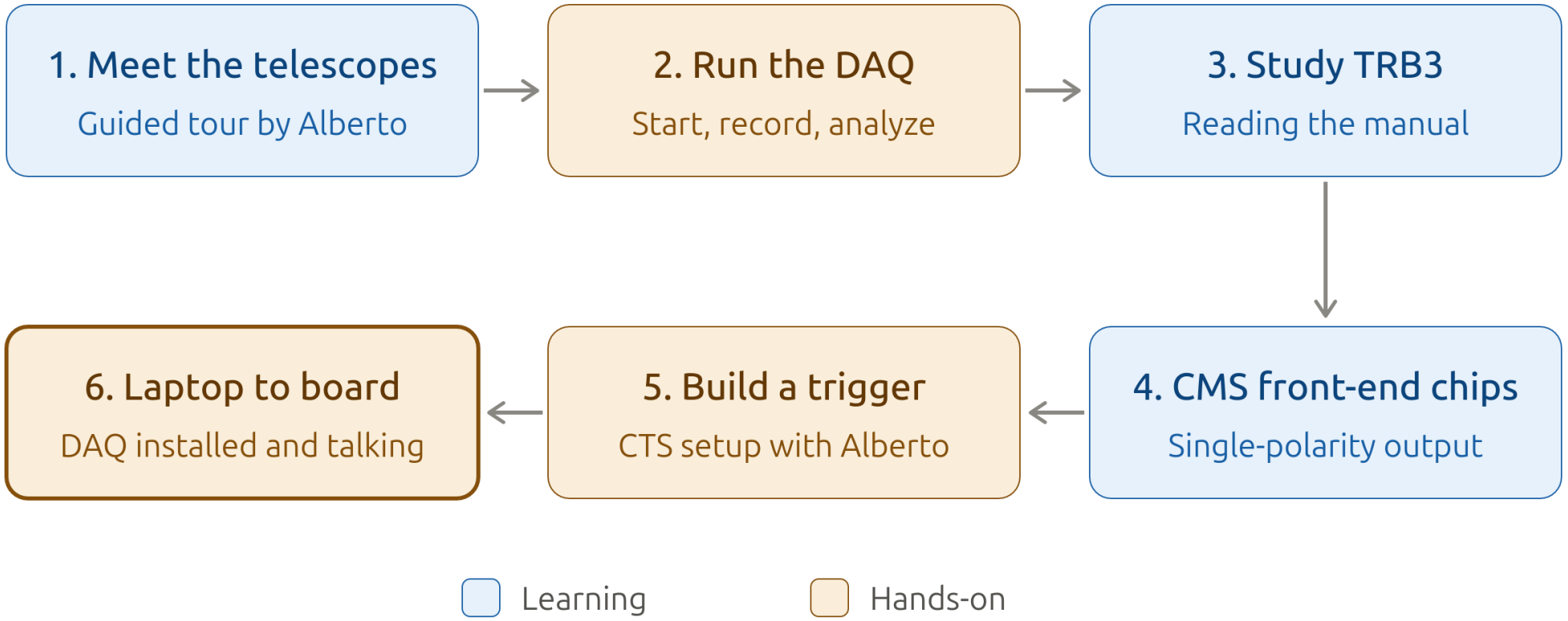
Visiting LIP in Coimbra

19 OCT – 30 OCT

Donya Ahmadi

Vrije Universiteit Brussels (VUB)

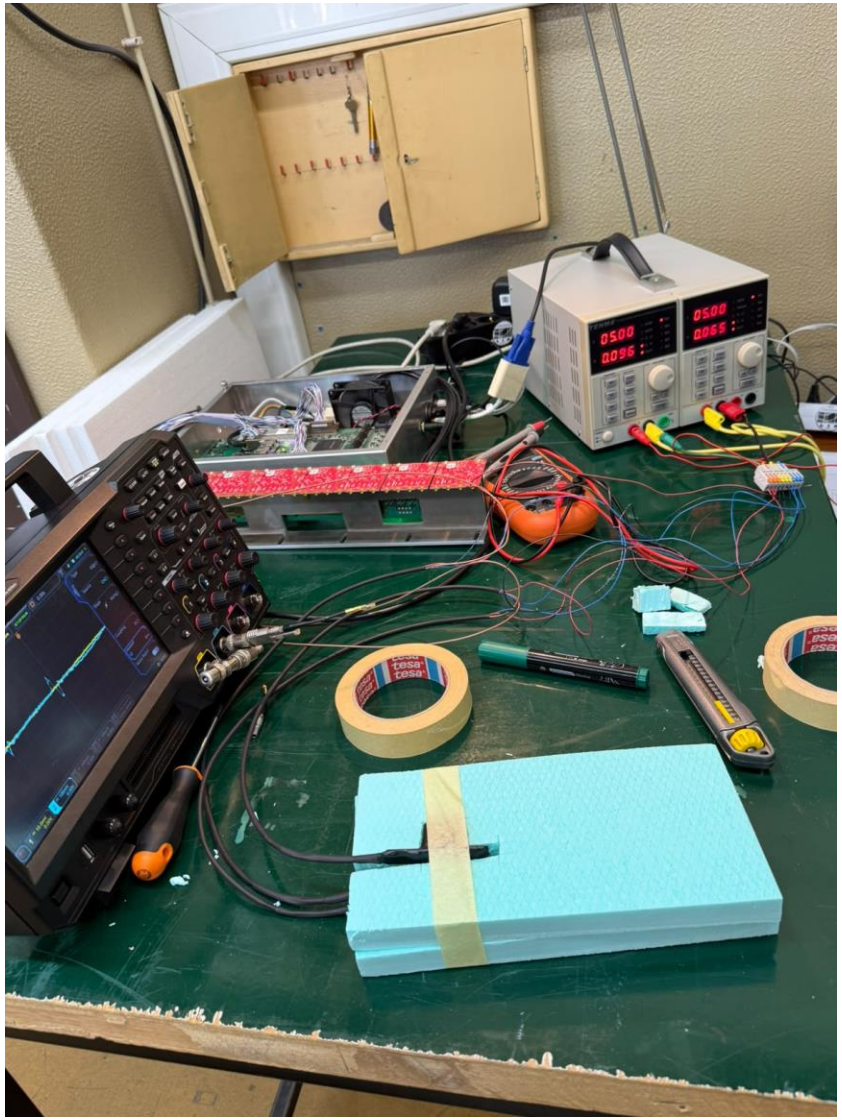
Activities: learning and hands-on experiment

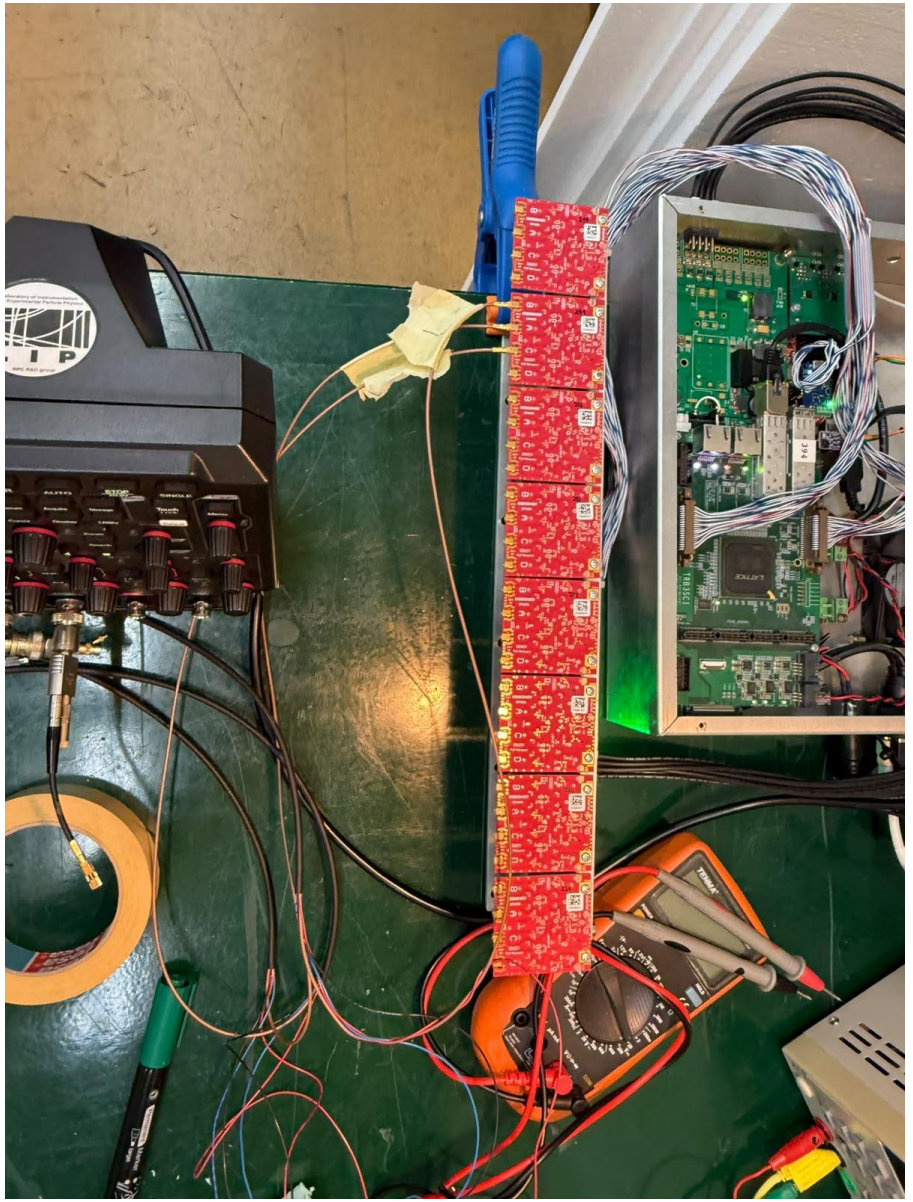


Also, Working on the proceeding paper for Muographers2026 (you can find it here https://arxiv.org/pdf/2611.00369v1 ;-)

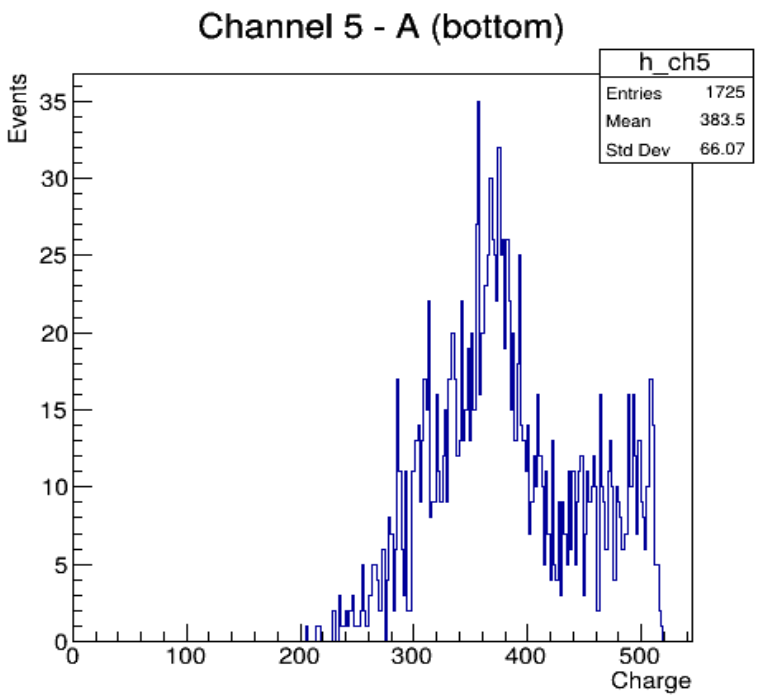
Testing fFEE + TRB3sc with three scintillators

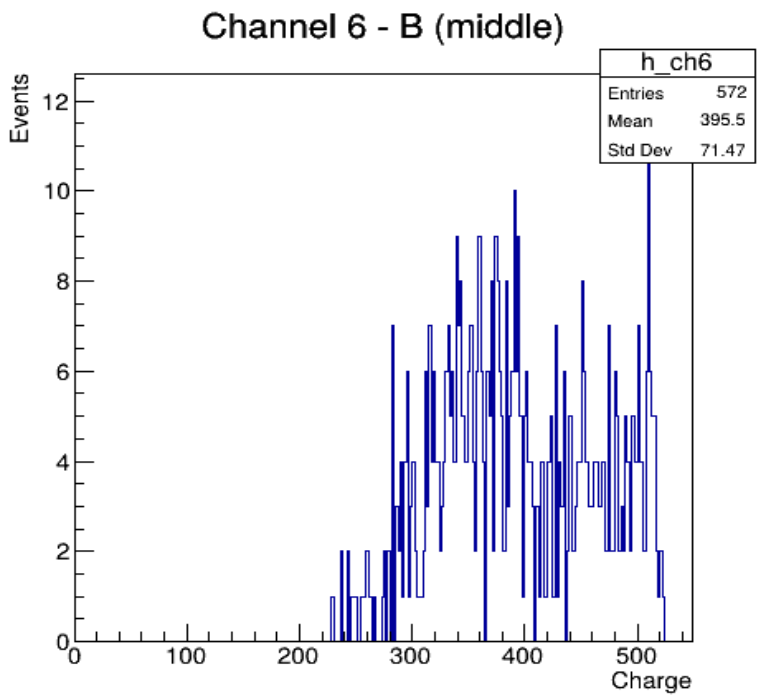
- Data taken with multiplicity 1

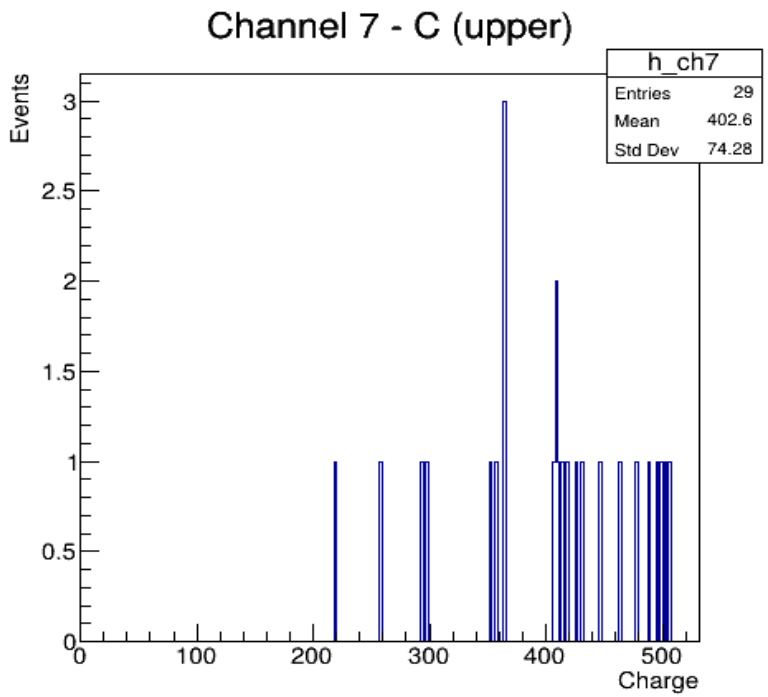




Charge distribution







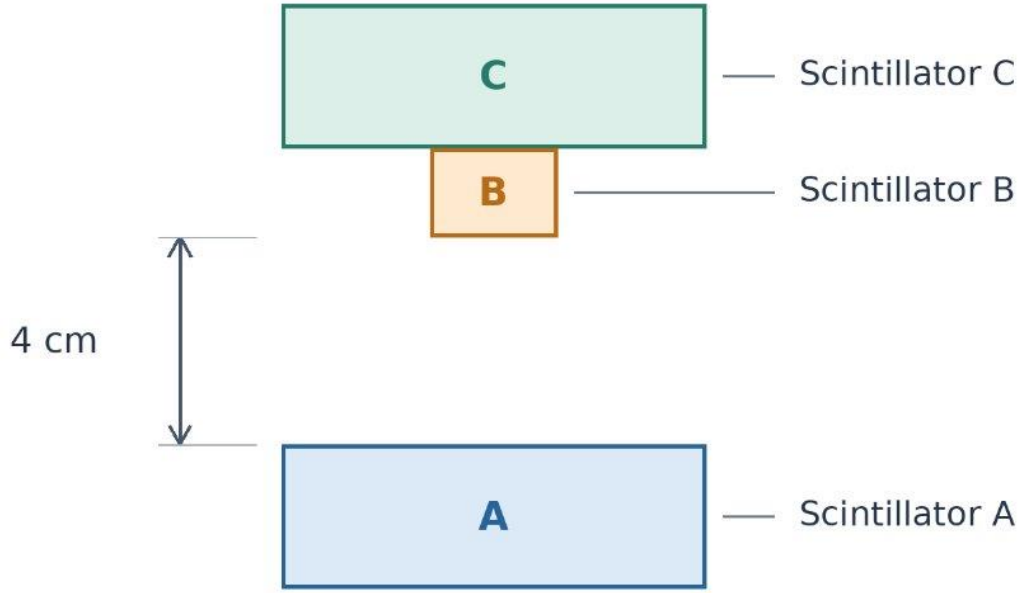
Efficiency and other variables

Scintillator	Trigger	Passed (A&B&C)	Total (trigger)	Efficiency (%)	Binomial error (%)
A (bottom)	B & C	4	14	28.57	± 12.07
B (middle)	A & C	4	19	21.05	± 9.35
C (upper)	A & B	4	16	25.00	± 10.83

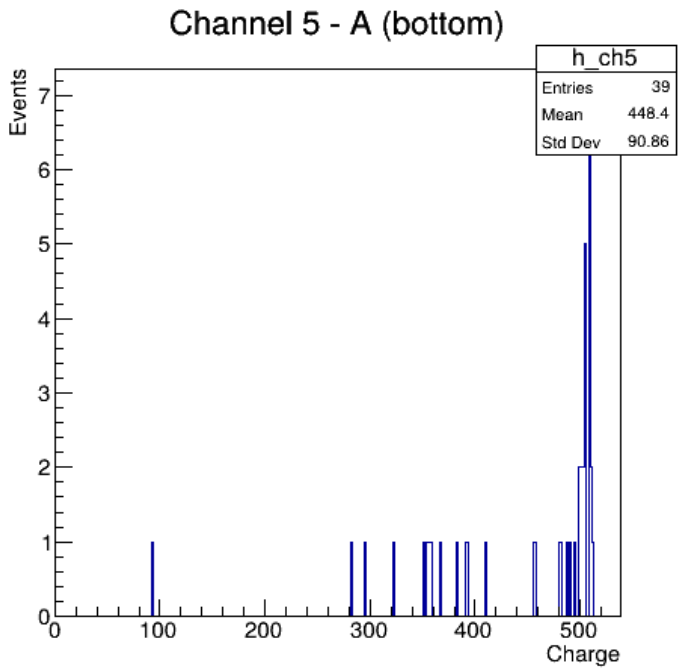
Channel / Selection	Description	Events
Total events	—	**2281**
Channel 5	Scintillator A (bottom)	1725
Channel 6	Scintillator B (middle)	572
Channel 7	Scintillator C (upper)	29
A & B	Coincidence	16
B & C	Coincidence	14
A & C	Coincidence	19
A & B & C	Triple coincidence	4

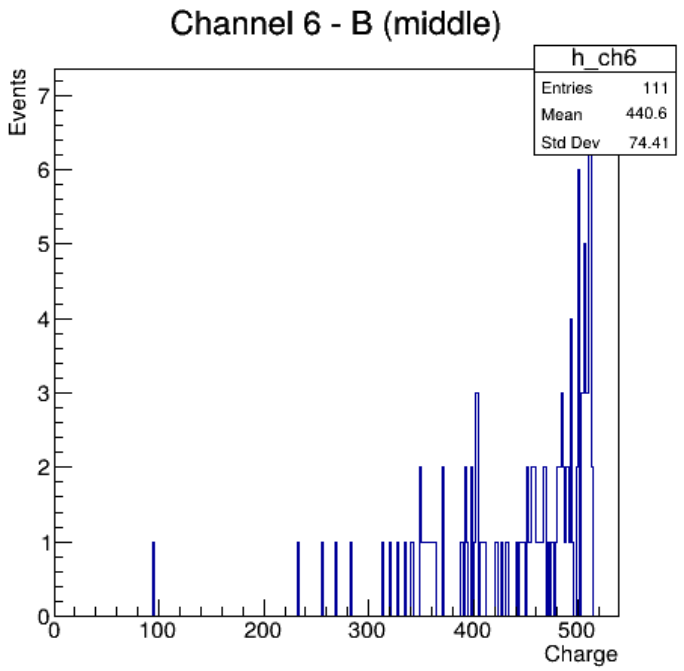
Config 1 (B and C attached above)

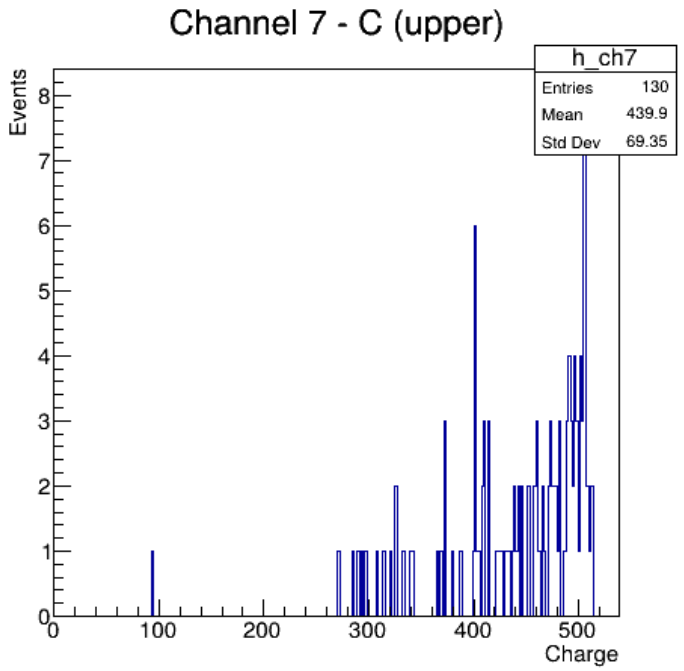




Charge distribution







Scintillator event summary

Total events: 137

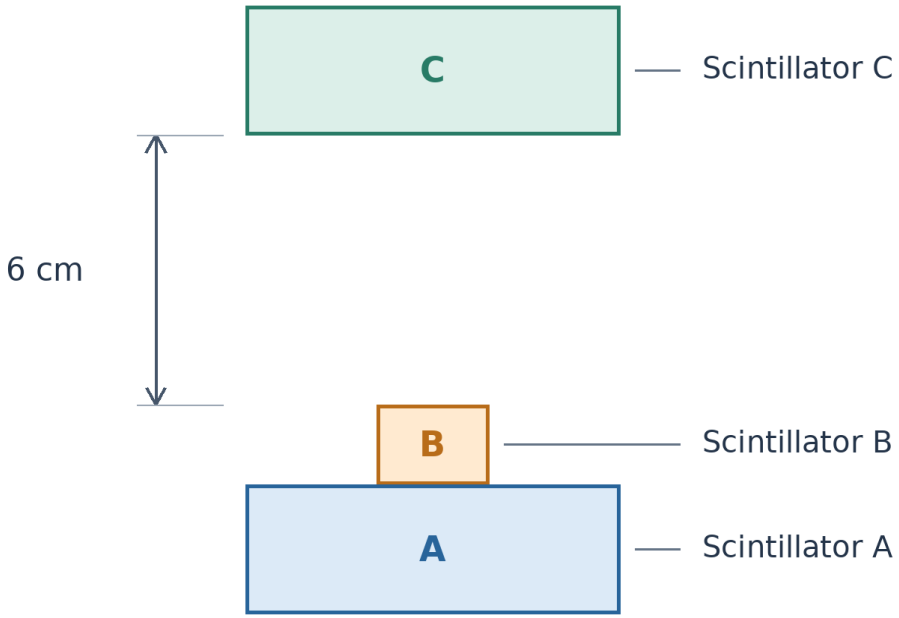
Scintillator	Position	Channel	Events	Efficiency
A	Bottom	5	39	5.77% ± 2.29%
B	Middle	6	111	18.75% ± 6.90%
C	Upper	7	130	46.15% ± 13.83%

Coincidence counts

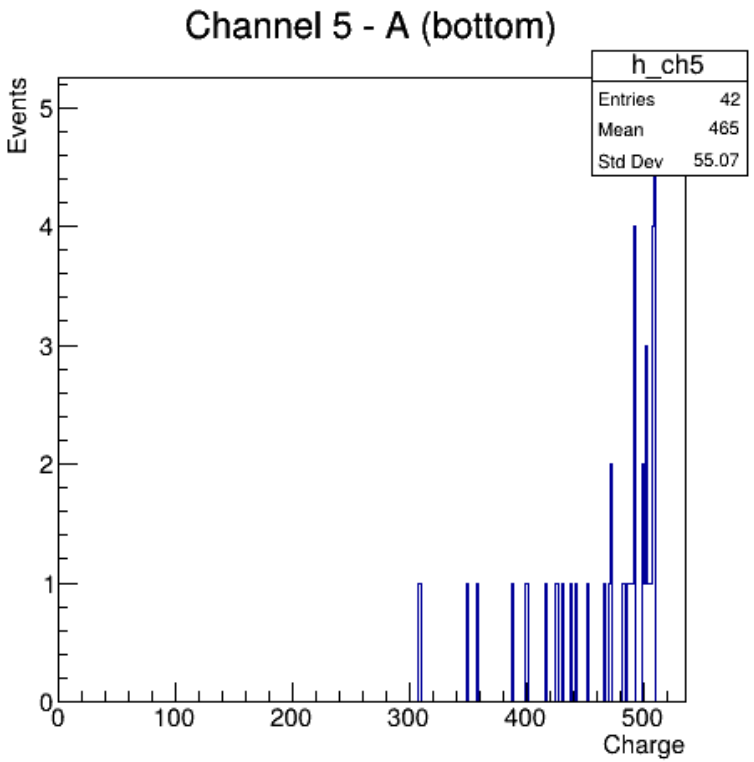
Coincidence	Events
A & B	13
B & C	104
A & C	32
A & B & C	6

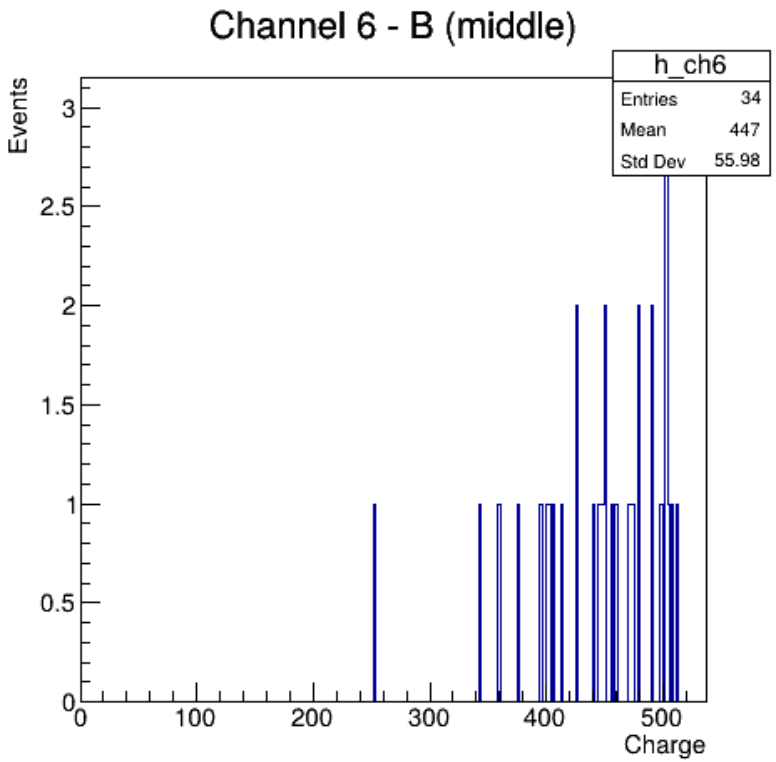
Config 2

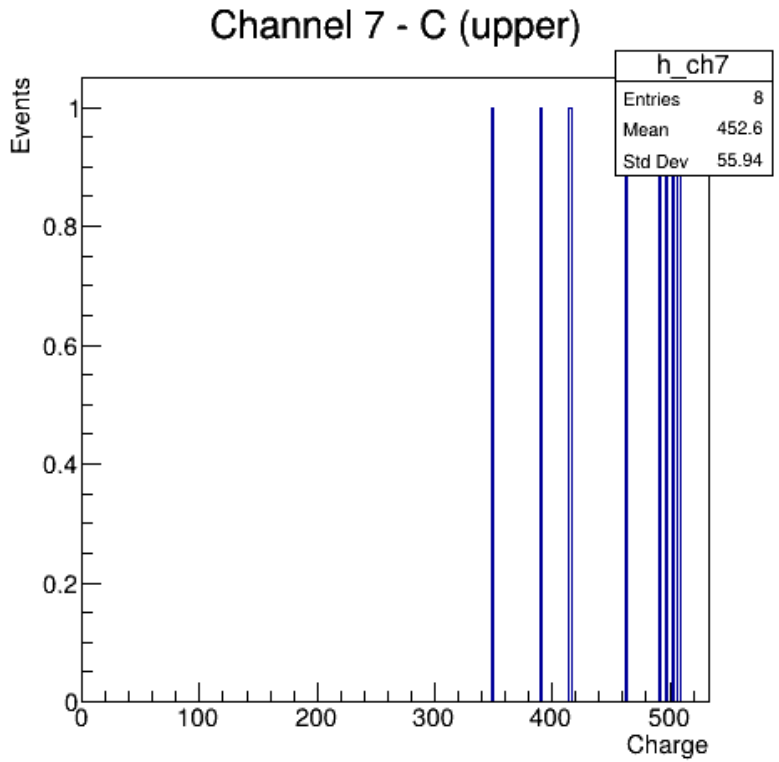




Charge distribution







Scintillator event summary

Total events: 42

Scintillator	Position	Channel	Events	Efficiency
A	Bottom	5	42	N/A*
B	Middle	6	34	0.00% ± 0.00%
C	Upper	7	8	0.00% ± 0.00%

Coincidence counts

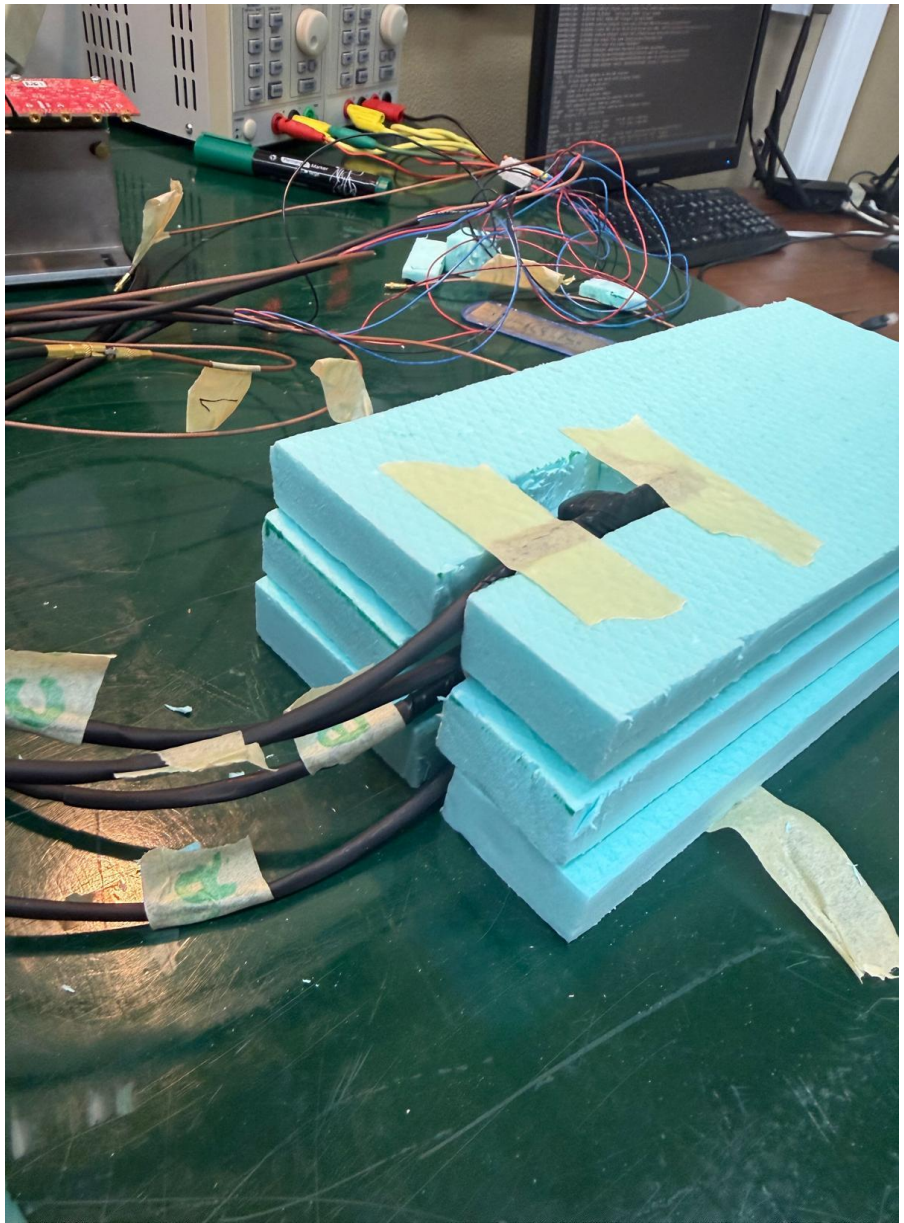
Coincidence	Events
A & B	34
B & C	0
A & C	8
A & B & C	0

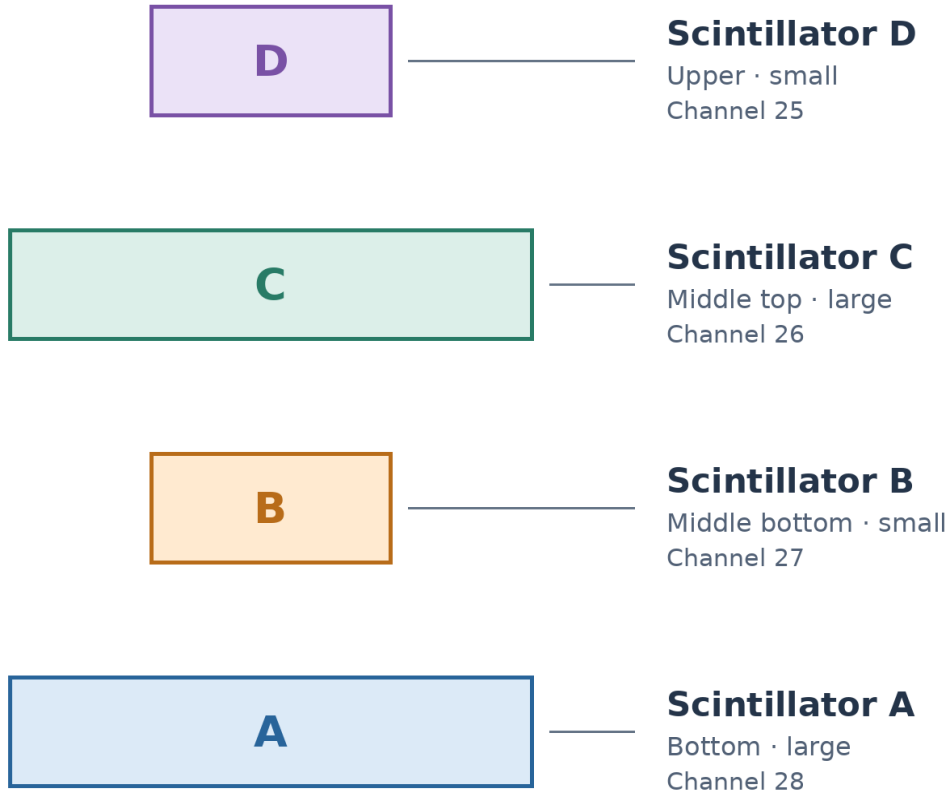
* N/A: no reference events; efficiency cannot be calculated.

Efficiency values and uncertainties reproduced as provided.

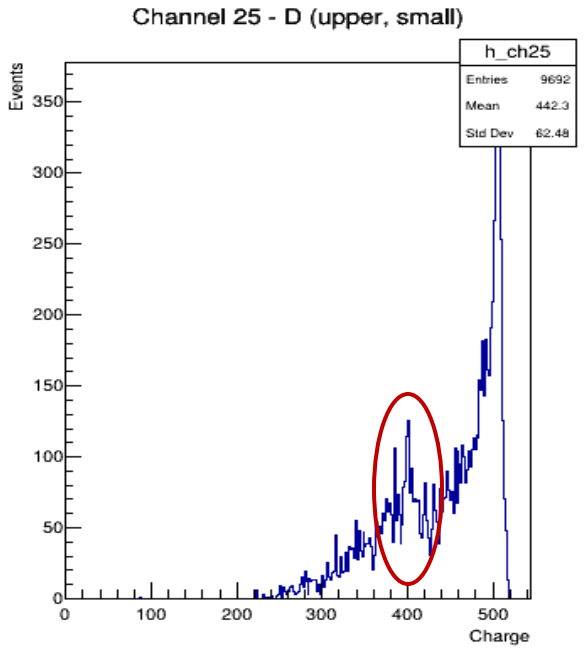
4-scintillator telescope

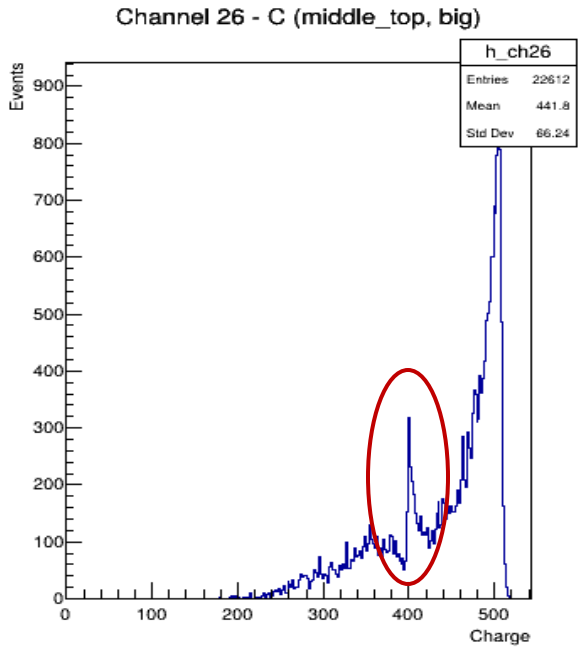
Config 1

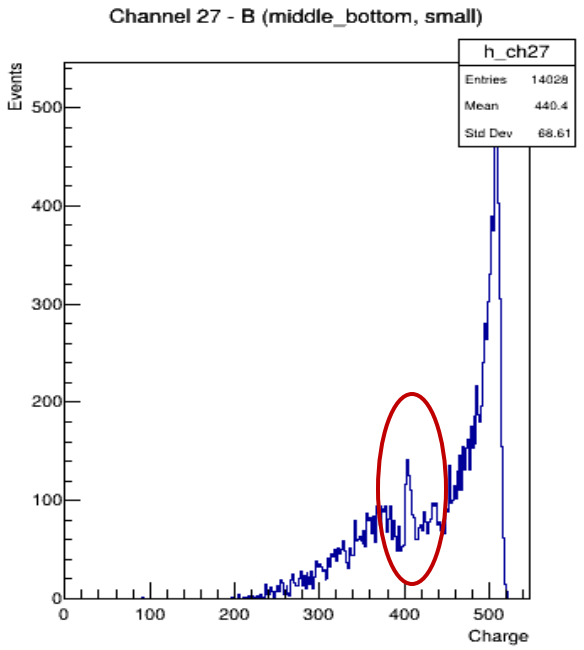


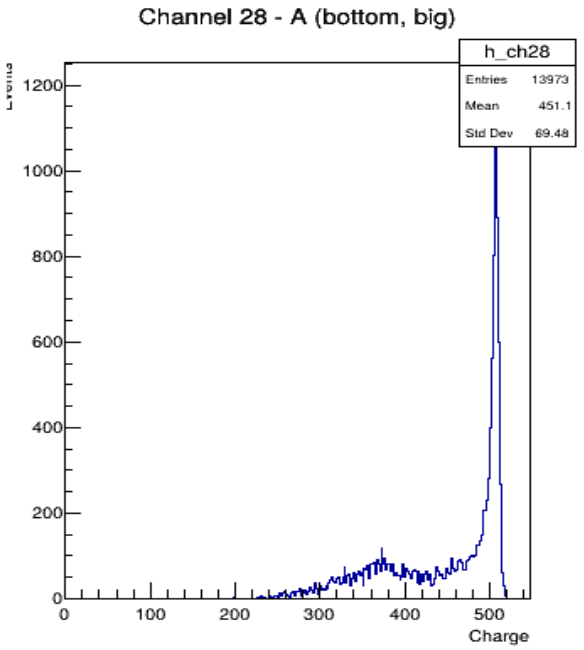

D
Scintillator D
Upper · small
Channel 25
C
Scintillator C
Middle top · large
Channel 26
B
Scintillator B
Middle bottom · small
Channel 27
A
Scintillator A
Bottom · large
Channel 28

charge distribution of each detector

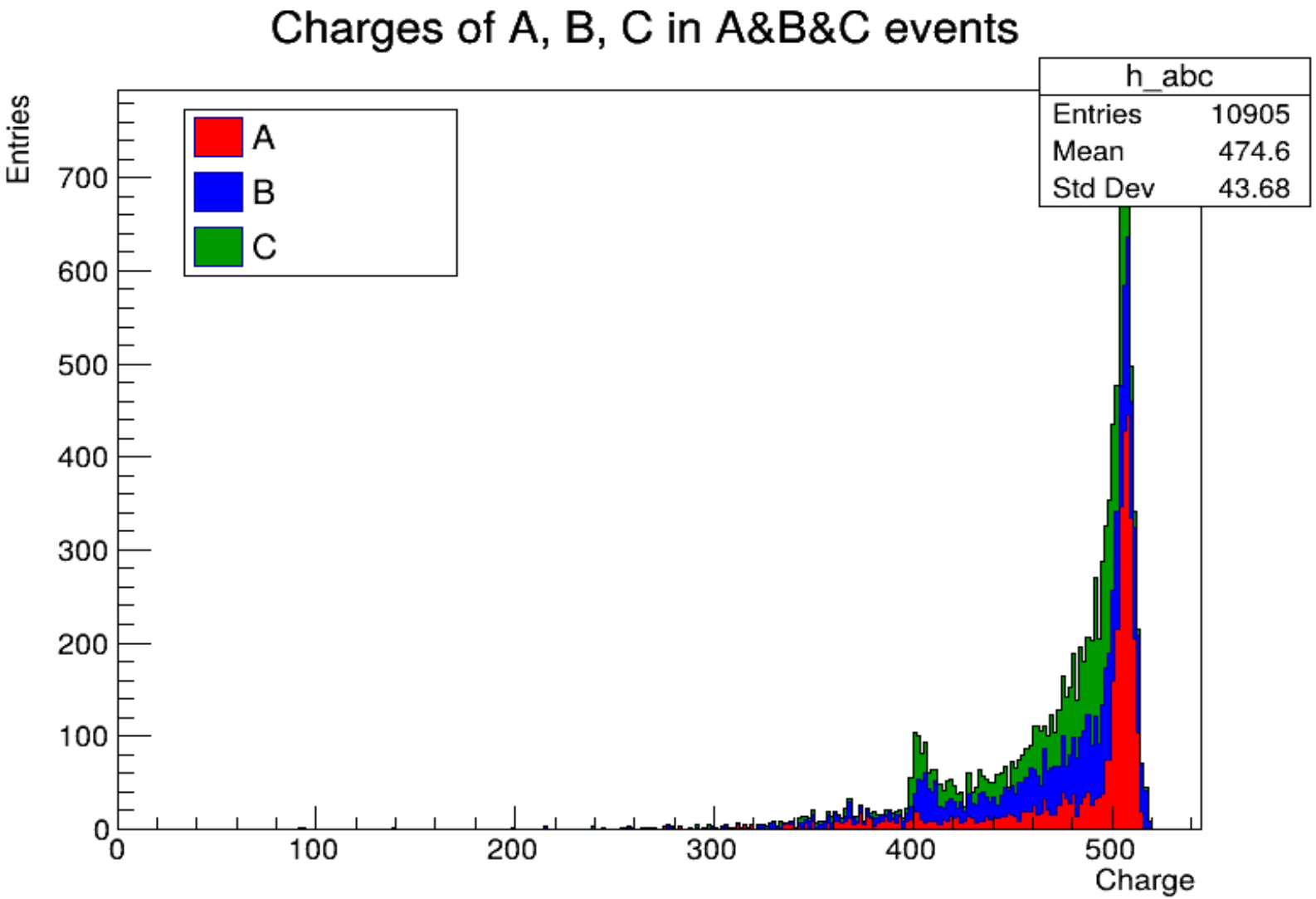








Charge distribution of channel A&B&C



Scintillator event summary

Total events: 27,690

Scintillator	Position	Size	Channel	Events
D	Upper	Small	25	9,692
C	Middle top	Big	26	22,612
B	Middle bottom	Small	27	14,028
A	Bottom	Big	28	13,973

Coincidence counts

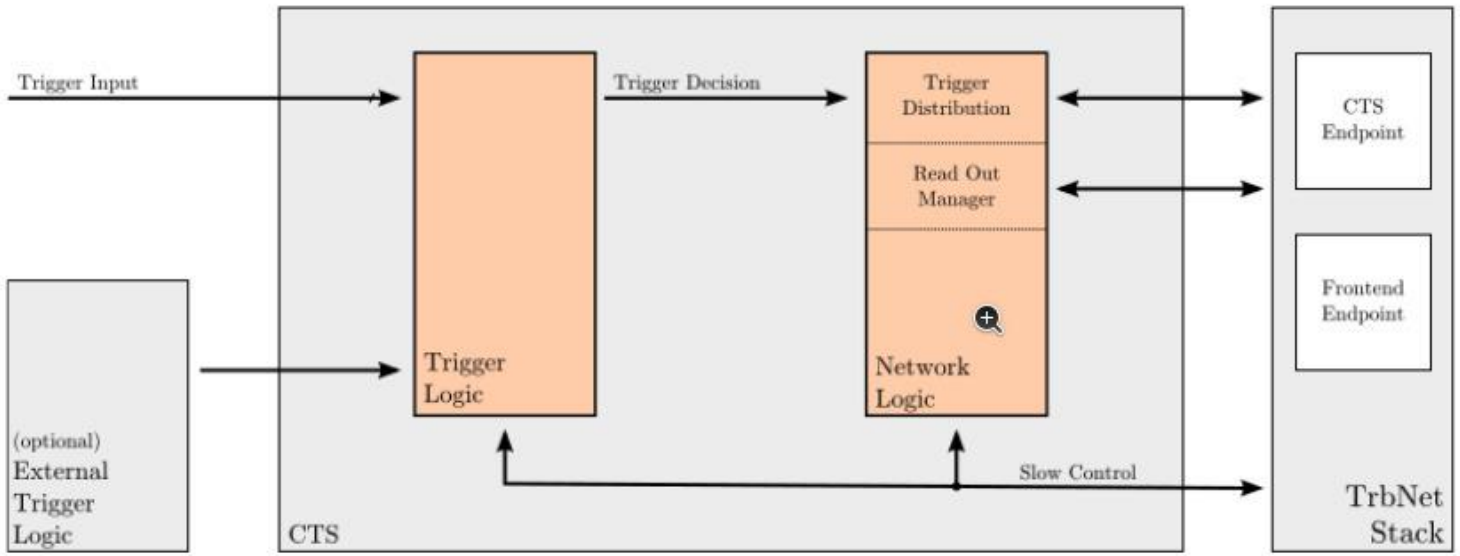
A & B	B & C	A & C	D & C	B & D & C	A & B & C	A & B & C & D
8,351	9,166	9,041	9,330	728	3,635	473

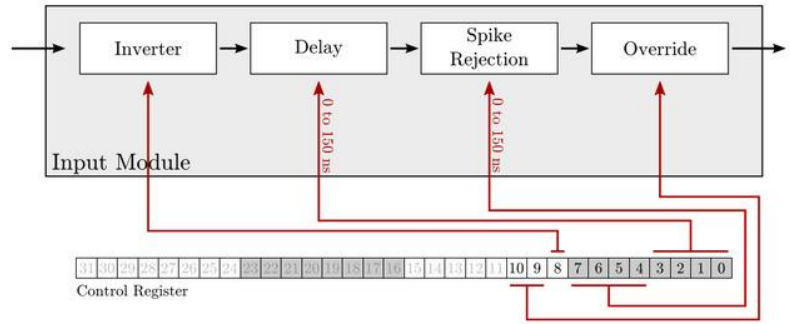
Efficiencies

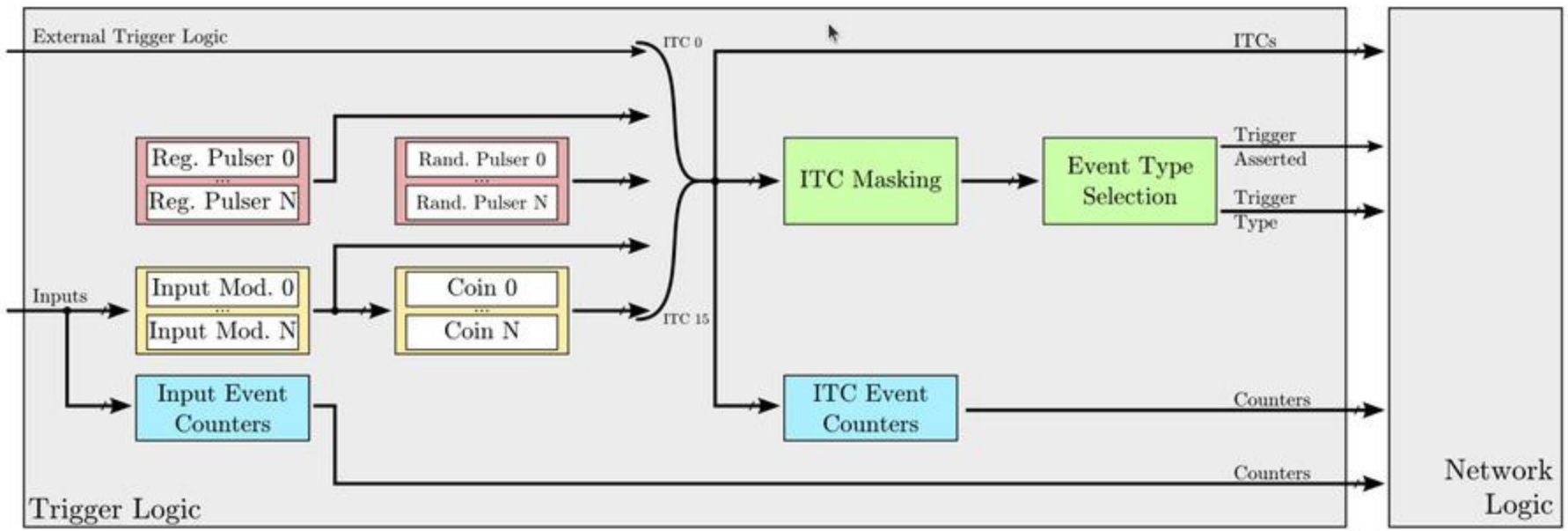
Scintillator	Reference trigger	Event ratio	Efficiency
A	B & C & D	473 / 728	64.97% ± 1.77%
B	D & C	728 / 9,330	7.80% ± 0.28%
C	A & B & D	473 / 473	100.00% ± 0.00%

Efficiency values and uncertainties reproduced as provided; D efficiency was not reported.

Central Trigger System of the TRB3

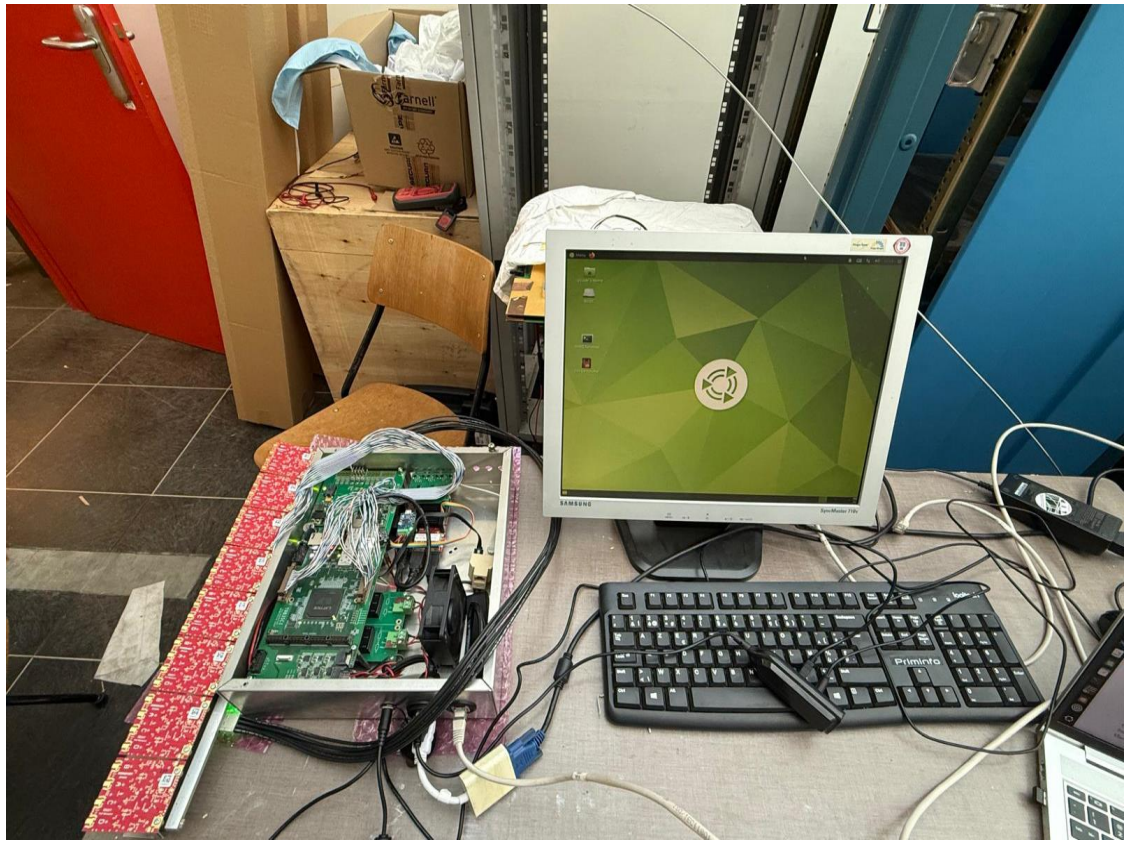

Trigger Input
Trigger Decision
Trigger Distribution
Read Out Manager
Network Logic
Trigger Logic
CTS Endpoint
Frontend Endpoint
(optional) External Trigger Logic
Slow Control
CTS
TrbNet Stack

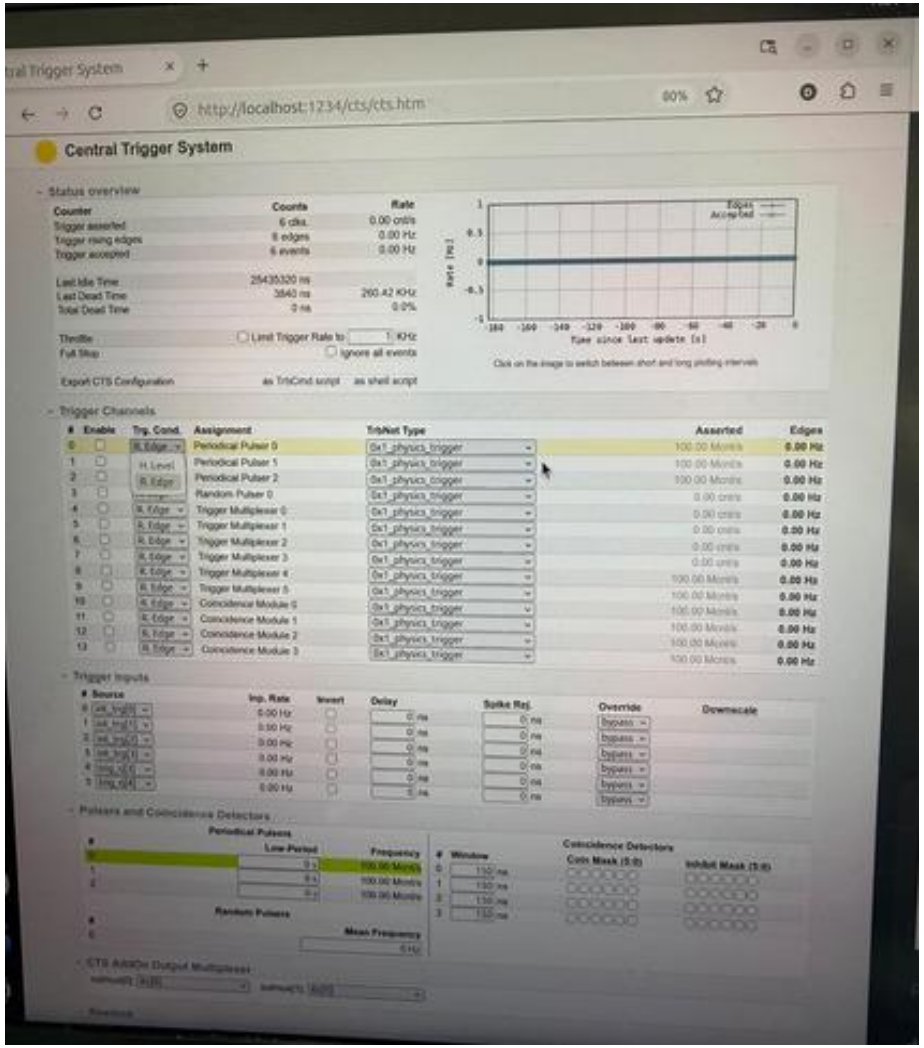

Inverter
Delay
Spike Rejection
Override
0 to 150 ns
0 to 150 ns
Input Module
31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Control Register


External Trigger Logic
ITC 0
ITC 15
ITCs
Reg. Pulser 0
Reg. Pulser N
Rand. Pulser 0
Rand. Pulser N
ITC Masking
Event Type Selection
Trigger Asserted
Trigger Type
Inputs
Input Mod. 0
Input Mod. N
Coin 0
Coin N
Input Event Counters
ITC Event Counters
Counters
Counters
Trigger Logic
Network Logic

Electronics and DAQ system transported to VUB

- **DAQ setup at VUB:** Installation in progress. The box can’t get internet over the Ethernet connection yet, and IT will fix this on Monday.
- **Scintillator power:** Found a bipolar DC power supply for the scintillators.
- **First trigger test:** Set up a trigger with a periodic pulser. The frequency and count rate show up correctly in the status overview, and .hld files are being written.





Studies on CMS ASIC Chip