FOOT meeting

TOF-wall: test with cosmic rays

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1.2. Data acquisition

2. Data analysis
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TOF-wall detector

- TW used to measure the energy loss ΔE of the passing particles and to provide their arrival time.
- Made of 40 bars of EJ-200 plastic scintillator arranged in two orthogonal layers of 20 each.
- At each end of each bar, the two series of two SiPMs were connected in parallel.

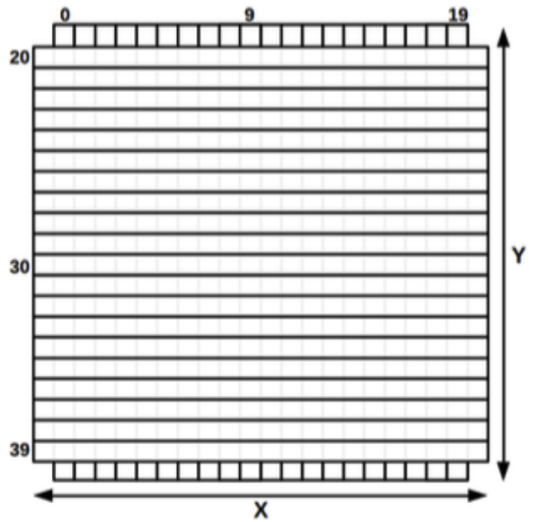


Figure: Scheme of TOF-Wall bar numbering

Experimental setup

- The light produced in the bars is collected at each end.
- Each group of four SiPMs provides a single summed analogical signal.
- The output signal of each side of each bar was input to a waveform digitizer board hosted in the WaveDAQ integrated trigger and data acquisition system.

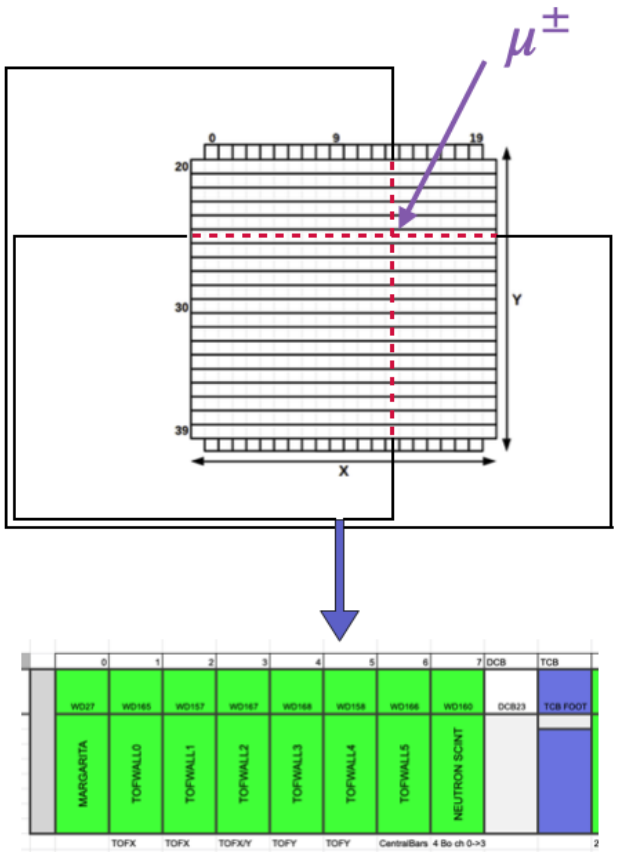


Figure: Thanks M. Morrocchi for the cabling!

Experimental setup

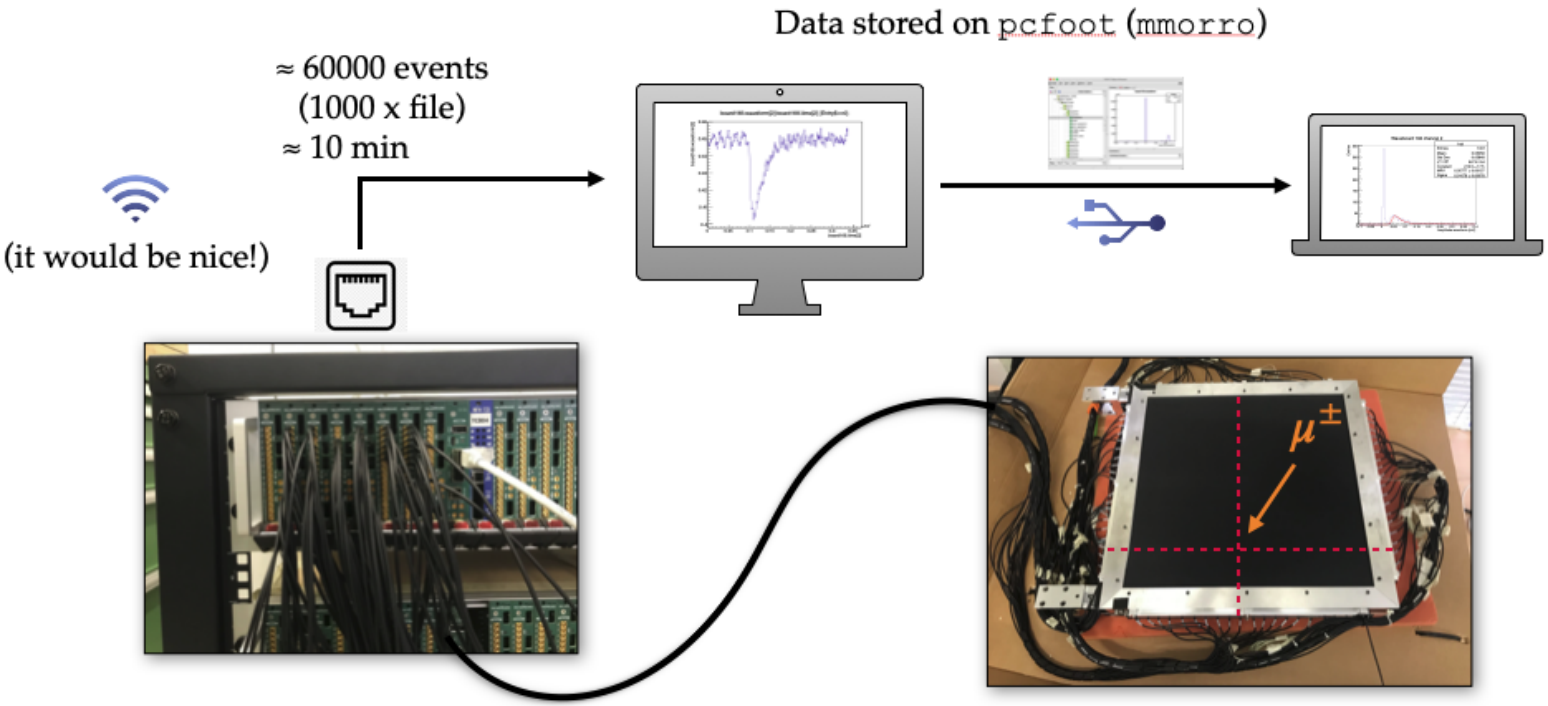
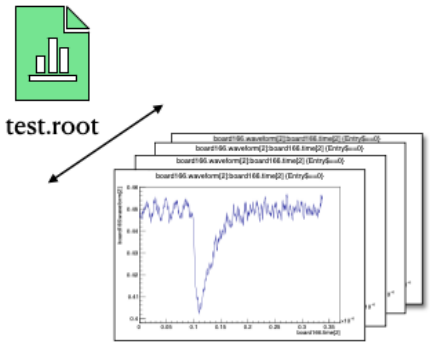
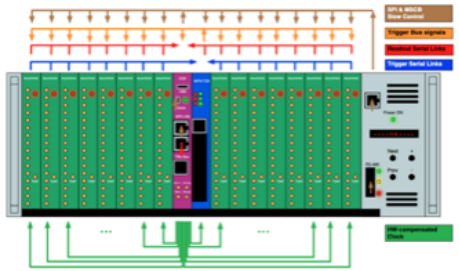


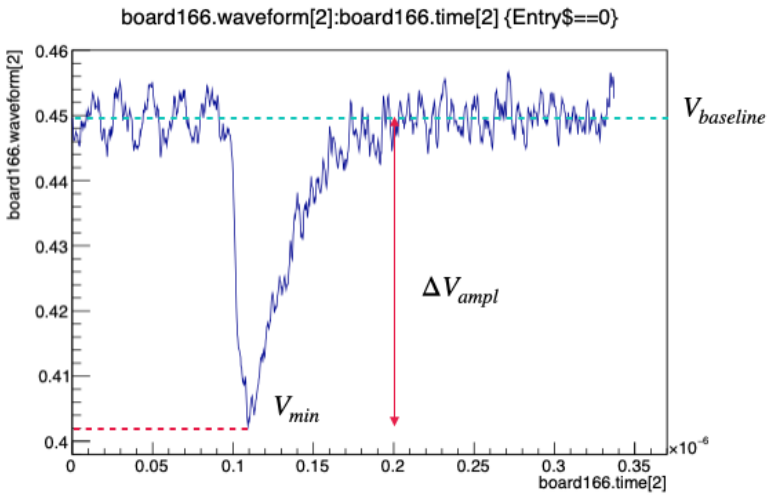
Figure: Schematic representation of the setup

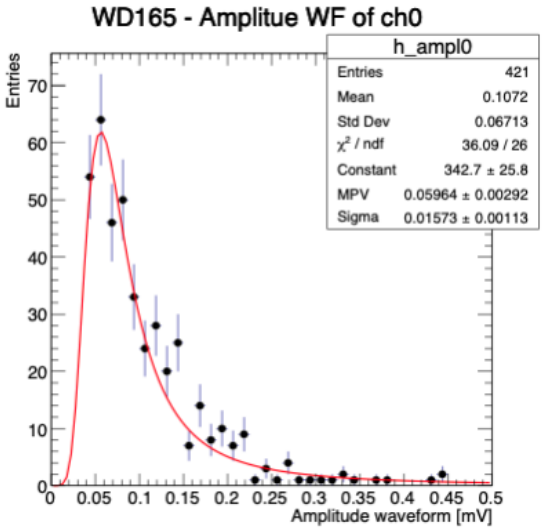
Data acquisition



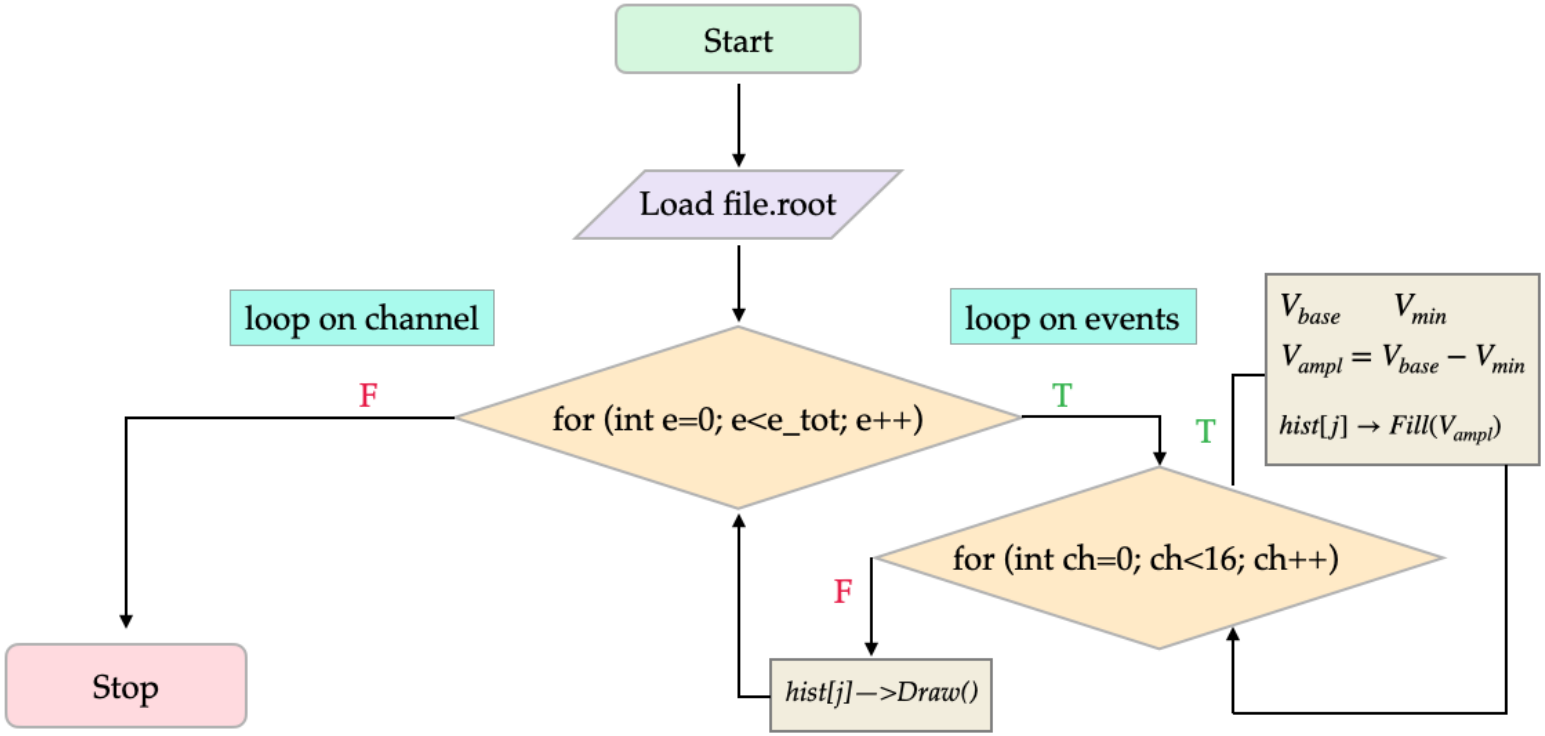
DAQ







Flowchart



Algorithm applied on all the waveDREAMs of the TOF wall.

WaveDREAM board 165 - Amplitude histograms

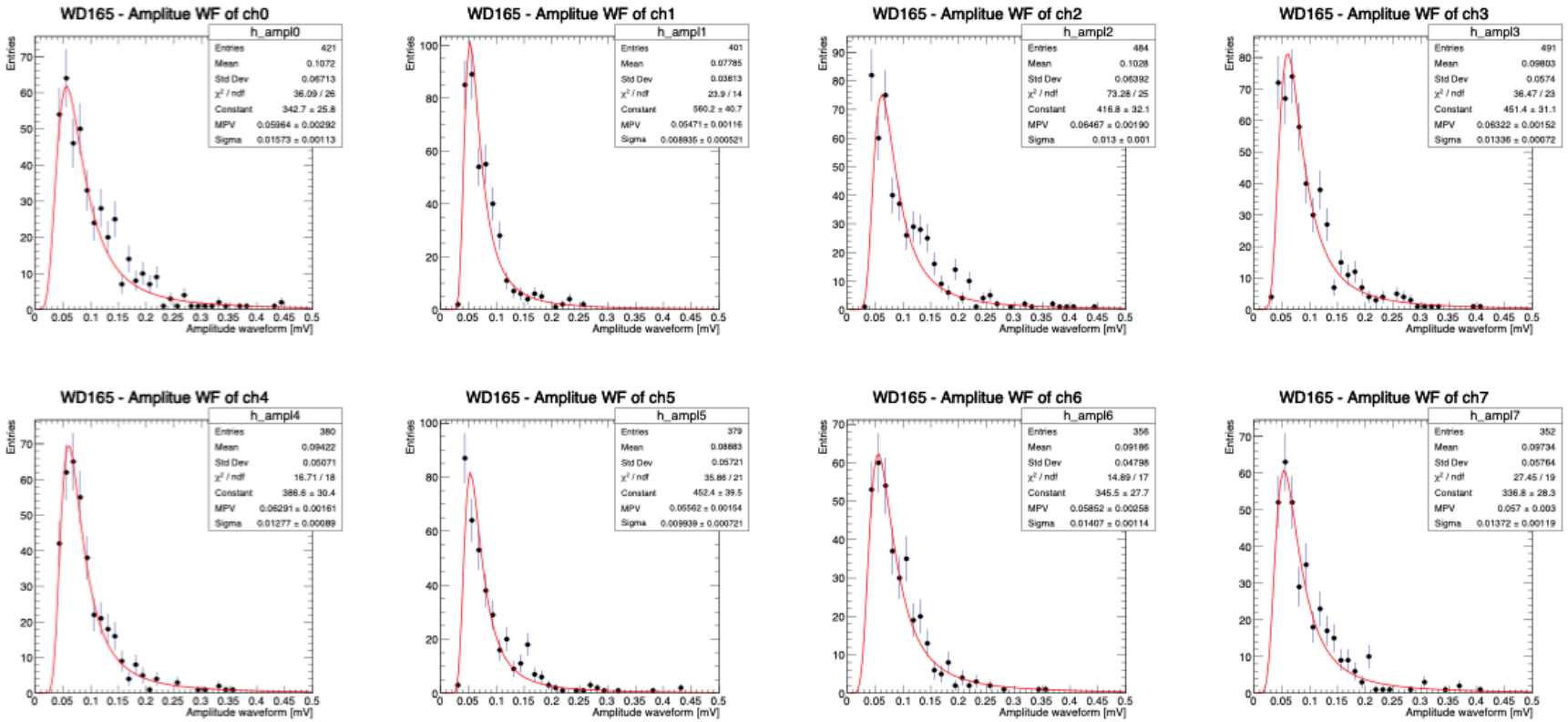


Figure: Channels from 0 to 7.

1

[1] Data in GoogleDrive/FOOT/Cosmici/3GSample-oct23

WaveDREAM board 165 - Amplitude histograms

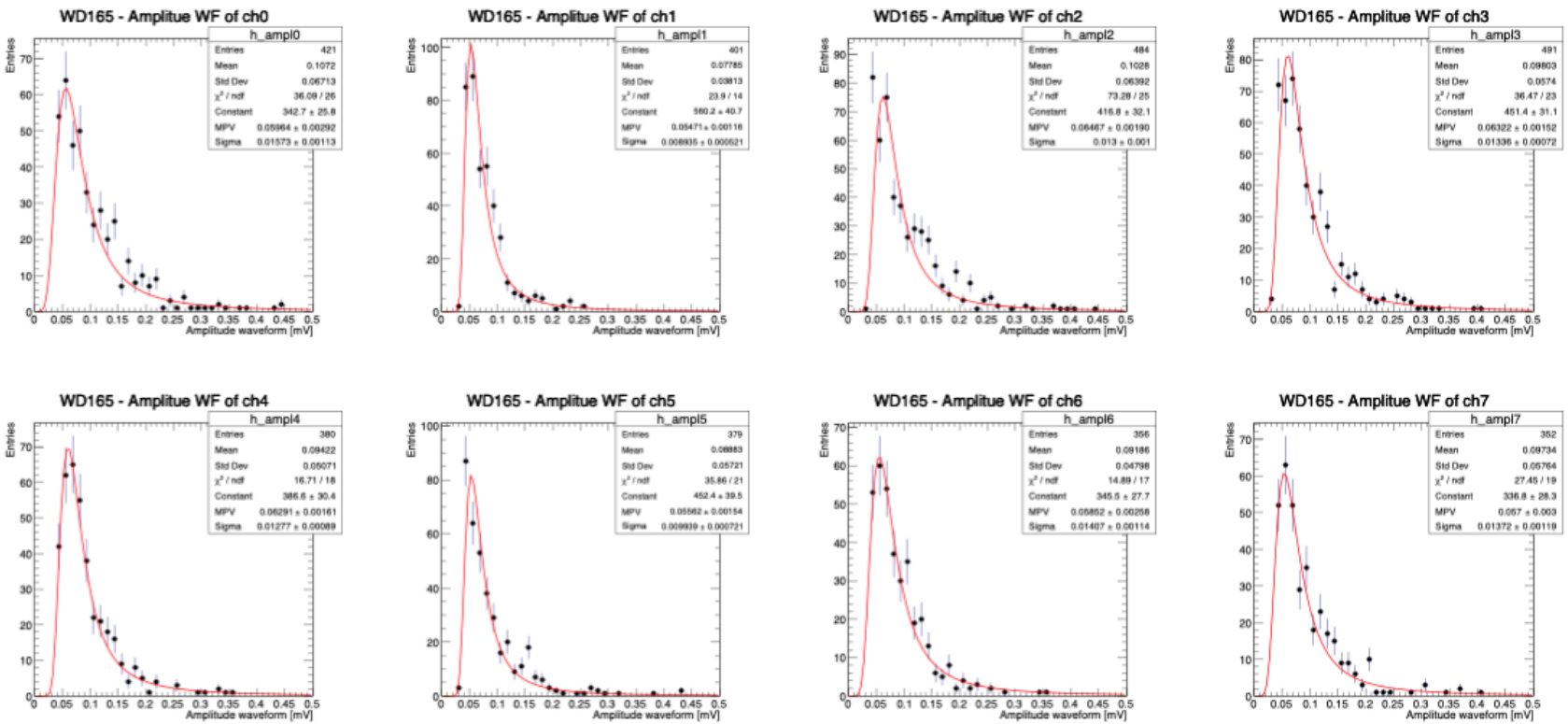
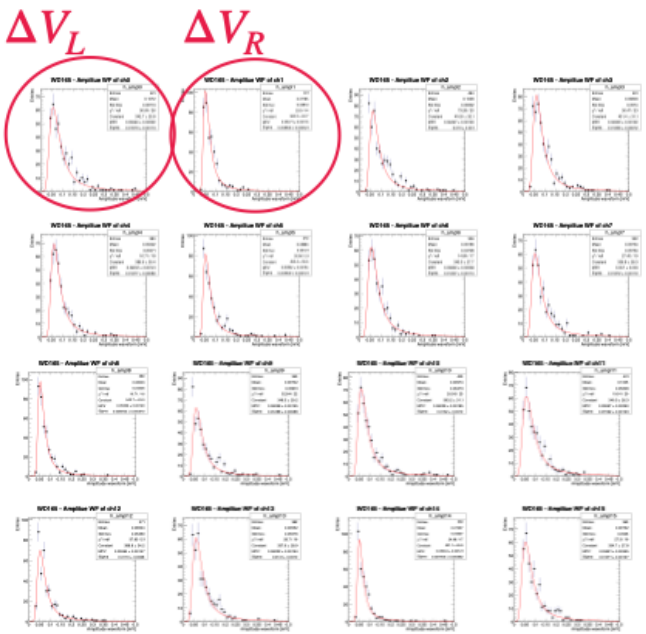


Figure: Channels from 8 to 15.

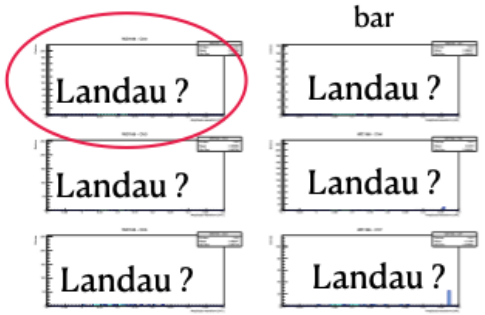
2

[2] Data in GoogleDrive/FOOT/Cosmici/3GSample-oct23

Charge

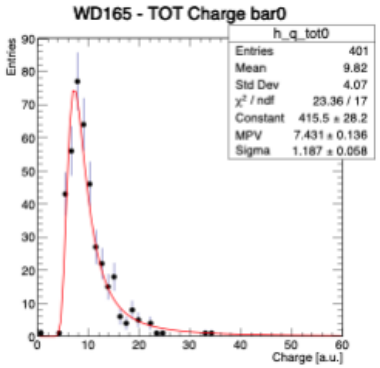


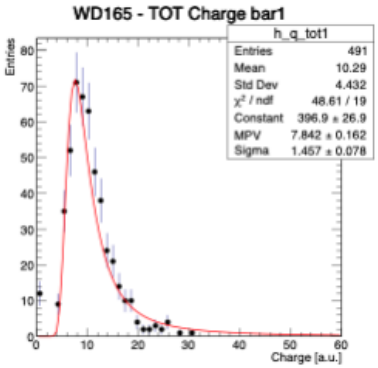
$$Q = \sqrt{Q_L \cdot Q_R}$$

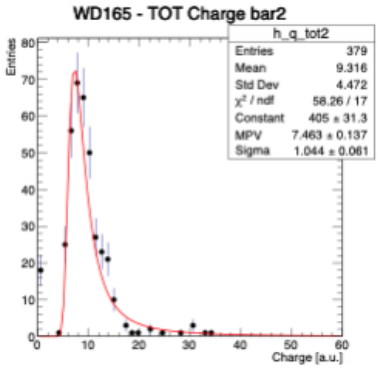


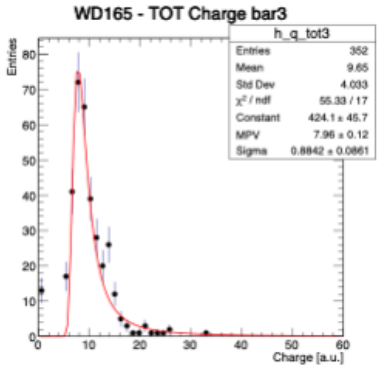
- Compute charge Q through the integral of the waveform (for each individual event).
- For each event, Q_{tot} evalutated from the collected charge on each side of the bar .

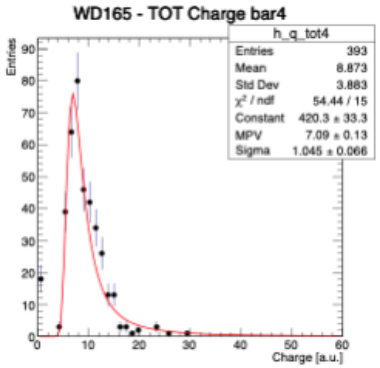
Charge

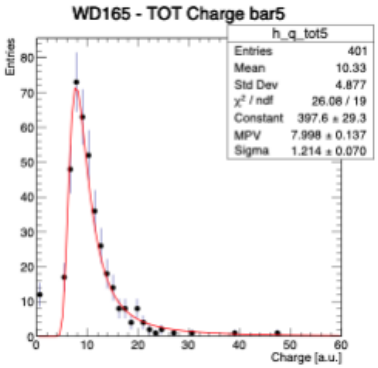


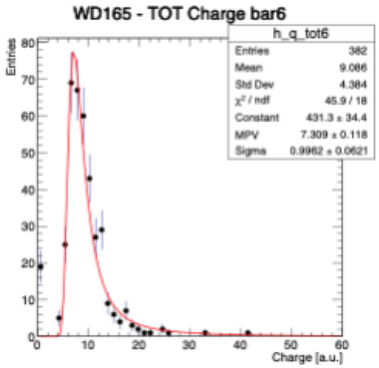


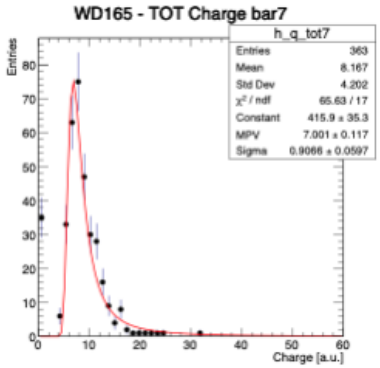






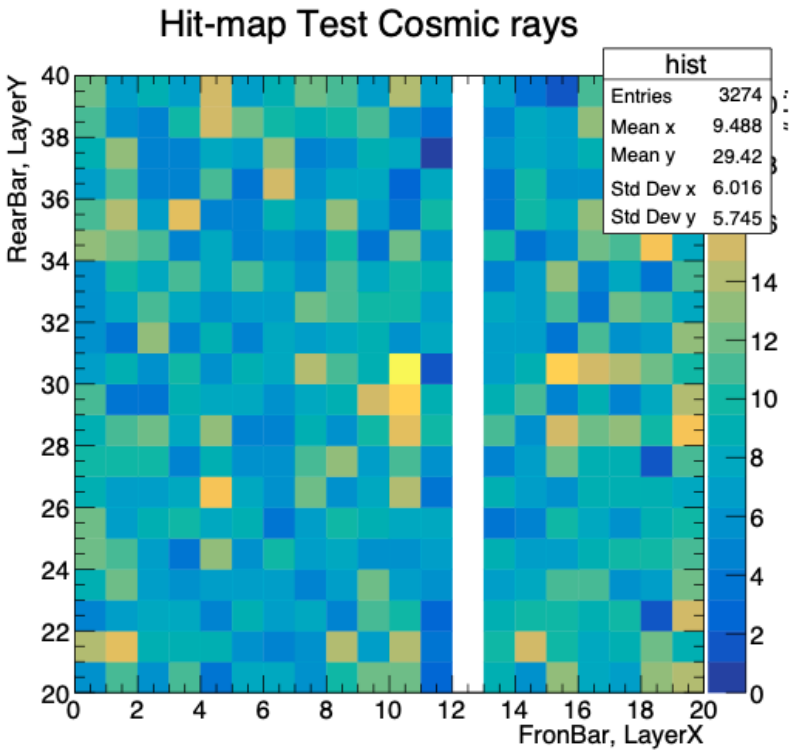




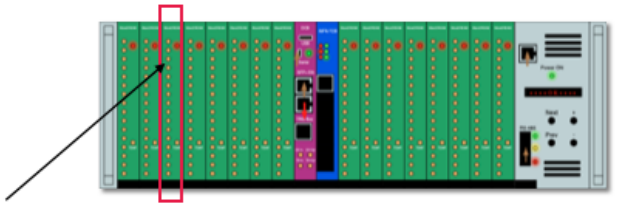


Good agreement with the expected Landau distribution.

Hit-Map TOFwall



Board 157, channel 2 and 3 disabled



Maybe a problem with the connector?

BAR 12 X-View

Distribution of hits on the TOF-wall bars is uniform for both layers.

Tesi di Laurea, Roberto Zarrella 2018-19

Tesi di Laurea, Marco Montefiori 2019-20