

# Beam test of LAPPD at CERN PS

## [05-19 October 2022]

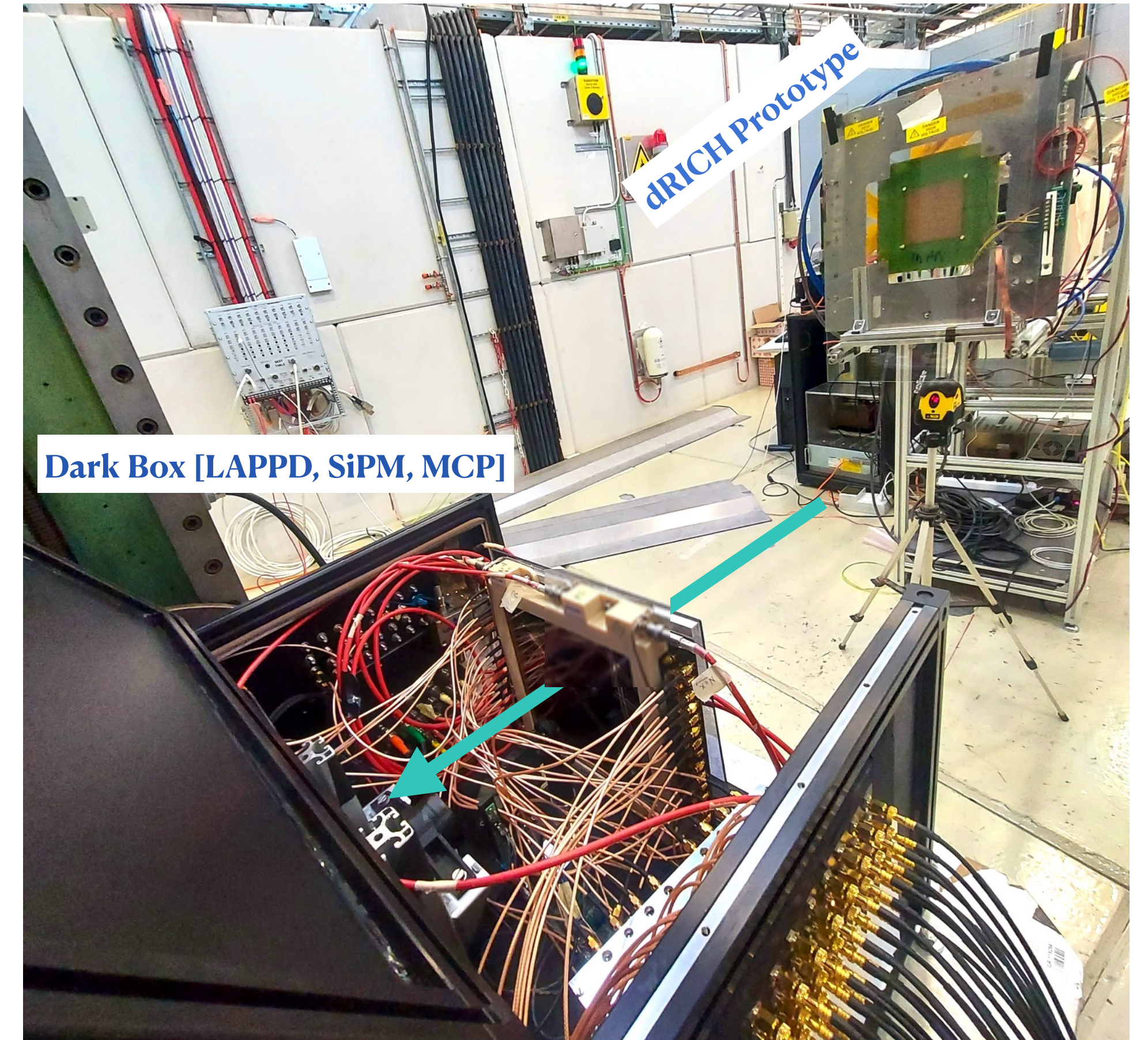
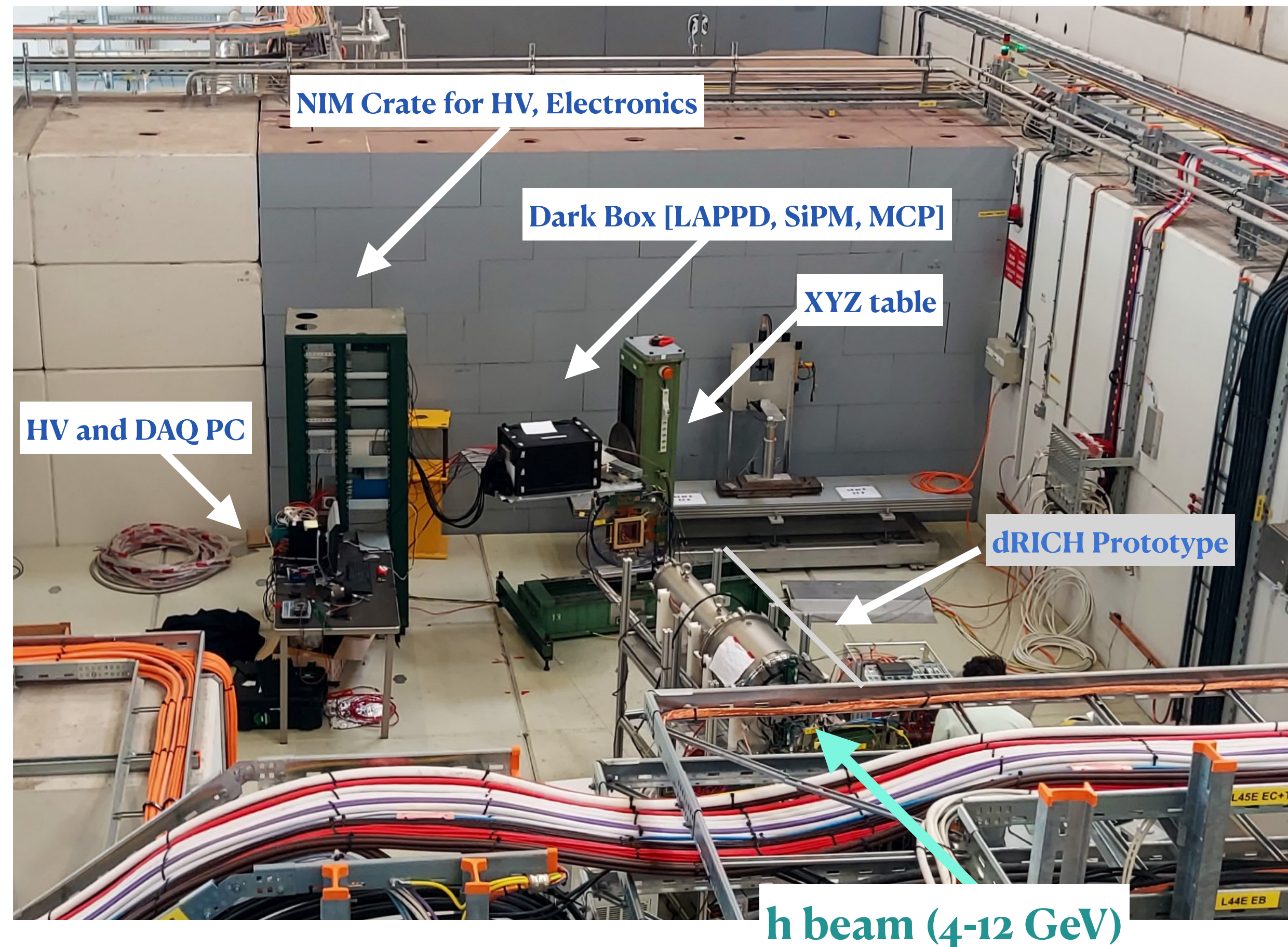
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INFN Trieste<sup>1</sup>, INFN Genova<sup>2</sup>, BNL<sup>3</sup>

20 Feb 2023

# CERN PS, Hall T10

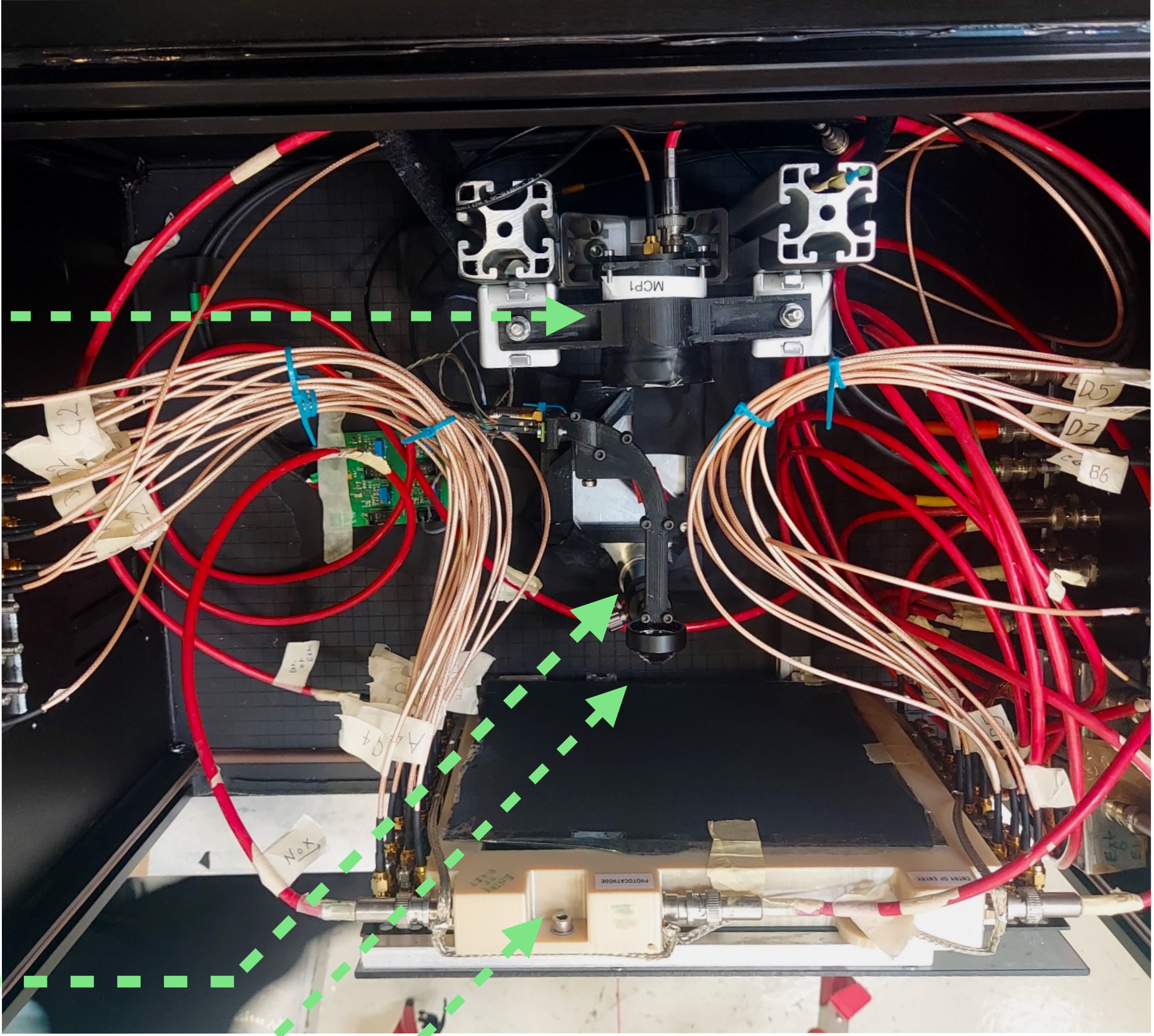
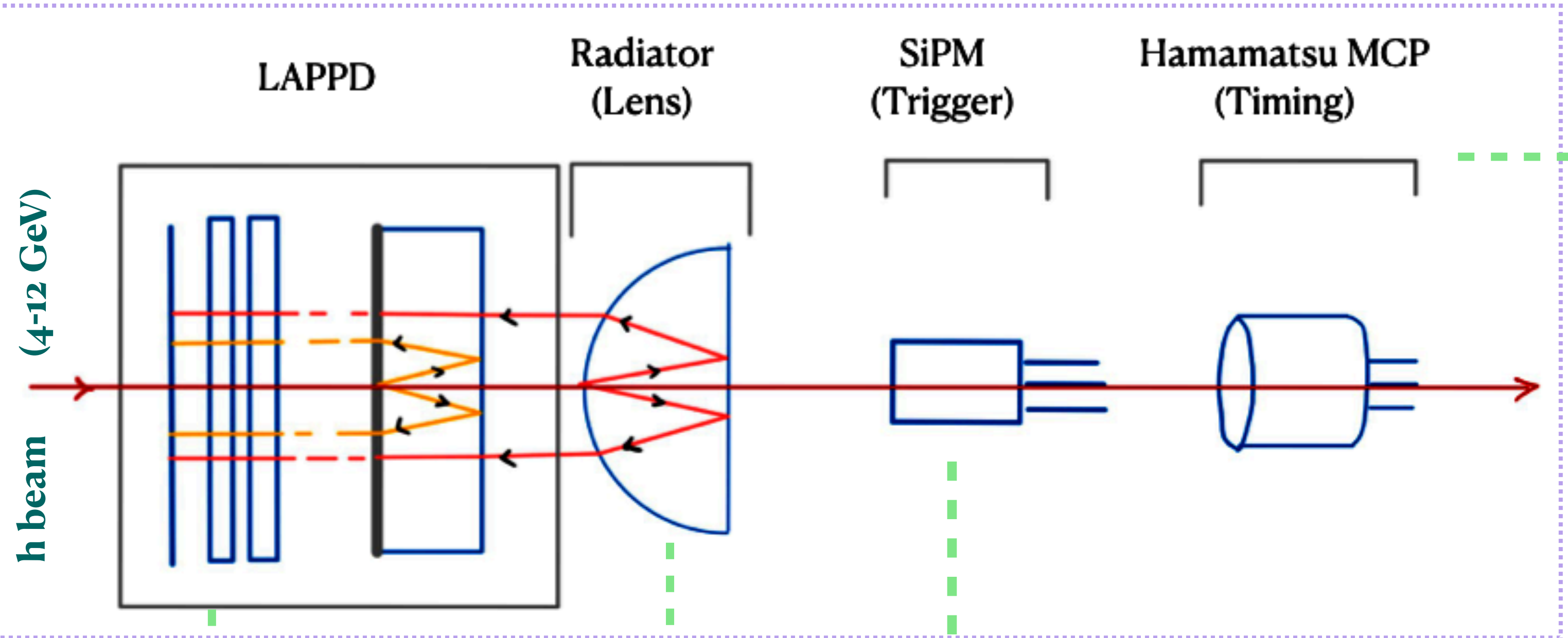
## LAPPD installed downstream of dRICH prototype



05-19 October 2022: The first Beam Test (parasitic) of the LAPPD #87 by INFN Trieste-Genova, BNL

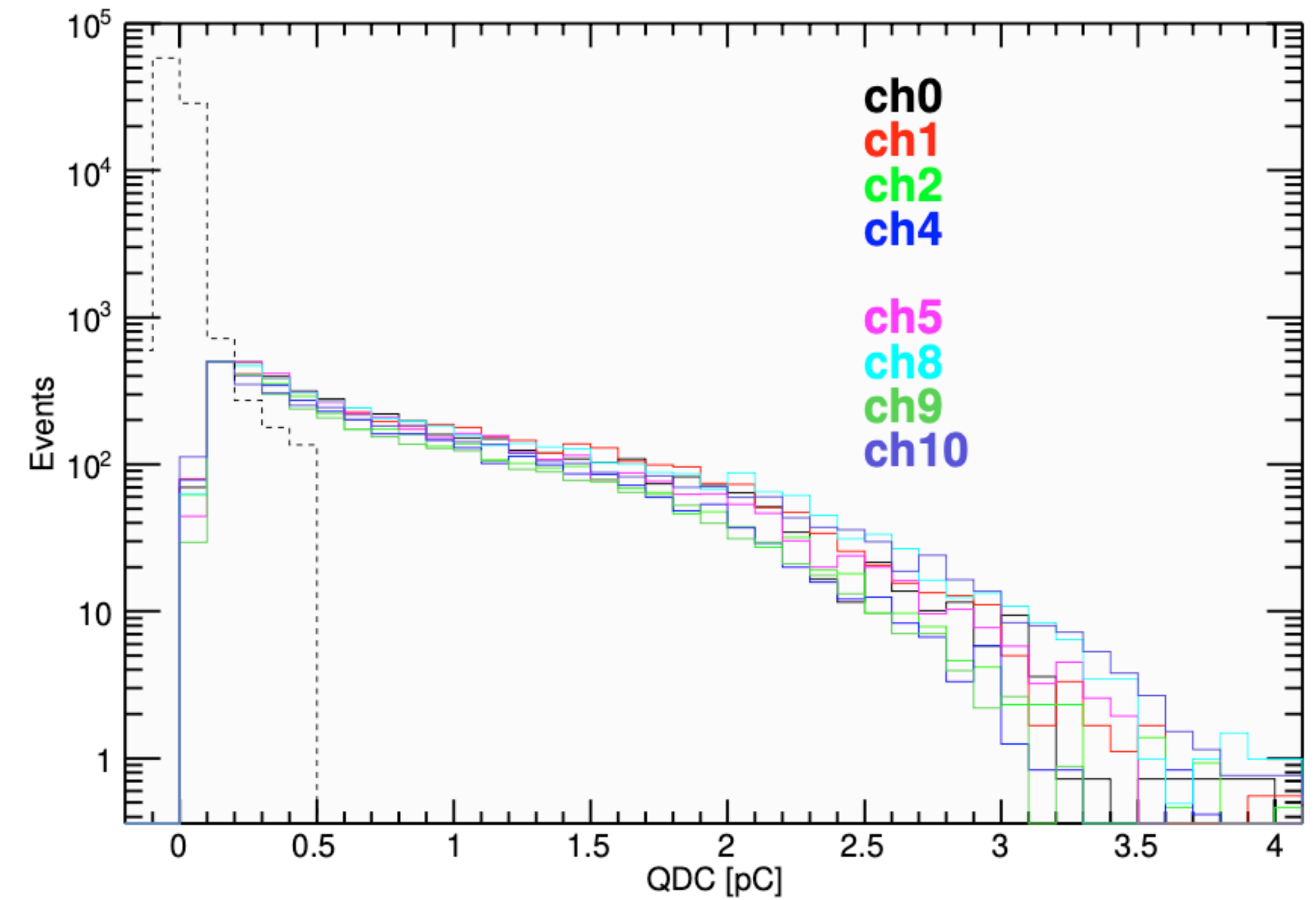
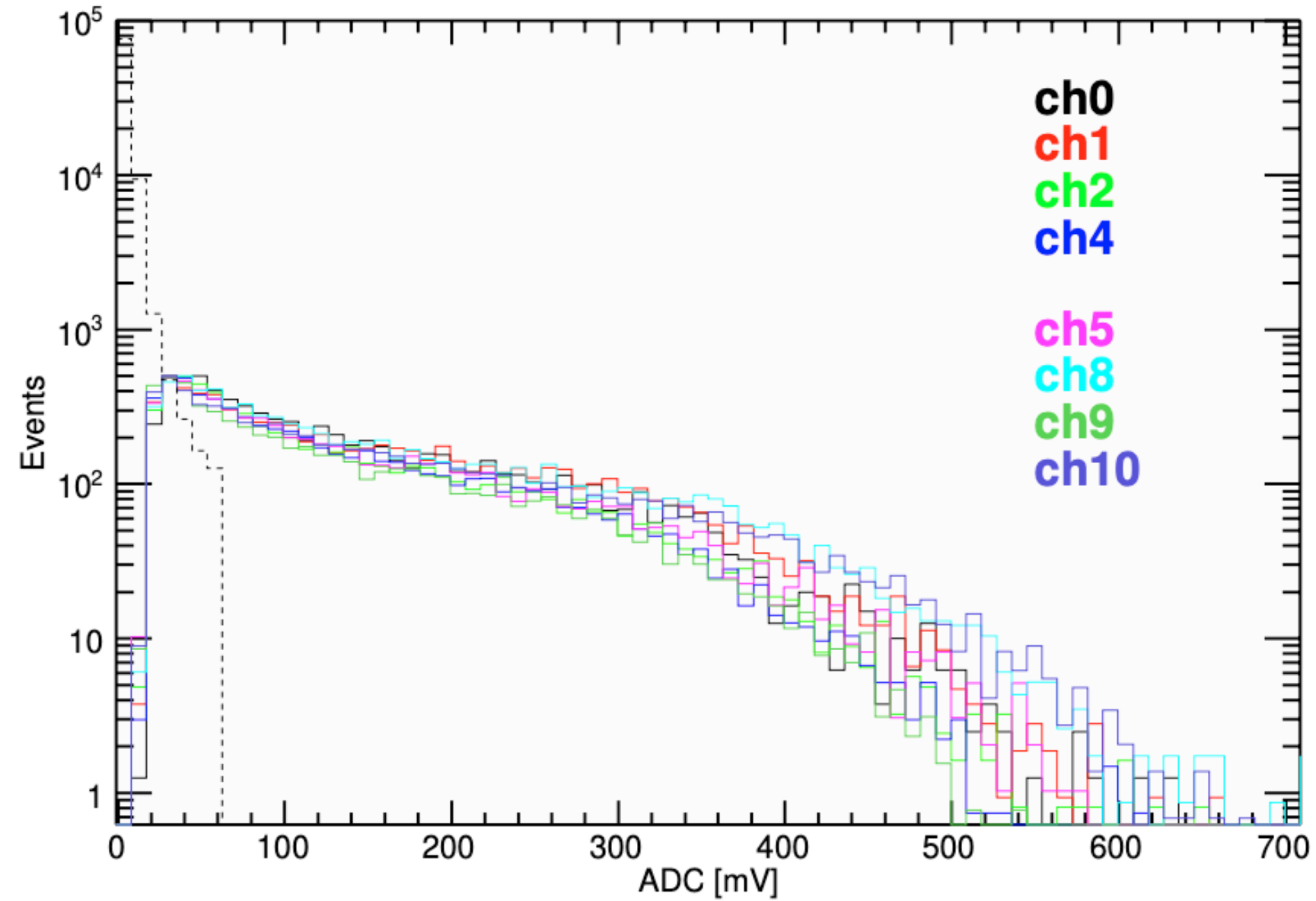
# A schematic of the setup and the details inside the dark box

**Illustrative Schematic: NOT TO SCALE**



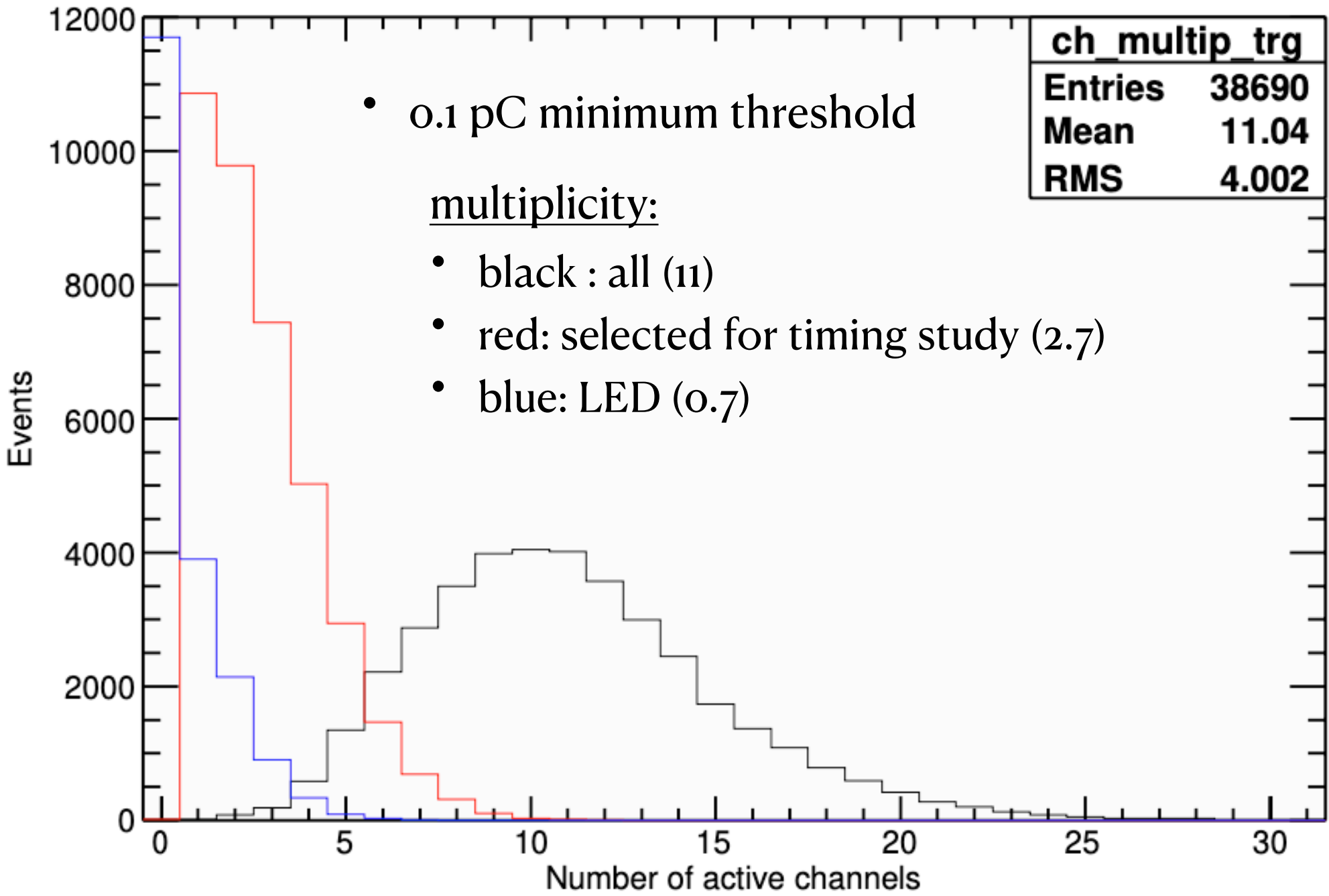
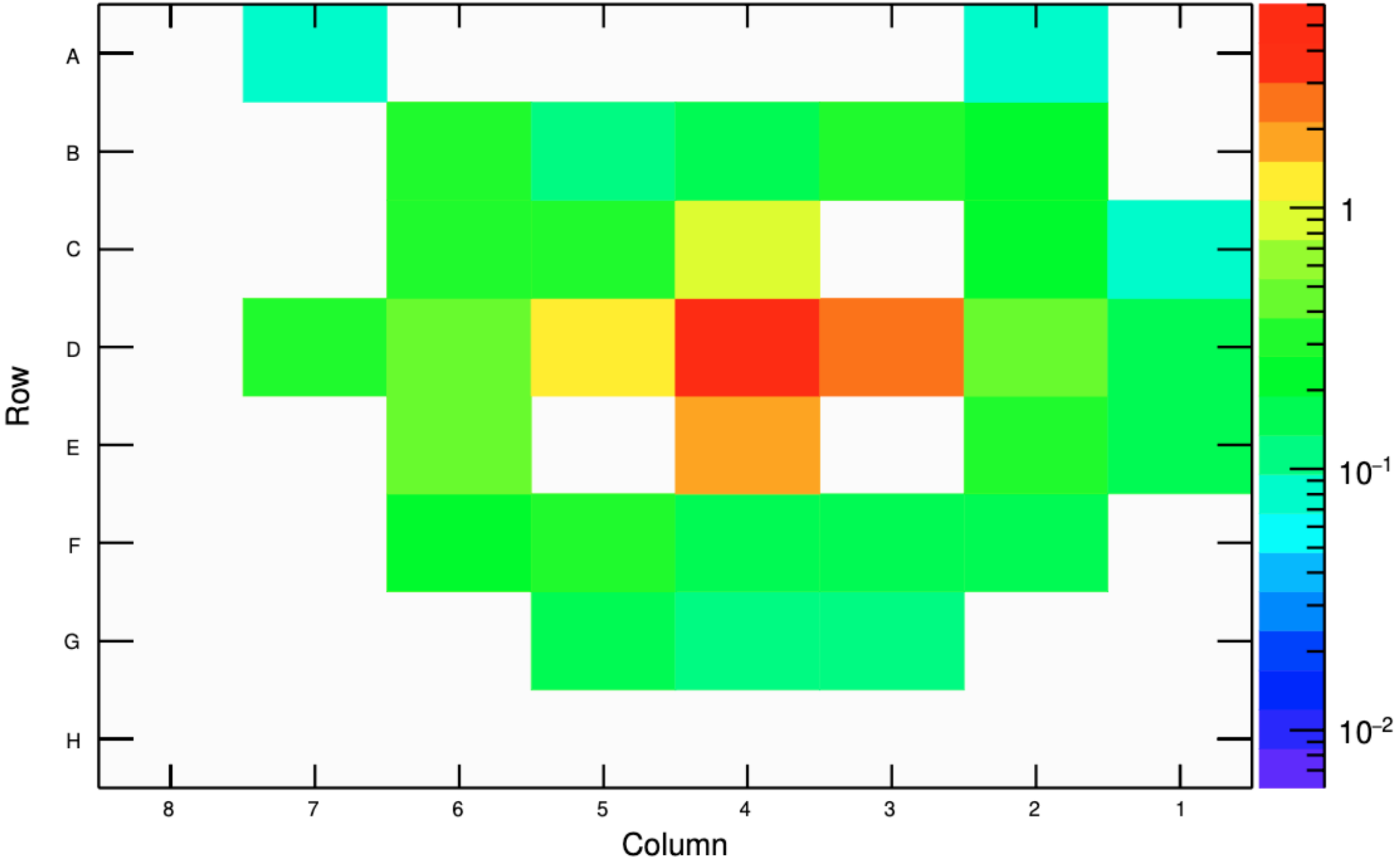
LAPPD window is covered by a protection card in this picture.

# The pulse height distribution and QDC spectra



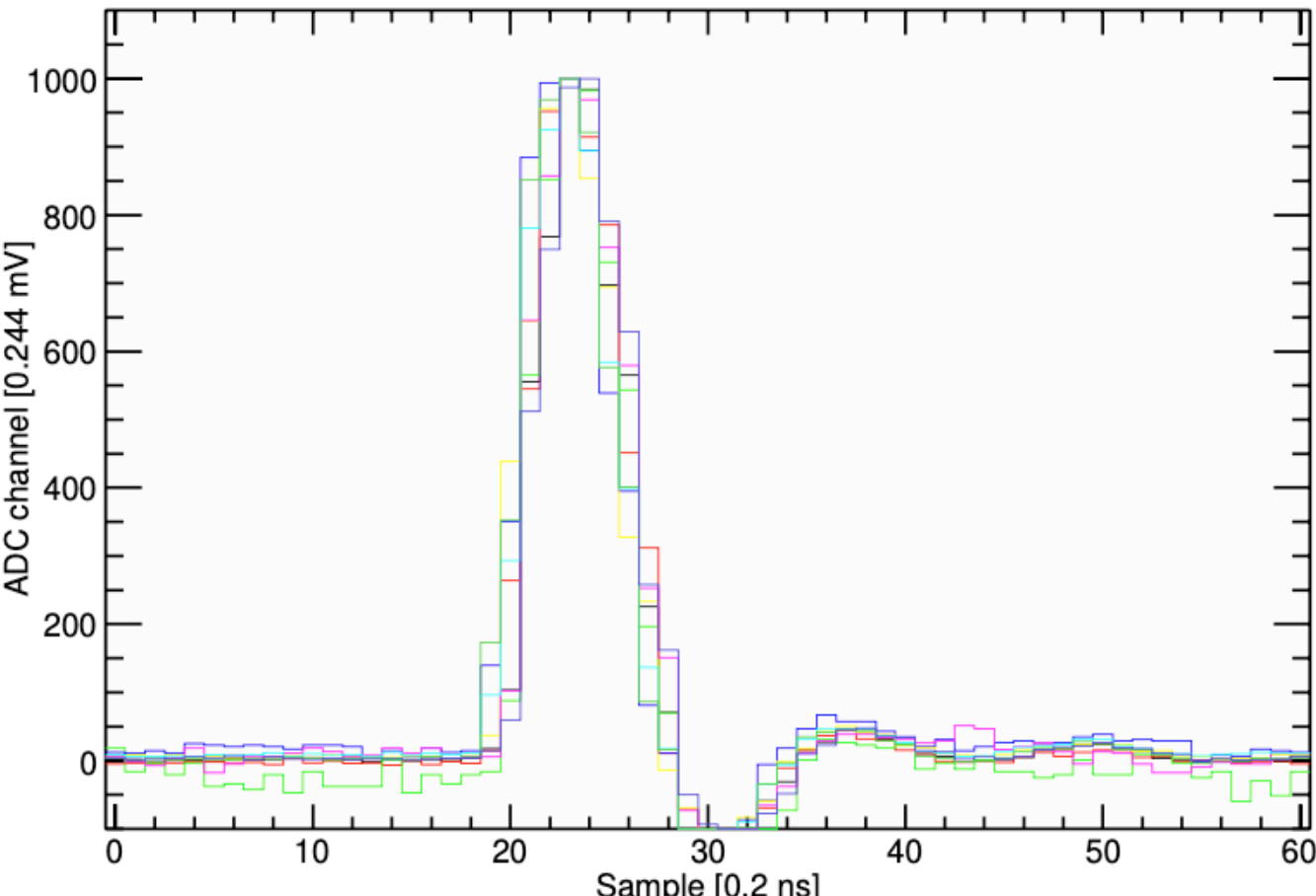
- In Black: Using a green LED at CERN PS ( LED is pulsed for 50 ns and only the first signal after the trigger is selected here)
- In Red: Using a pico-sec LASER at INFN, Trieste.
- The rest are from Cherenkov SPE at the Test Beam.

# The Cherenkov Ring on the LAPPD:

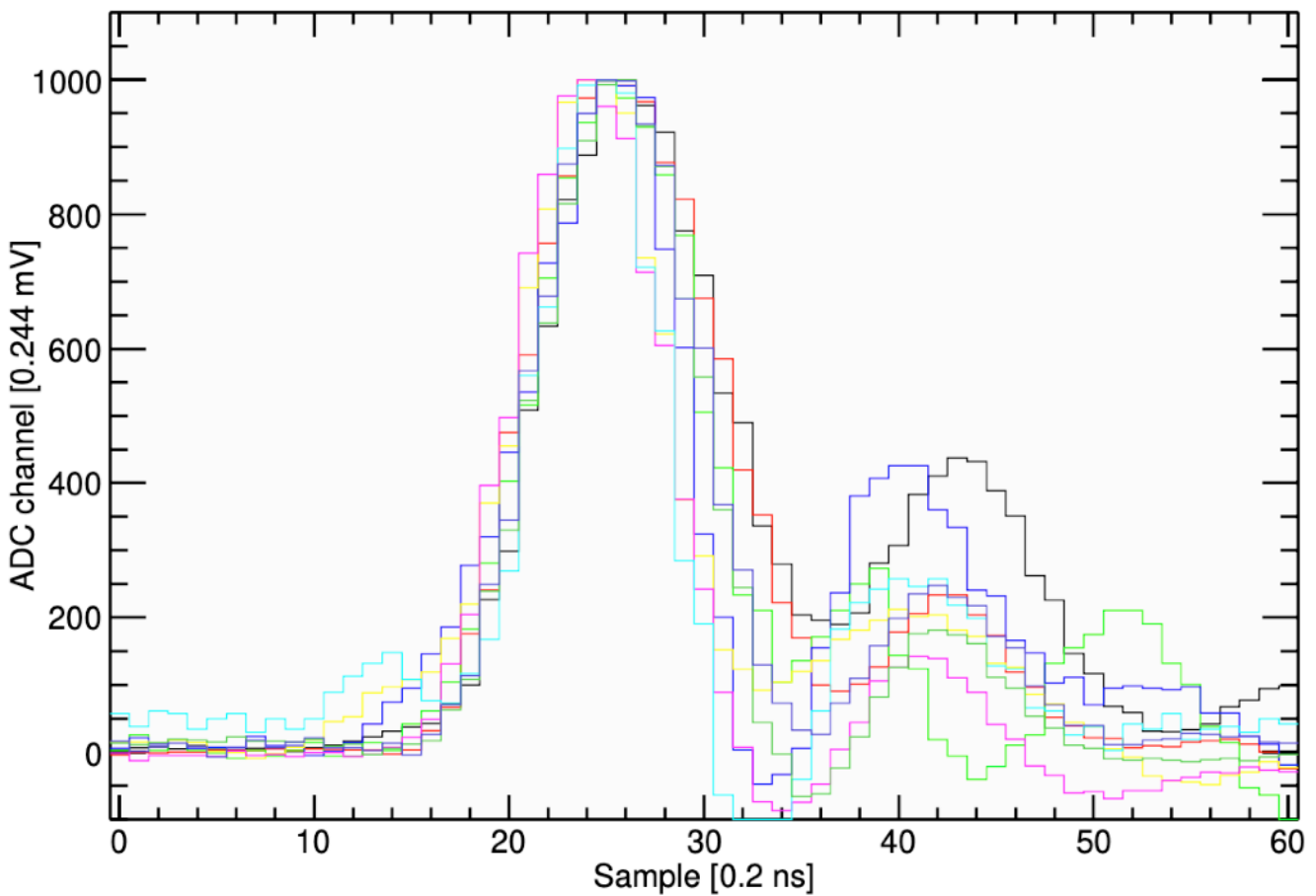


- Average charge collected in the Ring is lower than the SPE .
- The central pad D<sub>4</sub> is flooded, giving rise to cross talk.
- Only 24% hits are selected for timing analysis.

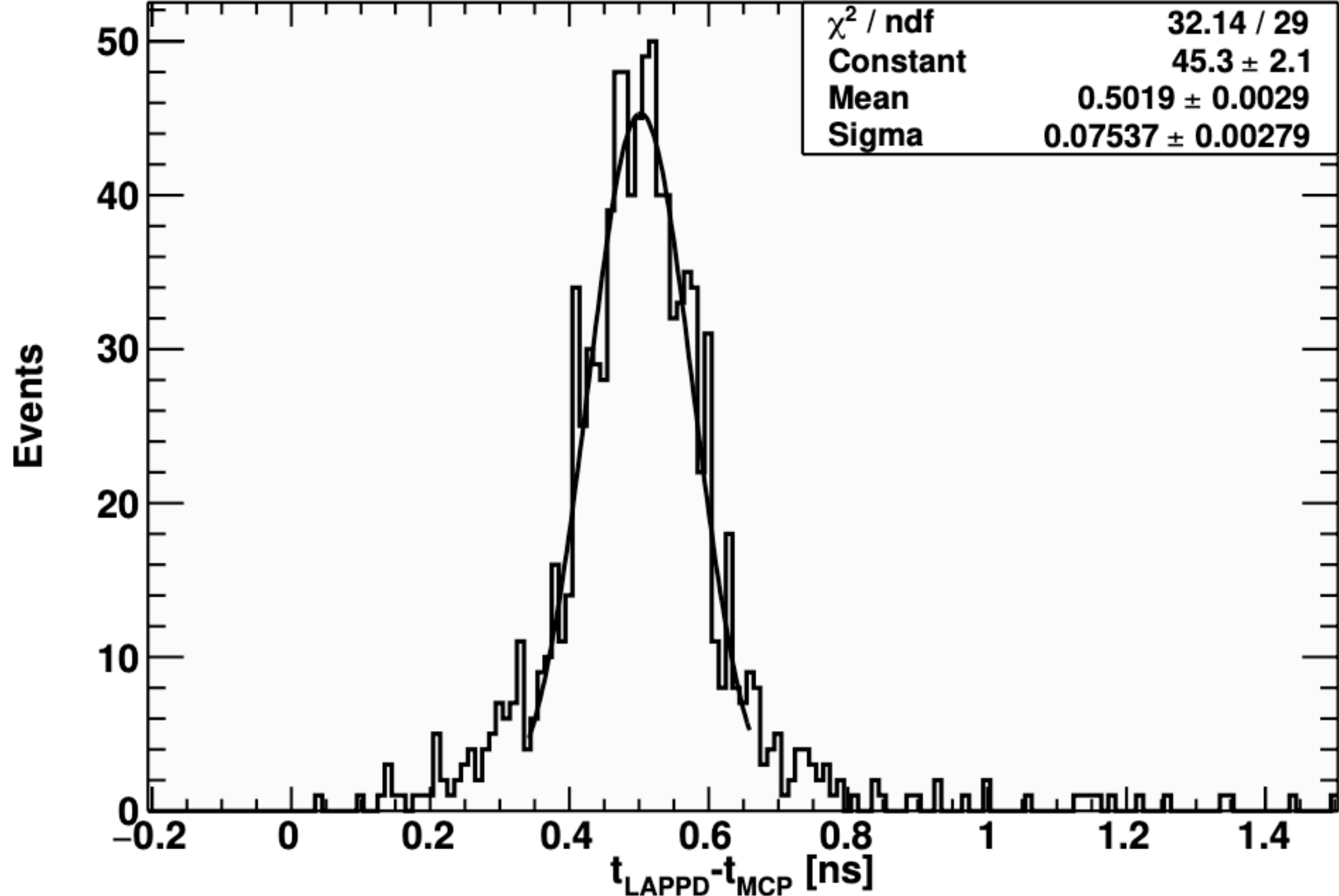
# Inside the dark box



• Digitised MCP signal



• Digitised LAPPD signal



• Timing difference between channel 2 and MCP

- The time difference is fitted by a Gaussian within  $2\sigma$
- The mean of 0.5 ns agrees with a preliminary GEAN<sub>4</sub> simulation
- The obtained  $\sigma$  varies within 80-130 ps, within <10 ps error
- The best resolution found in Channel 2 is  $75 \pm 3$  ps