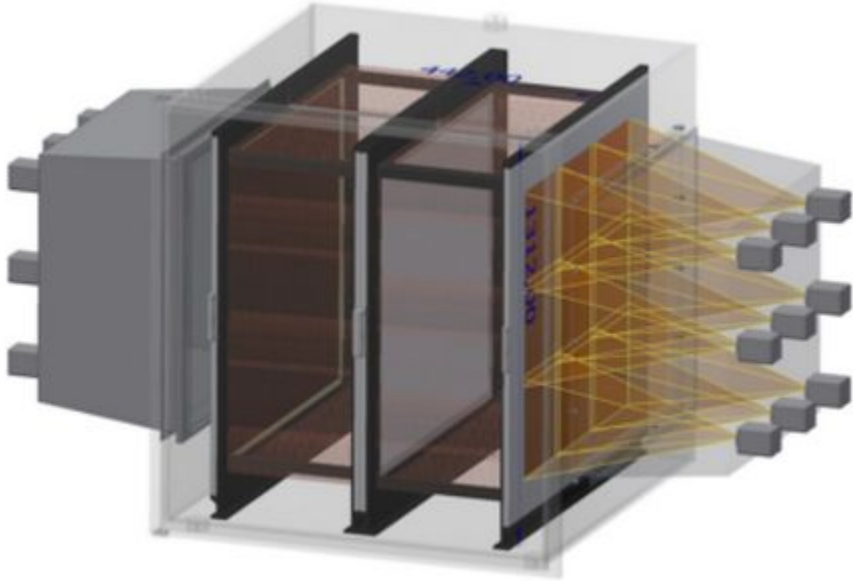# DAQ proposal

ROMA1 - LNF - CBPF - UFJF

Detector overview

System composition:
- The detector is composed of 18 readout regions, each equipped with 1 sCMOS sensor and 4 Photomultipliers.
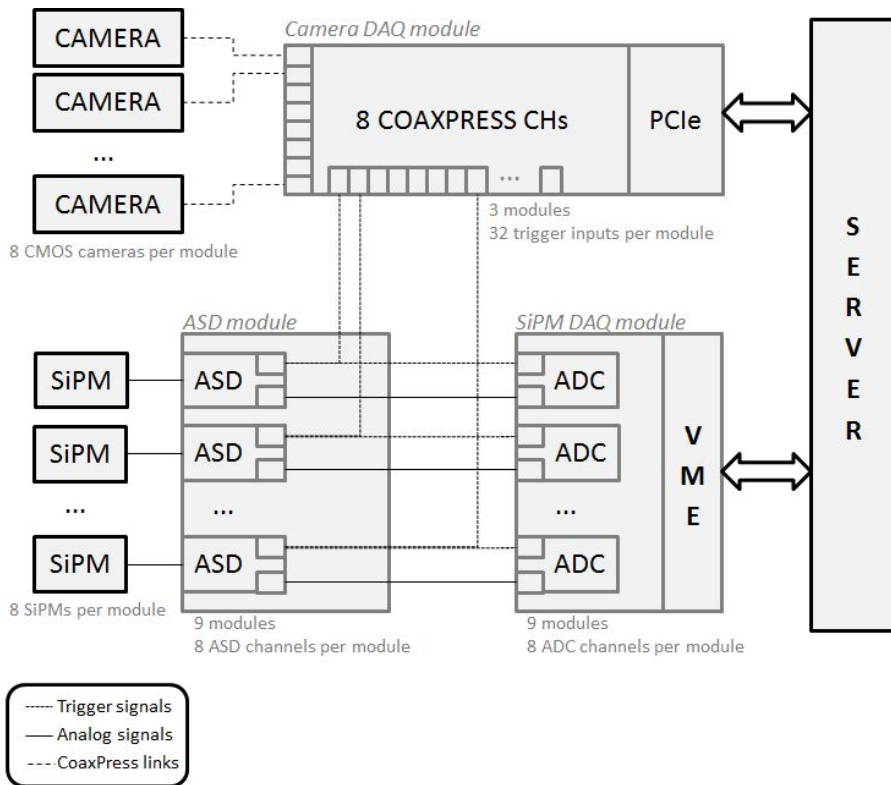- TOTAL: 18 sCMOS sensors and 72 Photomultipliers.

Components definition:
- sCMOS sensor (ORCA Fusion)
- PMT model (? H3695-10, H10721-4, others)
- GEM readout needed ?

Important characteristics:
- Max. image acq. rate = 10 Hz

DAQ proposal

Defined issues:
- PM acquisition electronics - custom solution
  - CBPF (has started development)
- Camera readout - commercial solution
 - UFJF-CBPF (components being defined)

Open issues:
- Amplifier module needed?
  - Depends on PM amplitude range and signal duration
  - ROMA1 - UFJF (under study)
- Image-based trigger - custom GPU server
  - Depends on compatibility with software algorithms
  - UFJF - ROMA1 (under study)
- GEM readout needed?
  - ROMA1 - LNF
- Hardware integration
  - Trigger, Time and Control signal distribution
  - Deadtime, Busy signal distribution
  - Event building
- Software integration
  - Framework: MIDAS preferred (experienced manpower; dedicated and easy to integrate slow-control electronics is available); decision to be taken soon to order appropriate electronics.
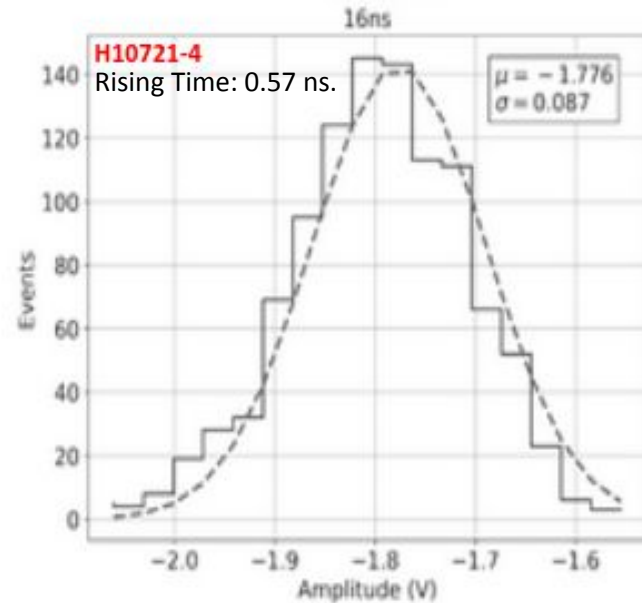 - ROMA1

PMT signal insights

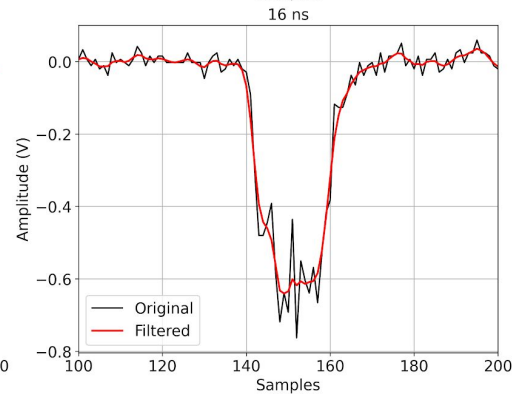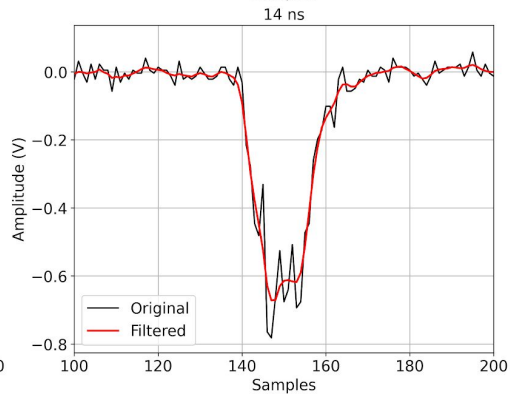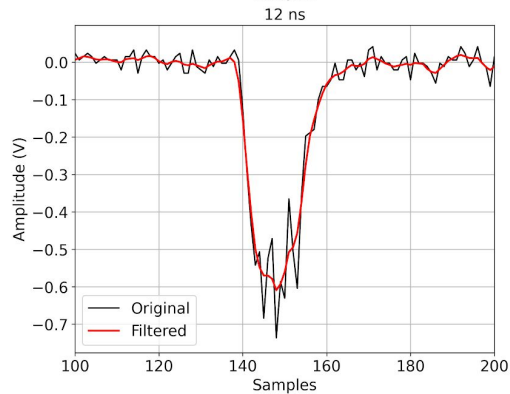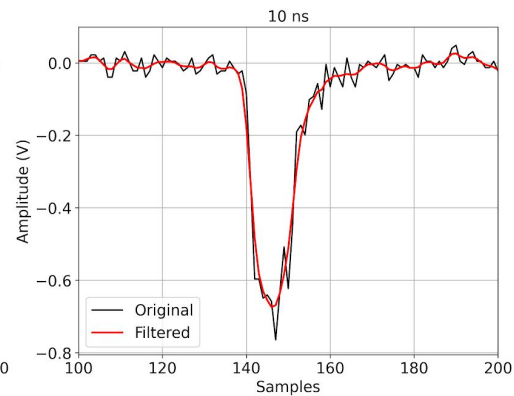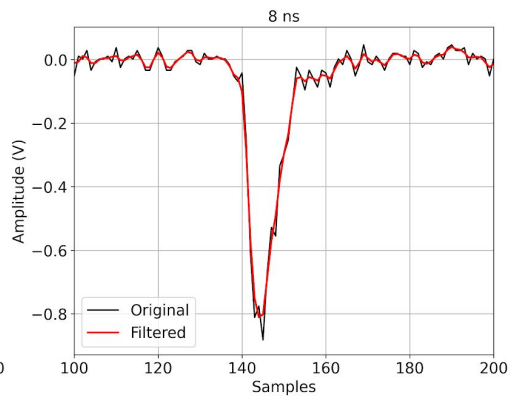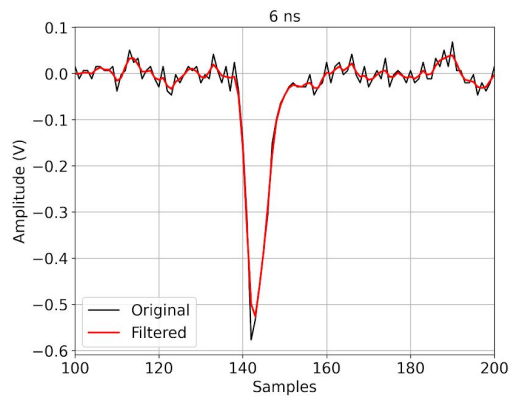*Francesco I, Davide P, Mariana M. Rafael N.*

Amplitude characteristics

PMT laser tests (16 ns pulse duration)
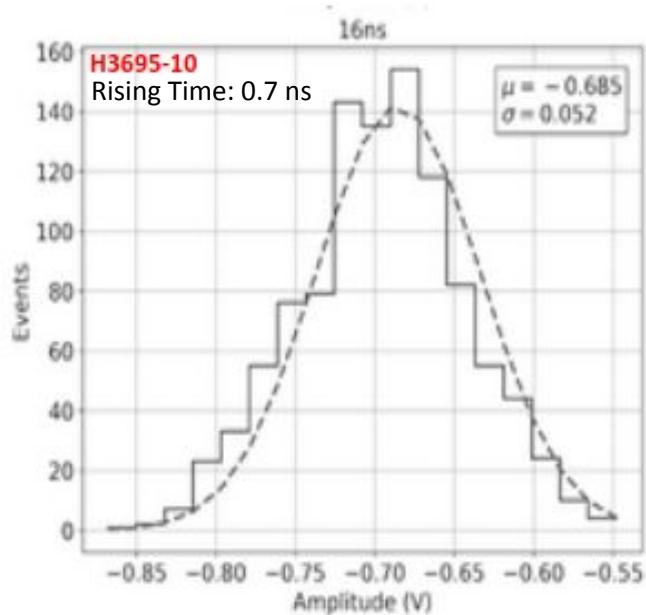
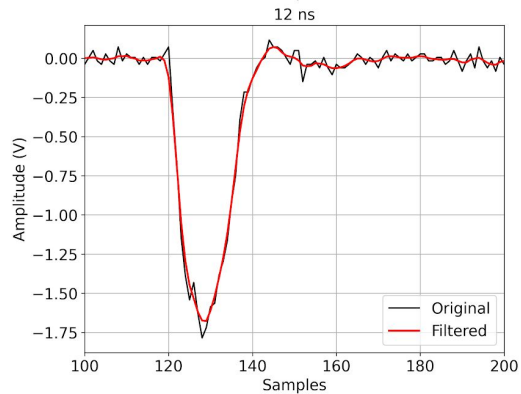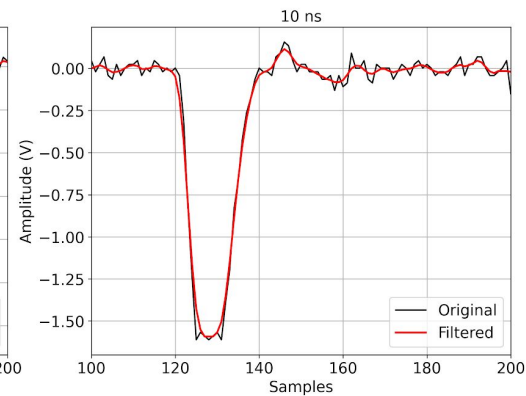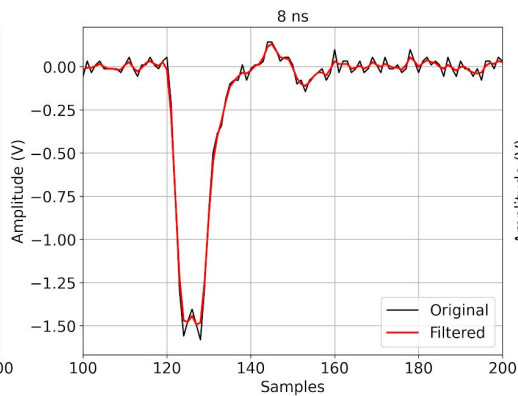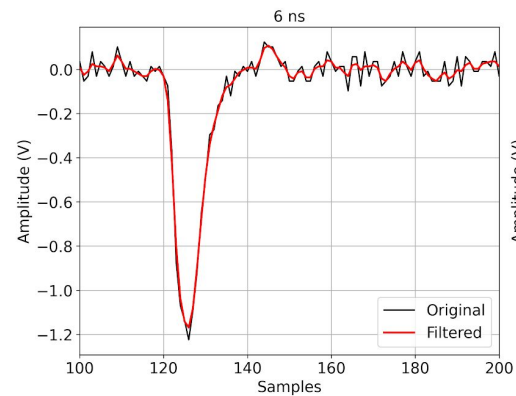**For DAQ definitions, more important than that is the signal characteristics measured with the detector**
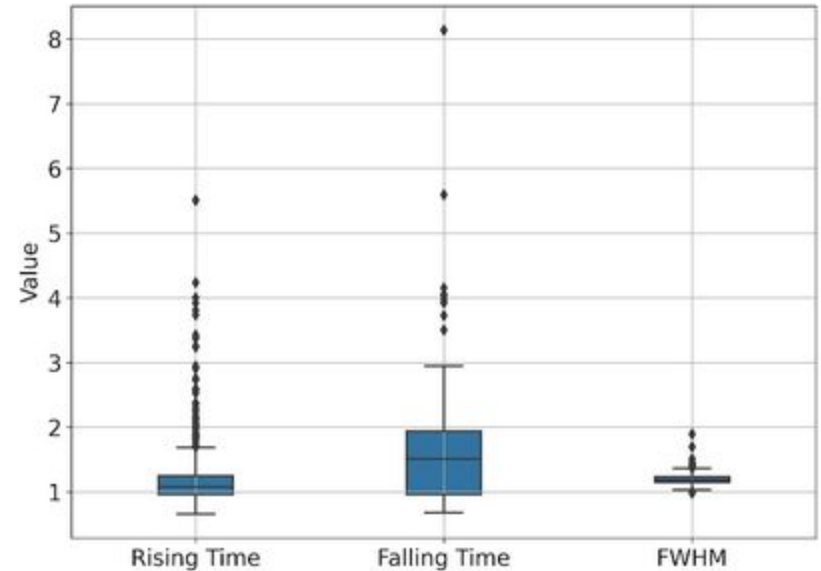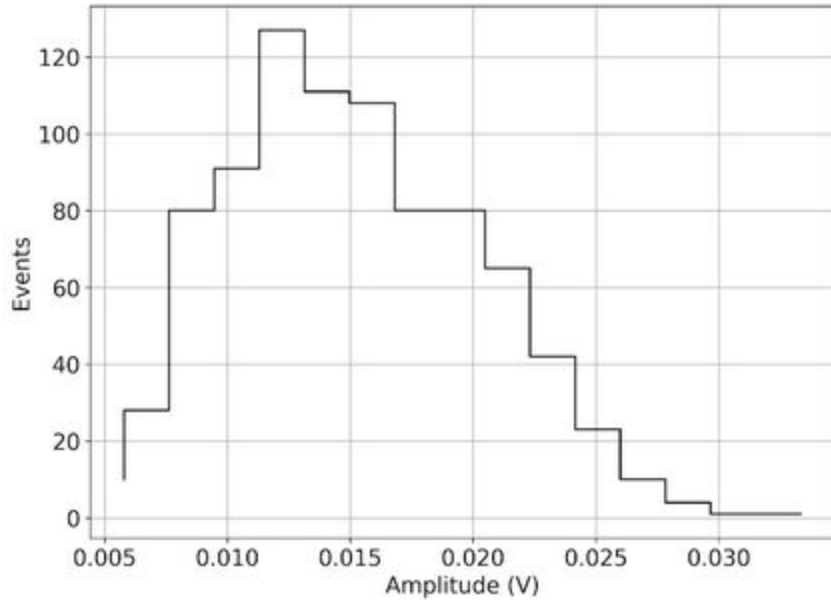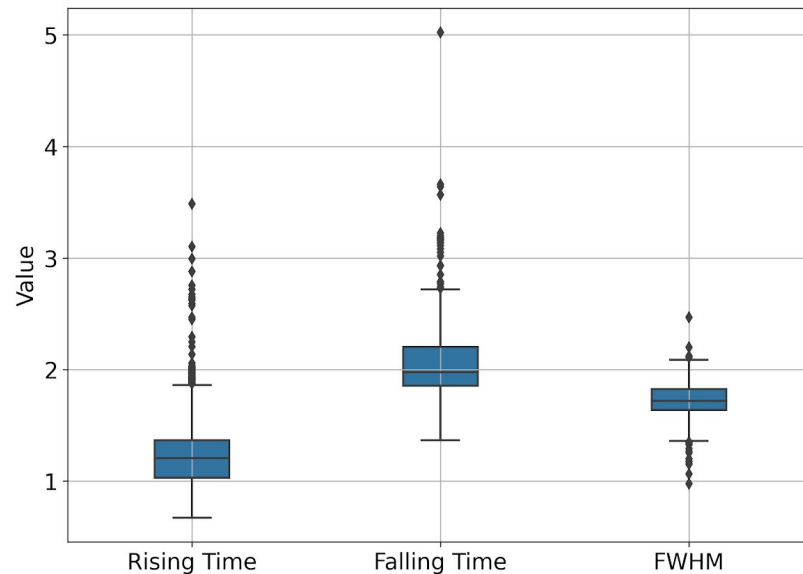
PMT **H3695-10** (1 GSPS)
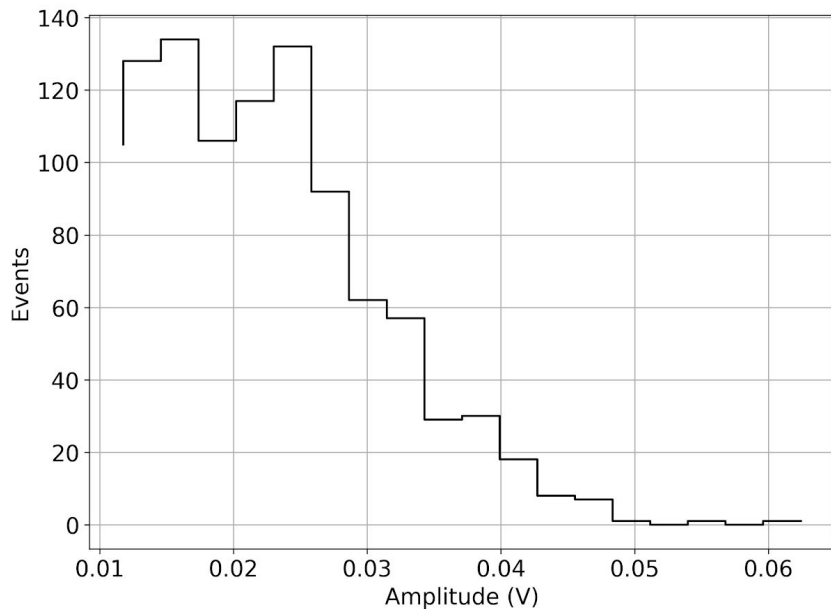
PMT **H10721-4** (1 GSPS)
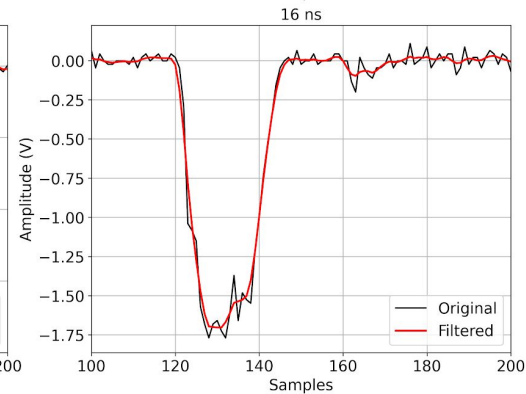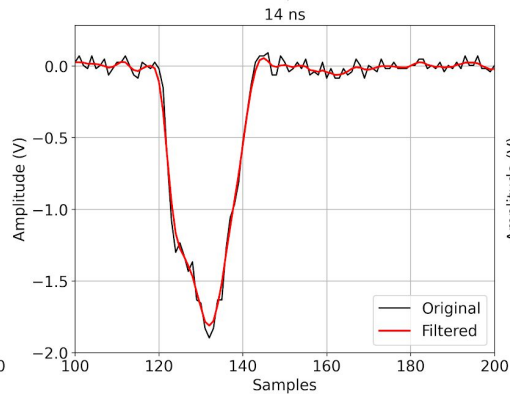
Amplitude/Timing characteristics - ~SPE (10 GSPS)
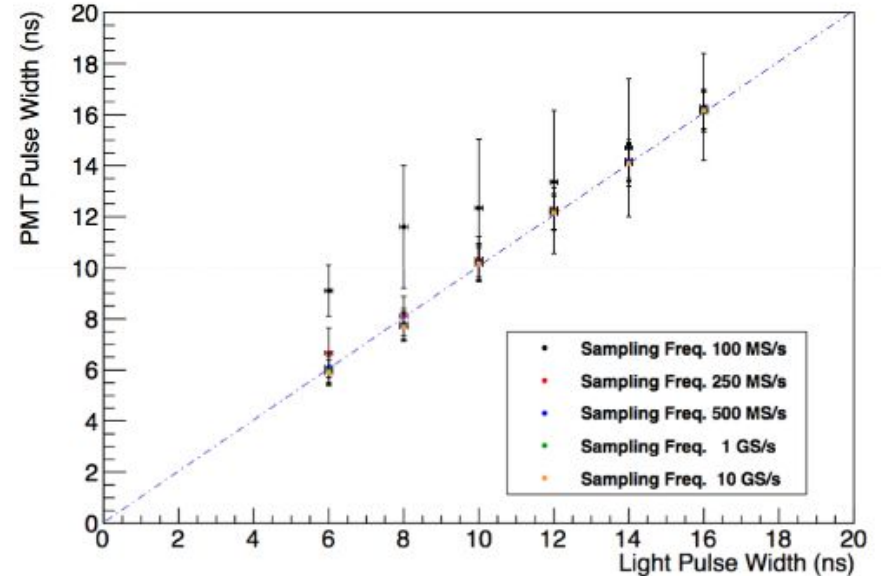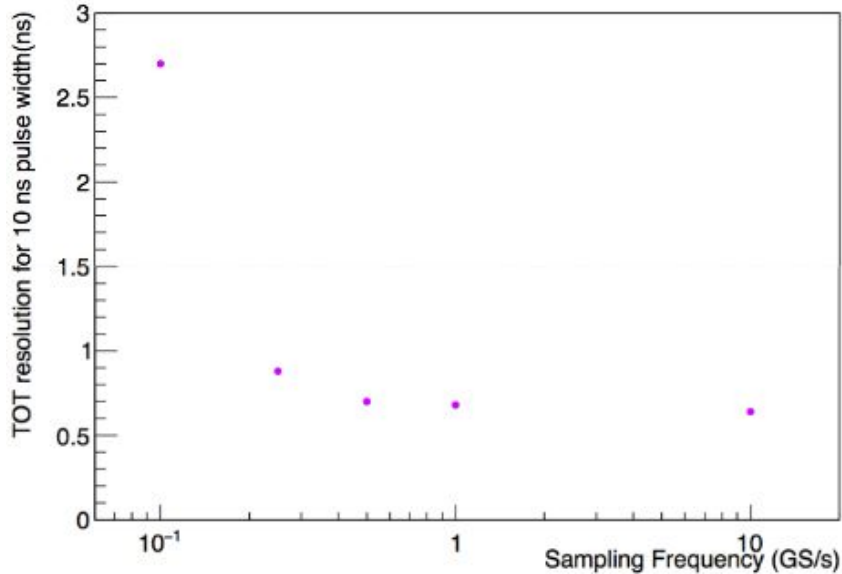
H3695-10

Amplitude/Timing characteristics - ~SPE (10 GSPS)

H10721-4

Timing characteristics - PMT model R7378A

From a past presentation given by Francesco I. and Davide P.

LEMON PMT signal arXiv:1910.07277v2 [physics.ins-det]

Just an example (LIME results might be important to have more realistic results)
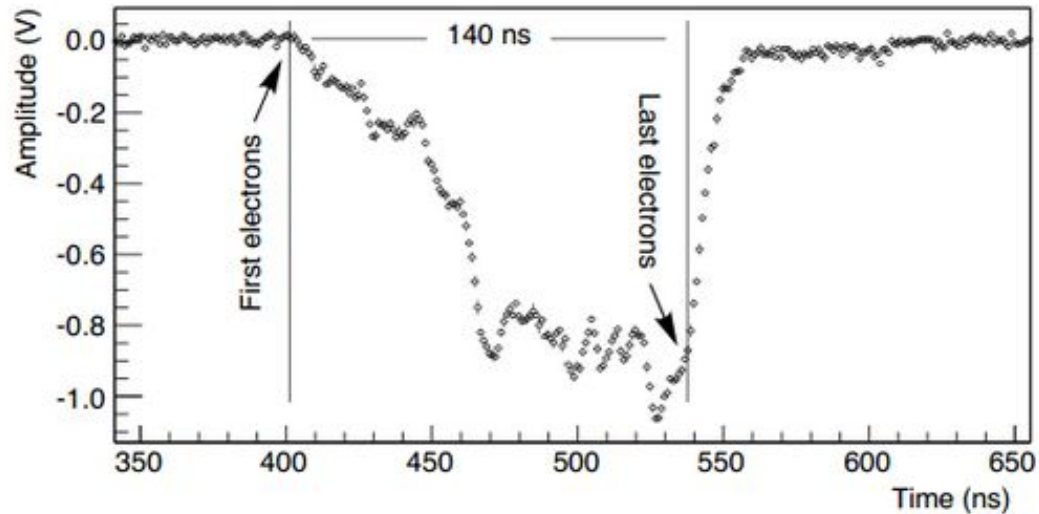

Figure 5. PMT waveform for a track crossing the drift gap inclined with respect to the GEM plane.