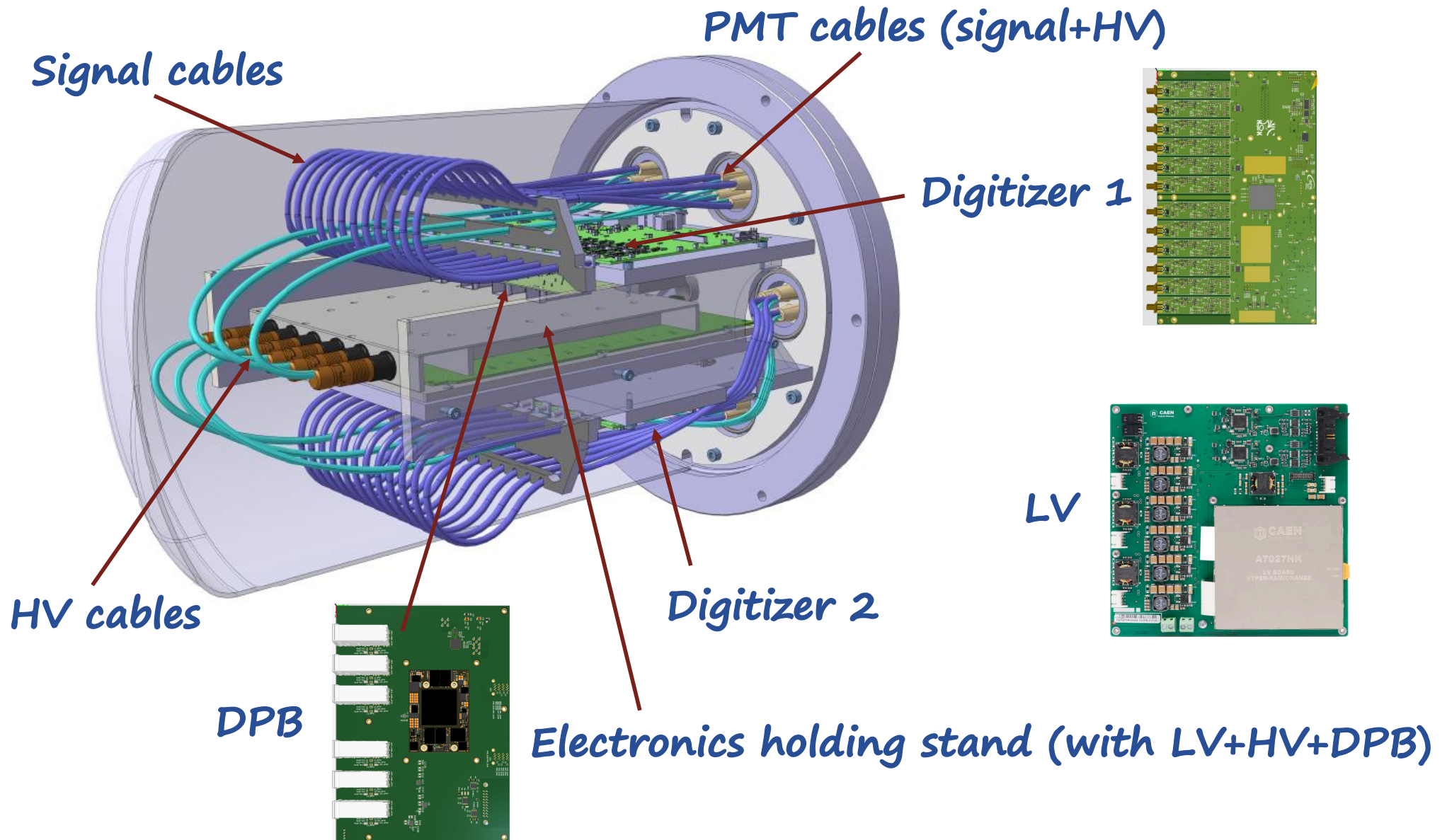
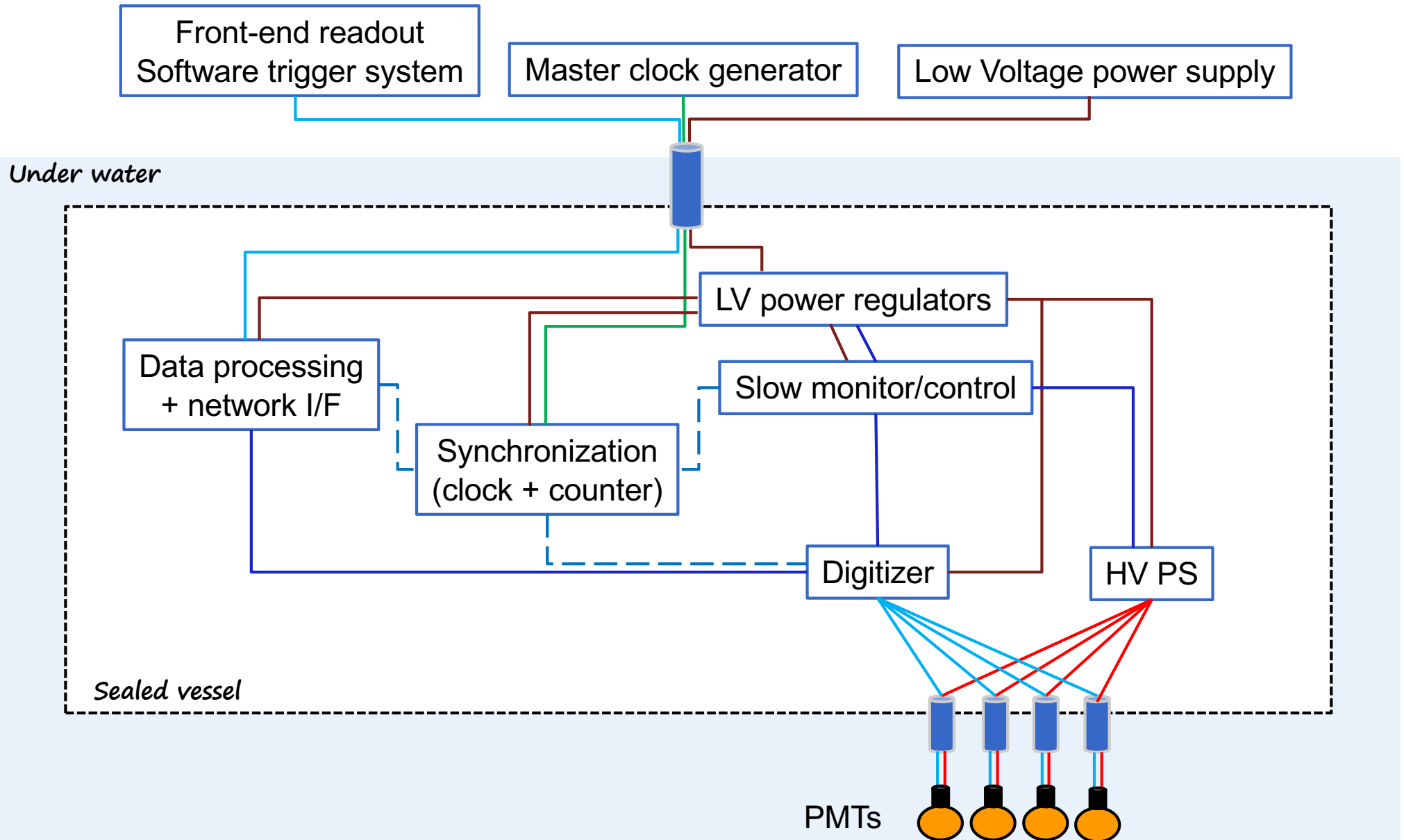




## Frontend electronics Testbench

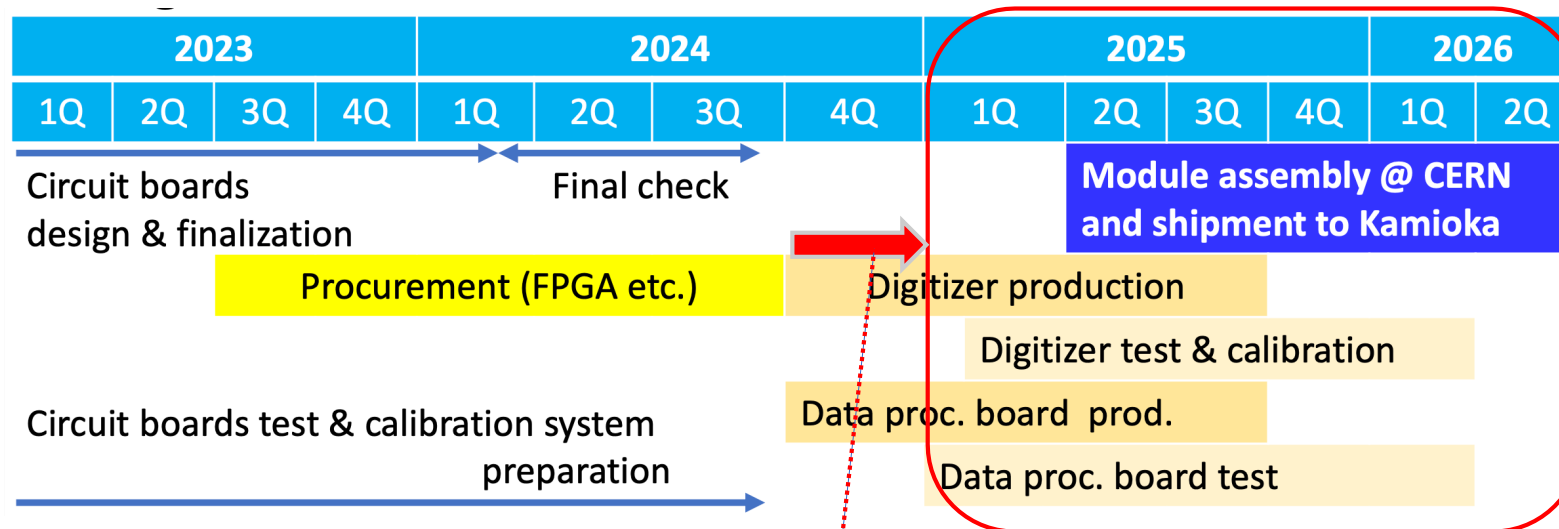


# FE electronics block diagram



# Our task at LLR

- **Design the test process and testbench** of the final production of the frontend electronics mounted in the vessel
- **Provide the test setups and install them at CERN** (where the assembly of the vessels will be performed)
- **Organize the tests of all vessels** (via **shifts** open to the whole HK collaboration)
- **Deliver the calibration data of each channel and store them in the HK DB**



**Testbench @CERN must be ready**

Starting production of the digitizer board in Dec 2024



# Not one but two testbenches!

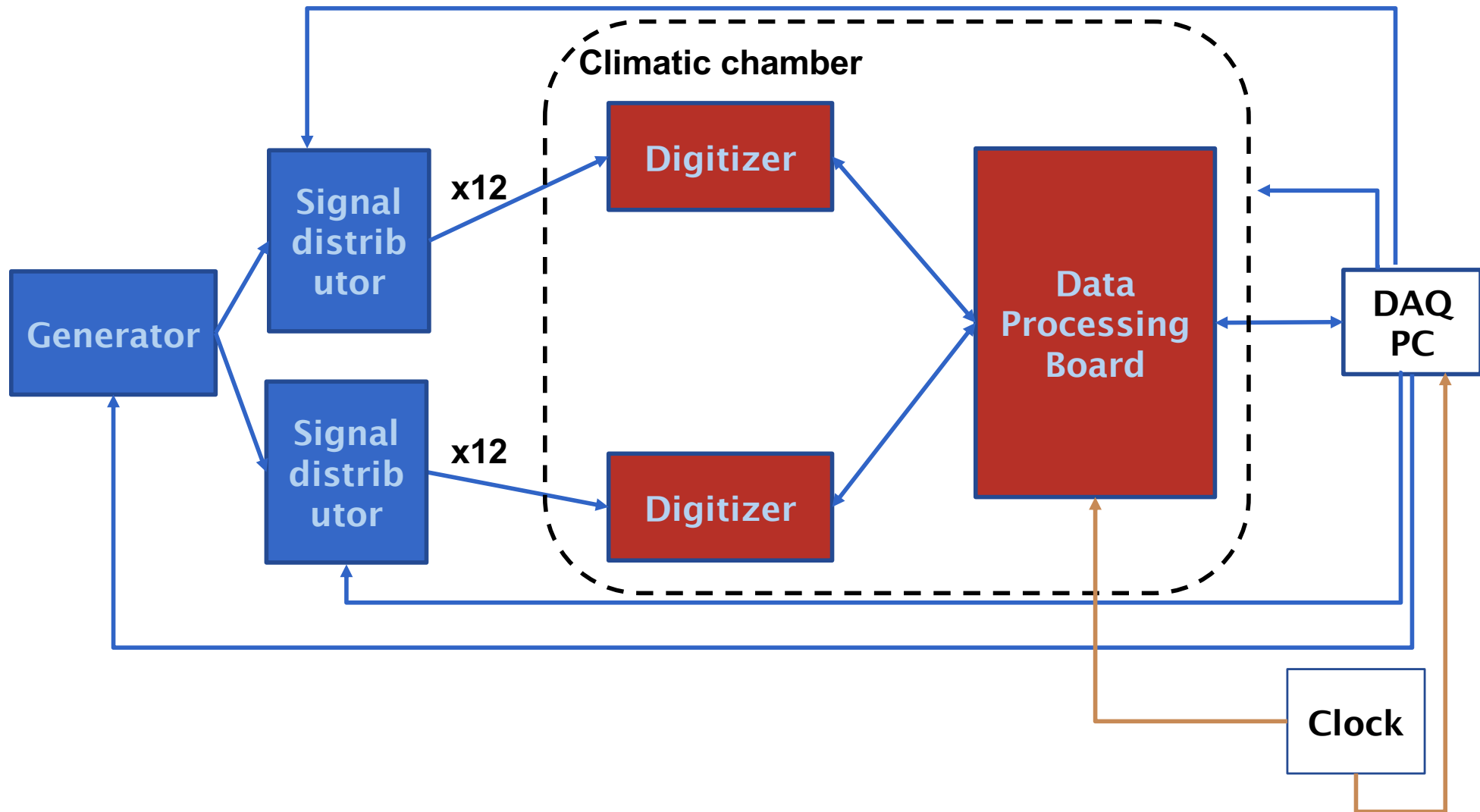
## 1. Testbench for the calibration

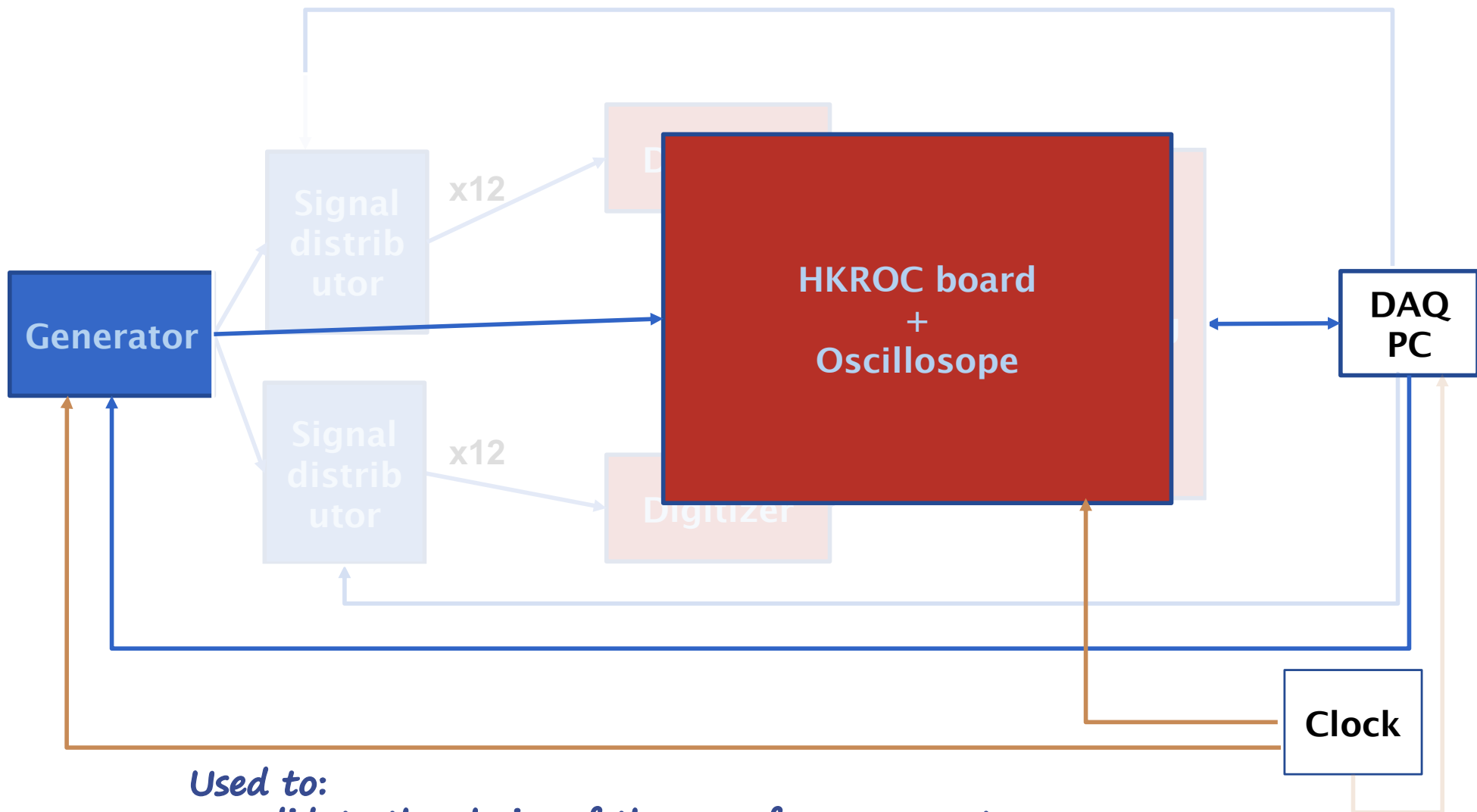
- Check the digitizer boards in various conditions of temperature and humidity
- Get the linearity curve:  $ADC = f(\text{charge from PM, T, H})$

## 2. Testbench for the assembly

- Check functioning of the FE boards before and after closing the vessel
- Check vessel with electronics after a water pressure test reproducing HK conditions

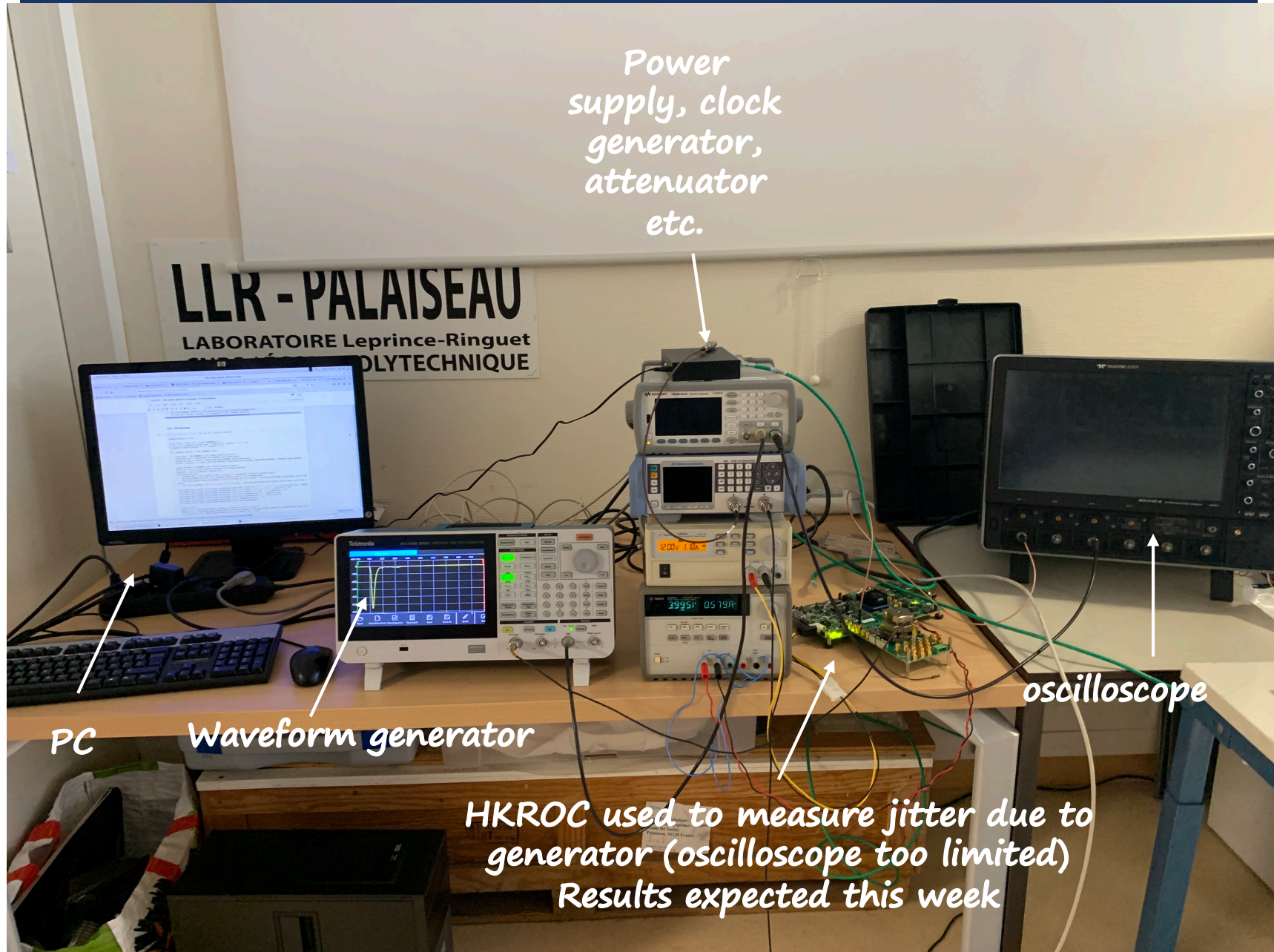
Both testbenches at CERN (precise location still being negotiated)  
To be ready by the end of 2024





Used to:

- validate the choice of the waveform generator
- Prepare software modules

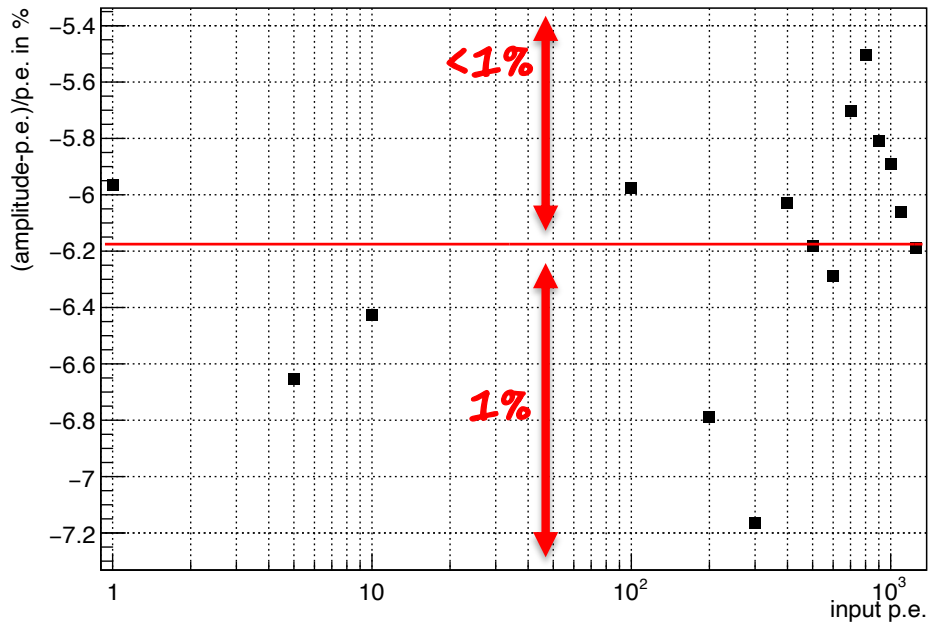
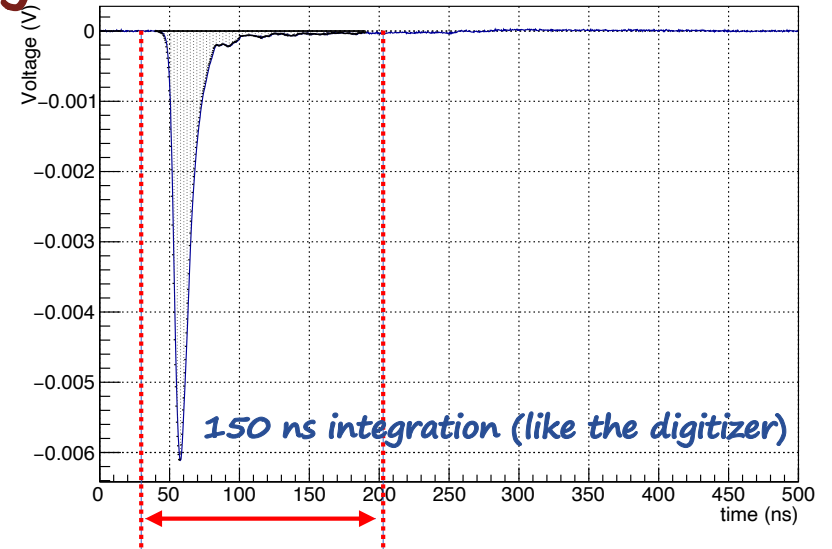
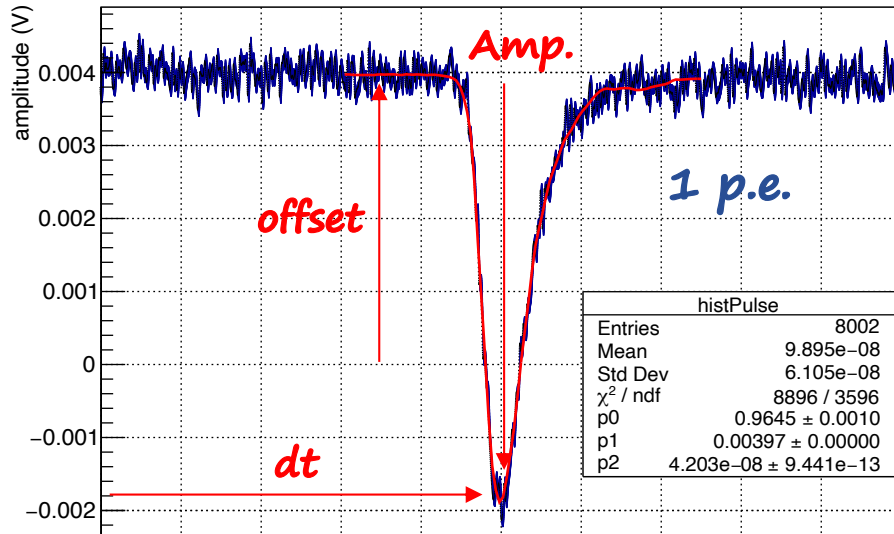




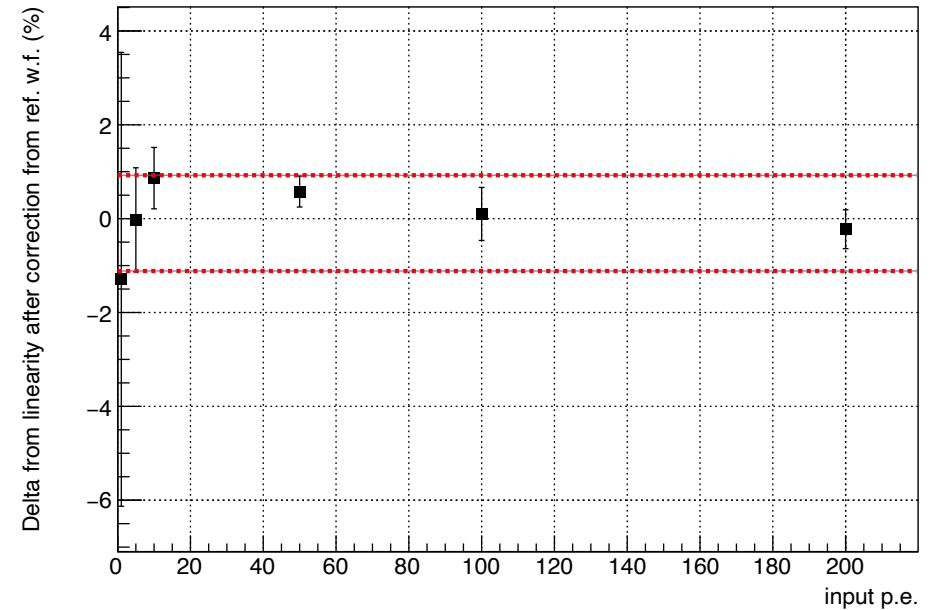
Fit with reference w.f.

## Linearity

Reference w.f. for 1 p.e.



Linearity of captured waveforms



# Some measurements

## Jitter

On going with HKROC (thanks to Rudolph, Denis etc.)  
Previous measurements with oscilloscope not totally  
conclusive (above 300 ps)

Stay tuned...