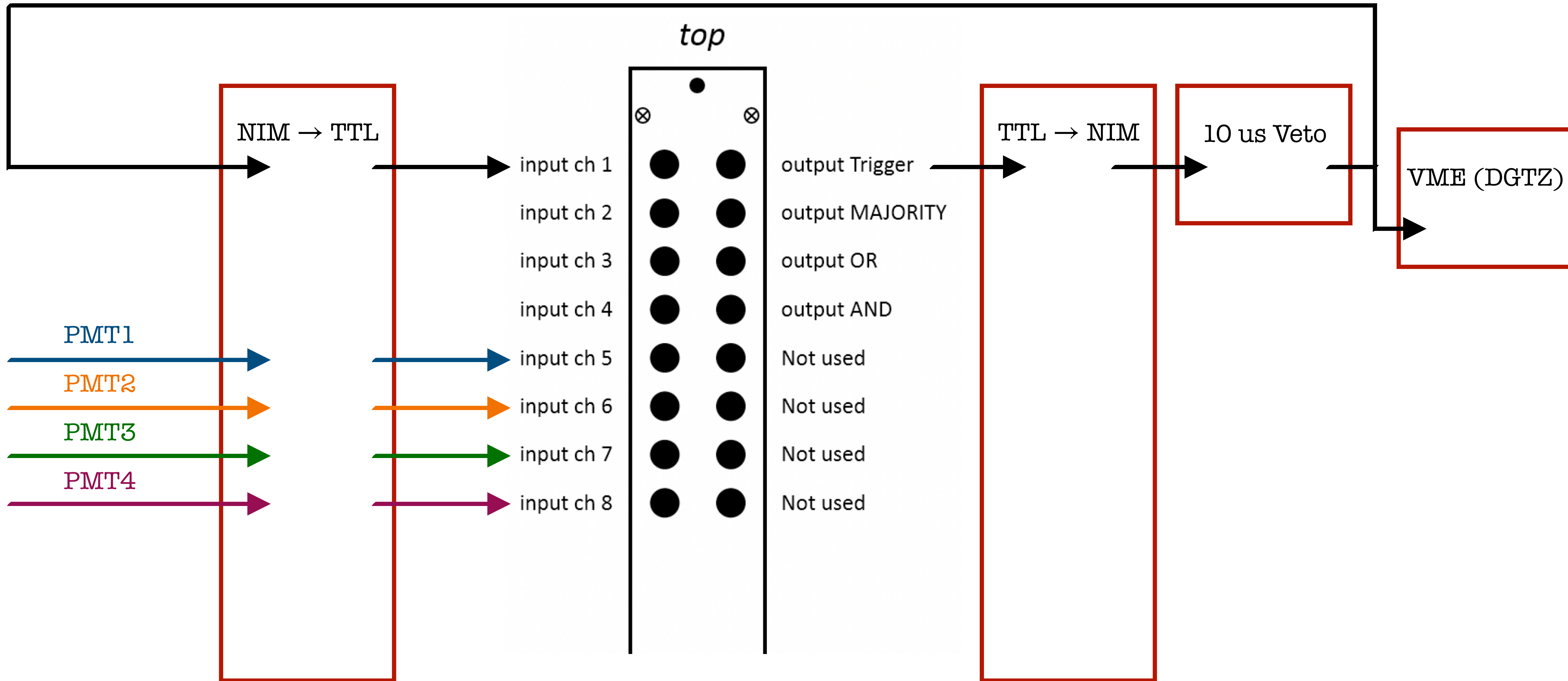
- In this contribution we present a couple of additions and changes to the DAQ system of LIME underground:
 - **Trigger Module now responsible of the trigger logic**
 - **PMT pedestal run**
 - **Readout of the GEMs signal**

Logic with the trigger module

- Trigger Module designed by our Brazilian colleagues
- Contains an FPGA card and a Raspberry Pi
- Standalone and programmable Trigger electronics
- Accessible remotely via Ethernet connection (SSH)
- All inputs and outputs are TTL and LVTTTL compatible

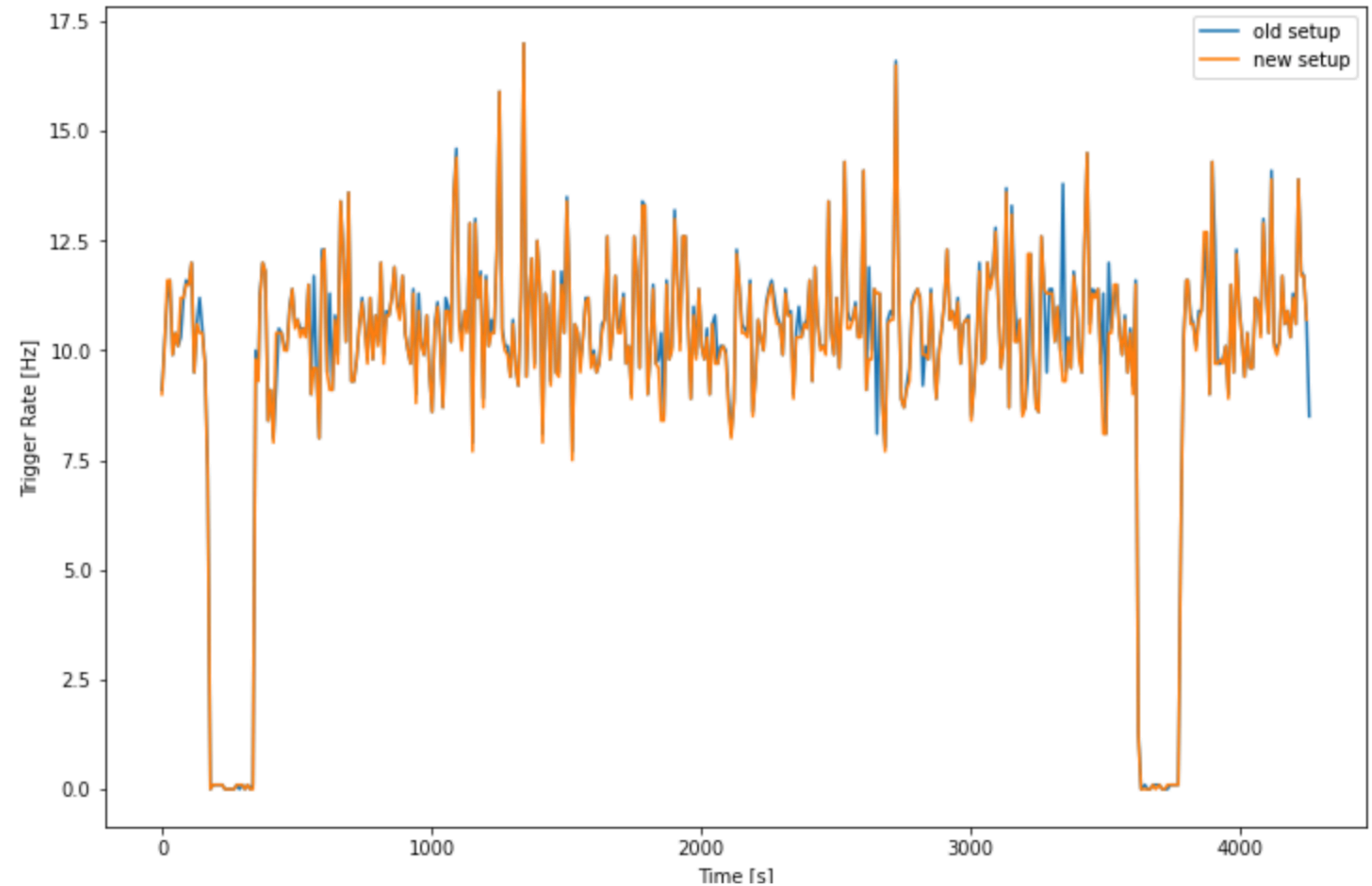


Logic with the trigger module



Logic with the trigger module

- We intensively tested this configuration during the last month
- The signals generated by this setup are consistent with the ones generated by the old setup



Pedestal for the PMTs

- Now we have a configurable Trigger signal \Rightarrow Generating a 10 Hz clock we have the possibility to acquire pedestal runs for the PMTs (with GEMs ON)
- How to recognize the runs from the SQL DB logbook:

A. PMT pedestal runs:

pedestal_run = 1
pmt_acquisition = 1

B. CAMERA pedestal runs:

pedestal_run = 1
pmt_acquisition = 0

C. Data runs:

pedestal_run = 0
pmt_acquisition = 0

Acquisition loop (~ 1 h):

- 1 PMT pedestal run:
30 pictures (~ 150 wfs)
- 1 CAM pedestal run (usual run)
100 pictures (0 wfs)
- 8 Data runs:
400 pictured

Acquisition of the GEMs signals

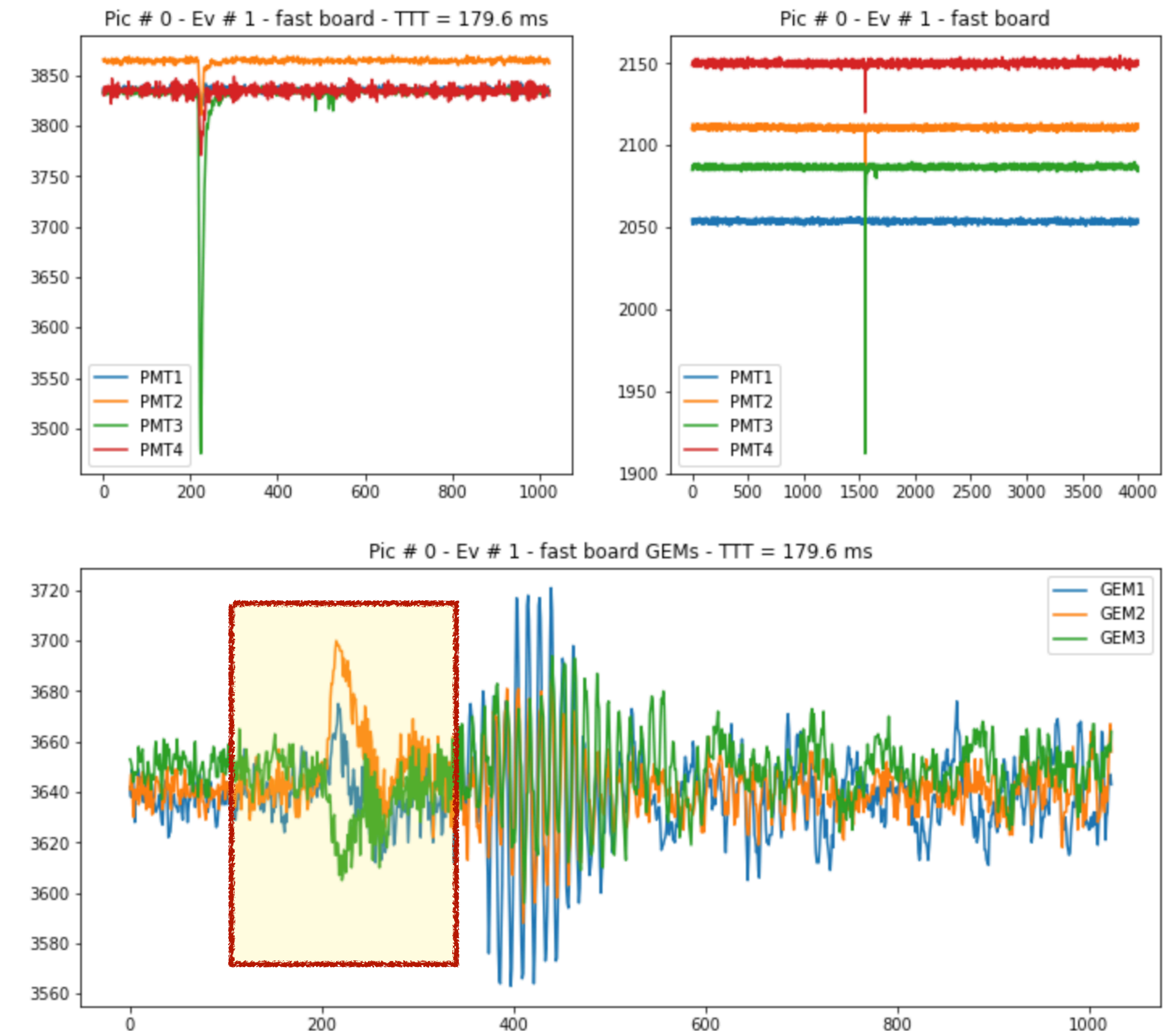
- GEMs signal now acquired with an amplification of a factor of 10
- They are acquired via the fast board on:

A. CH5 \leftrightarrow GEM1

B. CH6 \leftrightarrow GEM2

C. CH7 \leftrightarrow GEM3

- Quite noisy, but from a first analysis with the oscilloscope, the signal induced by the ^{55}Fe spots on the GEM2 doesn't show an evident dependence on the z position of the spot: no saturation?



LIME has now a triple readout!

- Possibly unaffected by the saturation (still to be verified with a dedicated analysis)
- With the exception of non-uniformities of the GEM gain, the intensity does not depend on the xy position (as the PMT signals do)
 - ◎ Properly calibrated, this could be very helpful during the PMT xy position reconstruction, reducing the uncertainty on the original light intensity

