TOF-wall

Test with cosmic rays

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November 2021

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.

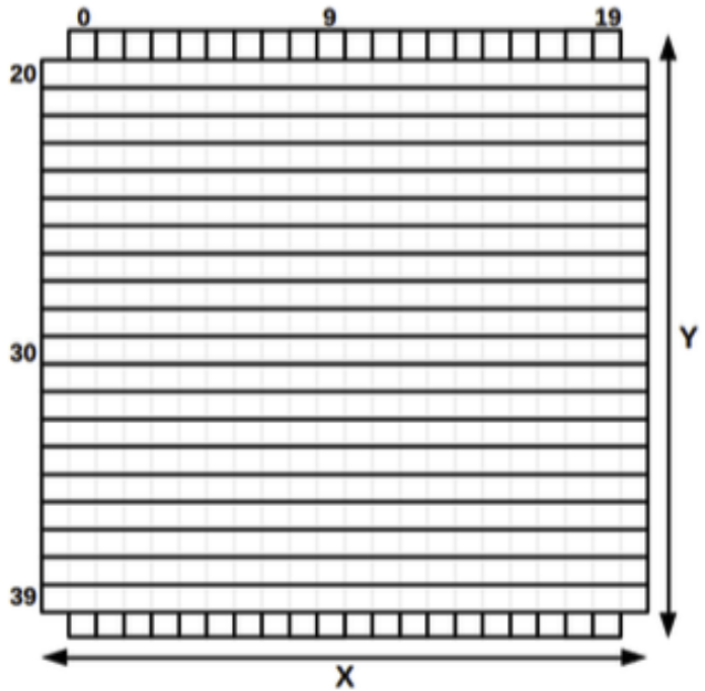


Figure: Scheme of TOF-Wall bar numbering

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, WaveDREAM, hosted in the WaveDAQ integrated trigger and data acquisition system.

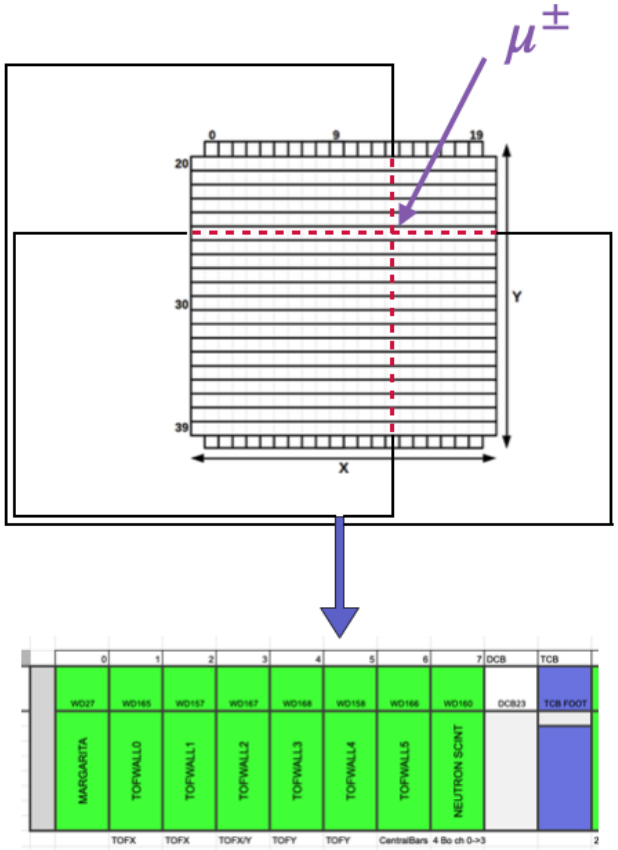


Figure: Thanks M. Morrocchi!

Experimental setup

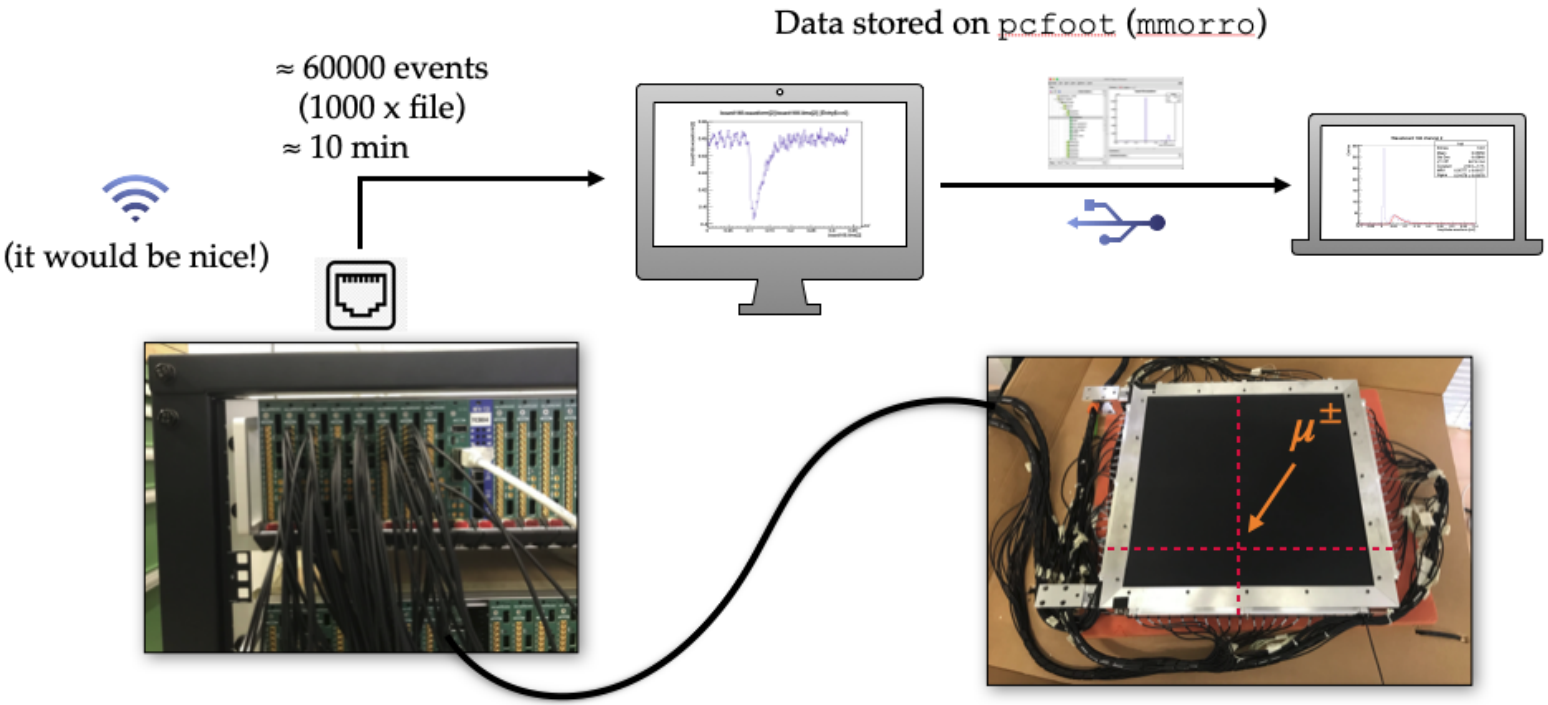


Figure: Schematic representation of the setup

Test

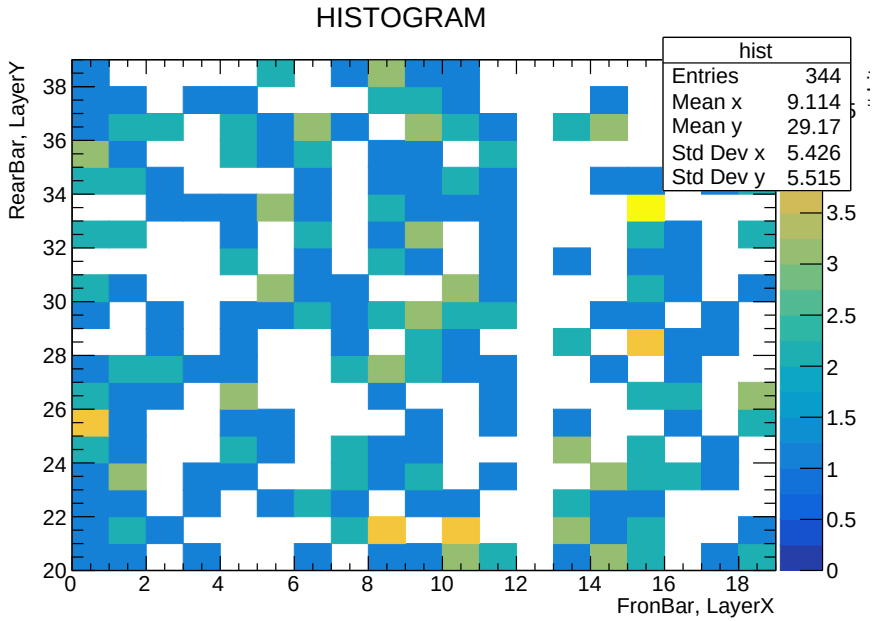


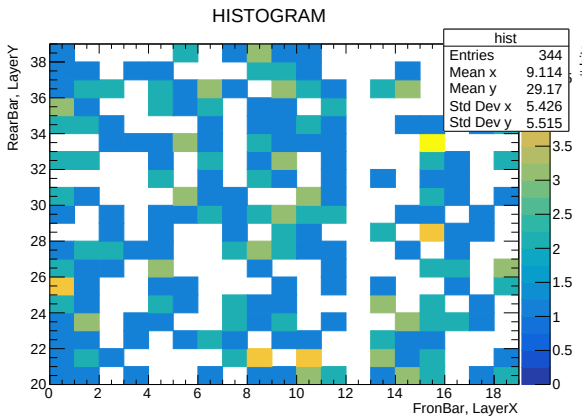
Figure: Example Waveform recorded by DRS4

- Select the channel of interest (ch 0 $\longrightarrow$ 11)
- Measure the amplitude of the signal ($\pm$ 5 mV)
- Correlate with the trigger value ($\pm$ 3 mV)

RAD - Radiation Assessment Detector

Il 31 maggio 2013, gli scienziati della NASA hanno riportato i risultati ottenuti durante la crociera e hanno affermato che il valore della dose equivalente per il viaggio di sola andata e senza sosta ($t_{tot} \sim 1$ anno) con i sistemi di propulsione e di schermatura attuali risulta essere 0.66 ± 0.12 Sivert.

L'esposizione a 1 Sv aumenta il rischio di morte per cancro di $\sim 5\% \Longrightarrow$ Grande rischio per la salute per qualsiasi missione umana su Marte.



RAD: calorimetro CsI per particelle cariche e raggi γ