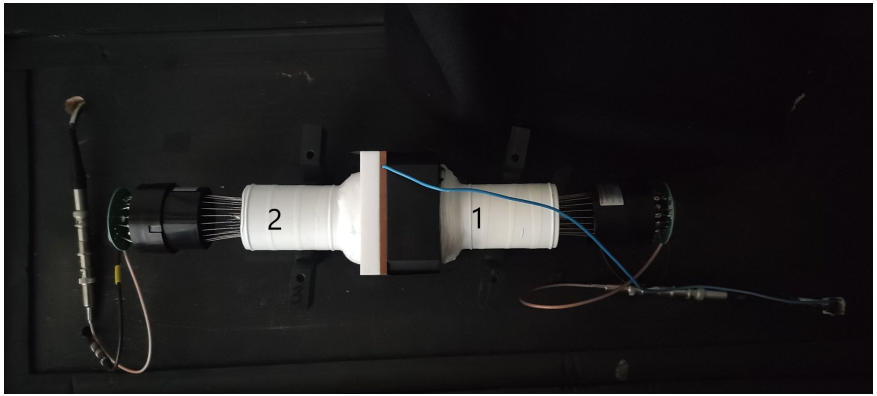
Report misure teflon

1 Marzo 2023 - Roma

Set up sperimentale 1

- Due tipi di setup a seconda di quale PMT vede la sezione;
- Due dataset: rame a terra, senza rame;
- Setup1=PMT1 vede la sezione;
- Setup2=PMT2 vede la sezione.



“Setup 1”

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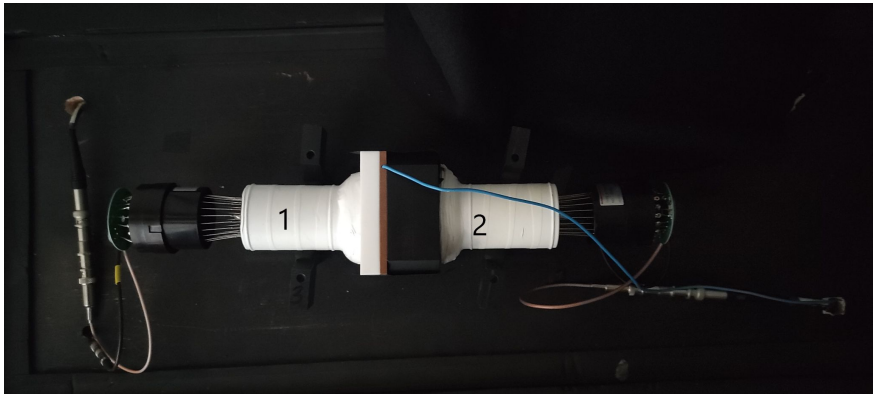


“Setup 2”

Set up sperimentale 1

- Guadagno fotomoltiplicatori fissato a $5 \cdot 10^6$;
  - PMT 1: -1525 V;
  - PMT 2: -1425 V;
- Trigger:
  - coincidenza (and logico)
  - -1 mV;
- Tempo di buio:
  - 2 giorni: No rame
  - 4 giorni: Terra 1 e 2;
- Numero wvf raccolte ≃ $20 \cdot 10^3$

Trigger Rate

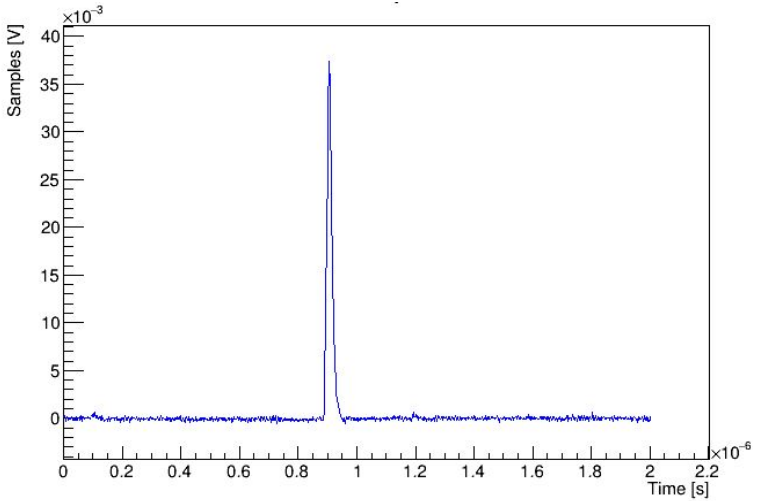
	Rate [Hz]	**Dev std [Hz]**
No rame	2,44	0,02
Terra 1	6,28	0,04
Terra 2	3,7	0,03

Tipologia segnali: No rame

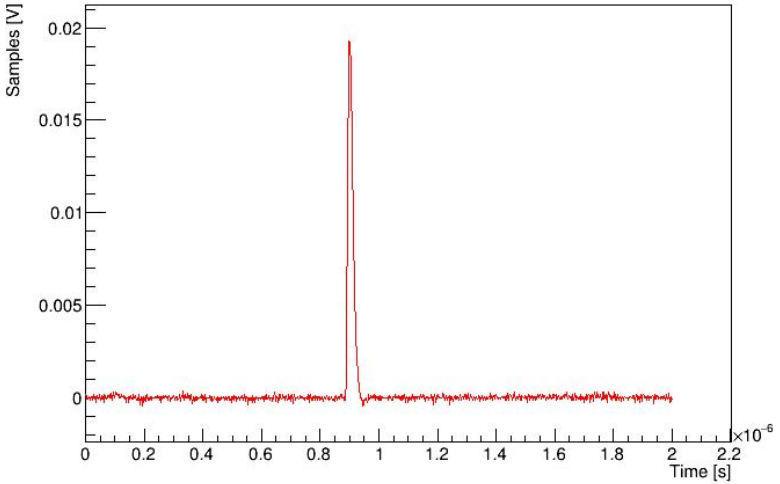
Senza rame:

- Singoli su entrambi i canali ;
- Rumore PMT2;
- Evento più fotoni (Setup1)

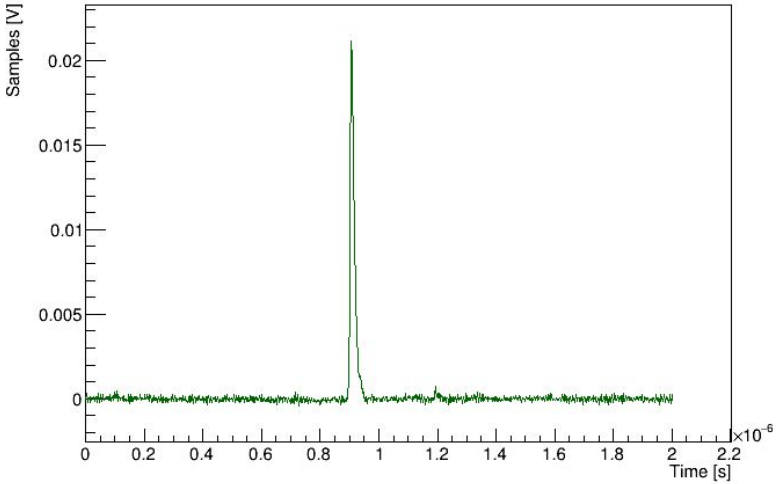
Canale Somma



Canale 1 →



Canale 2 →



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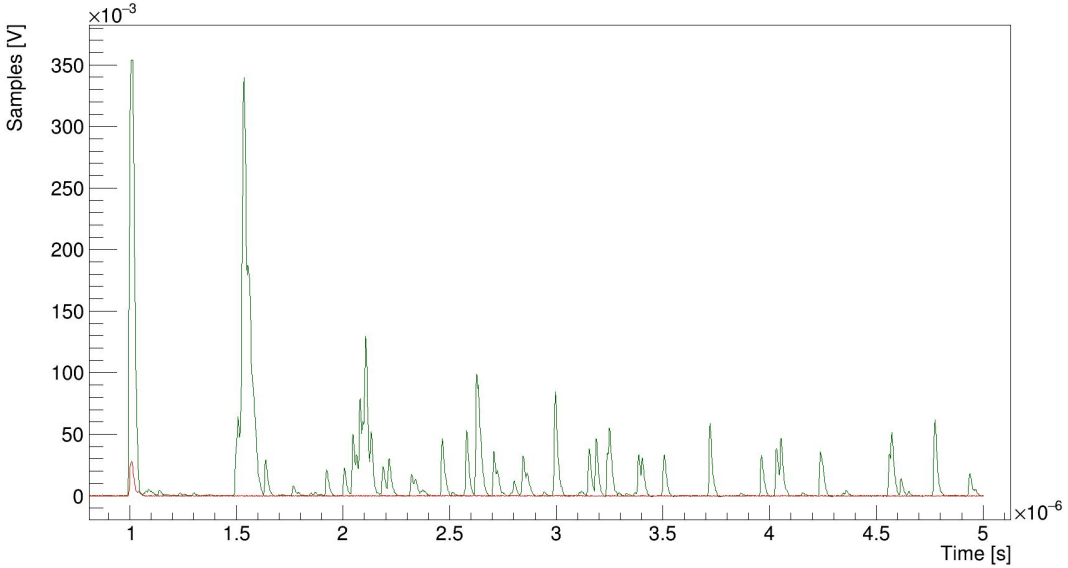

Tipologia segnali: No rame

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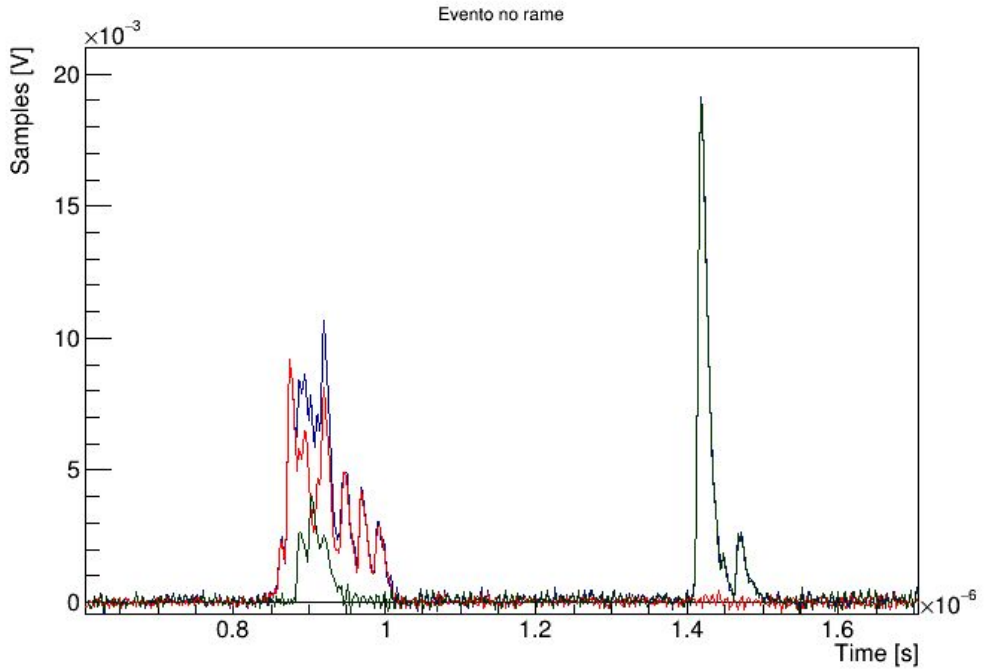
Canale somma;
PMT 1;
PMT 2.

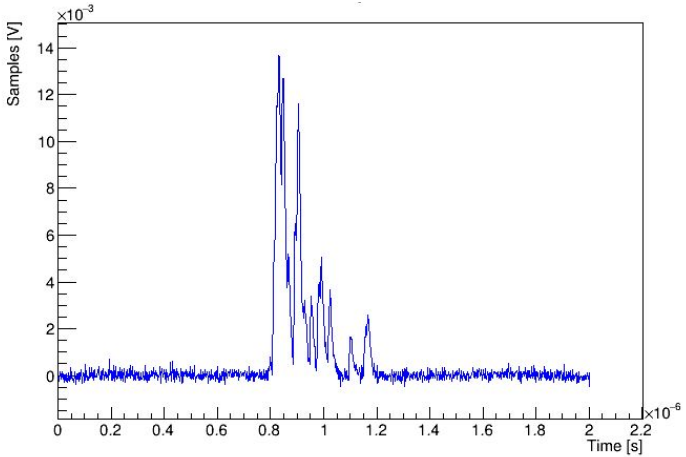


Tipologia segnali: Setup 1

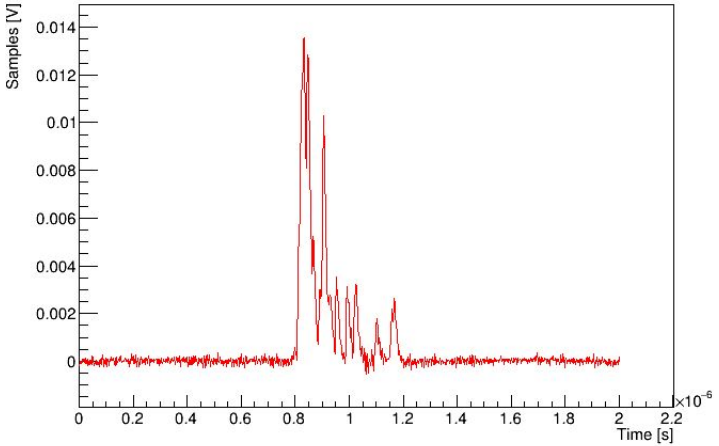
Rame a terra:

- Setup 1: PMT1 vede segnali di ampiezza maggiore

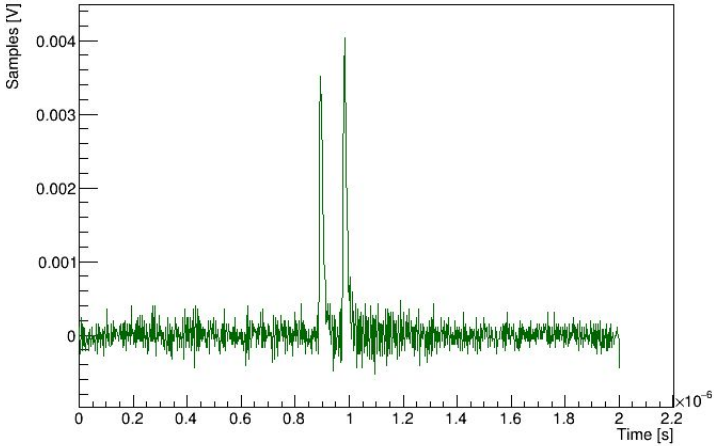
Canale Somma



Canale 1 →



Canale 2 →



Tipologia segnali: Setup 1

Rame a terra:

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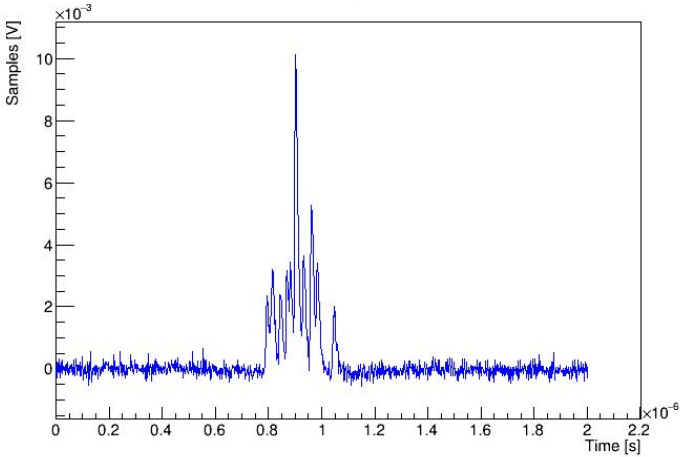
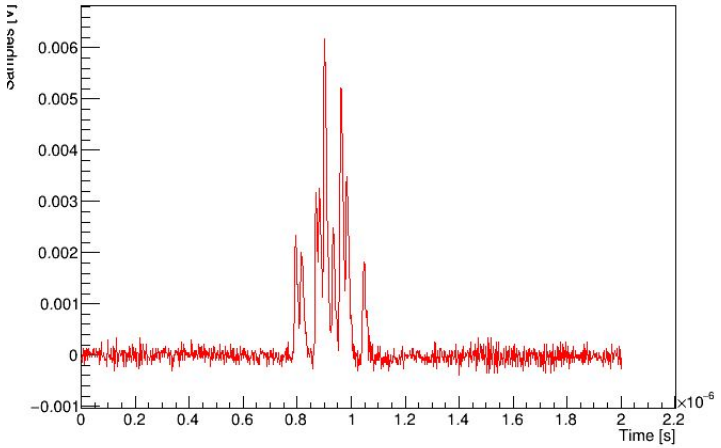
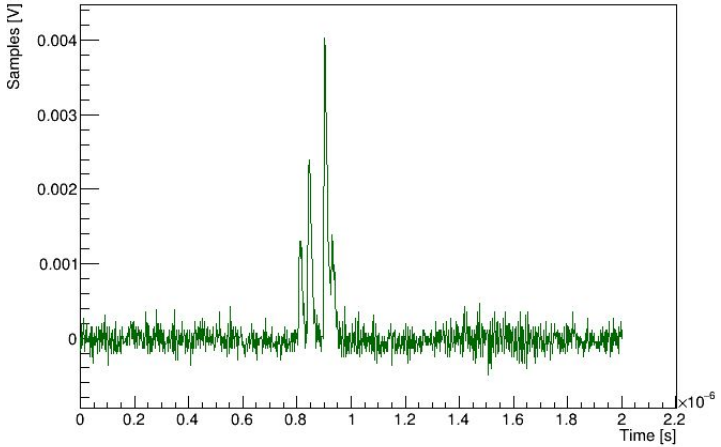
Canale Somma



Canale 1 →



Canale 2 →

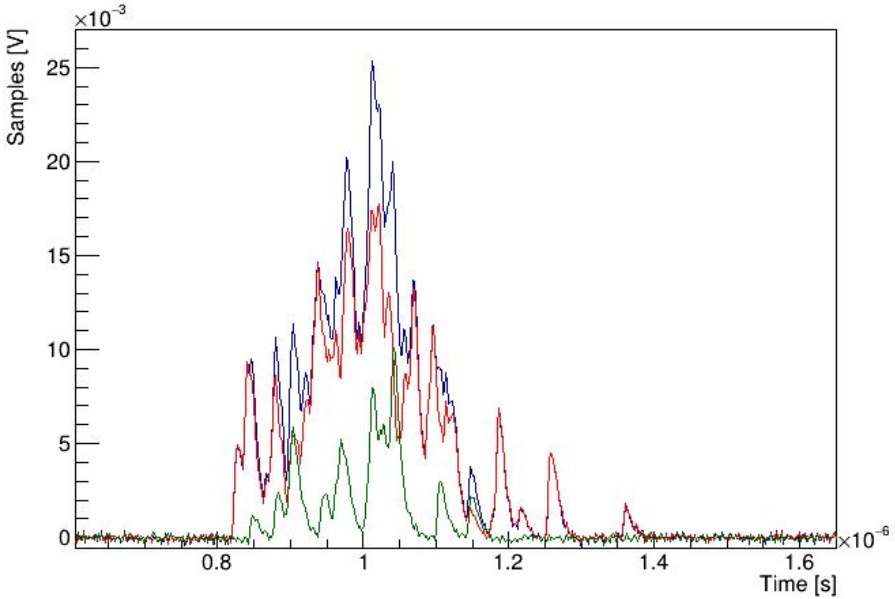


Tipologia segnali: Setup 1

Rame a terra:

- Setup 1: PMT1 vede segnali di ampiezza maggiore

Canale somma;
PMT 1;
PMT 2.

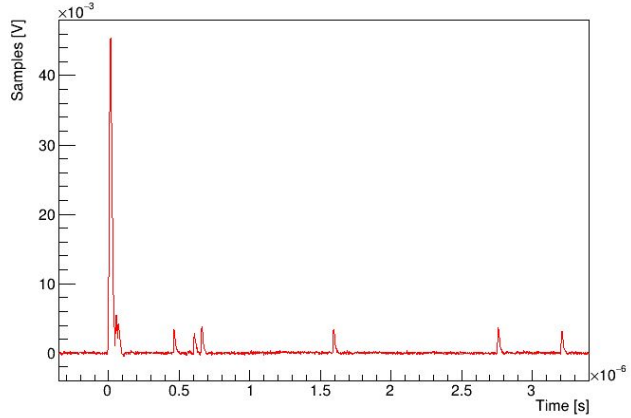


Tipologia segnali: Setup 2

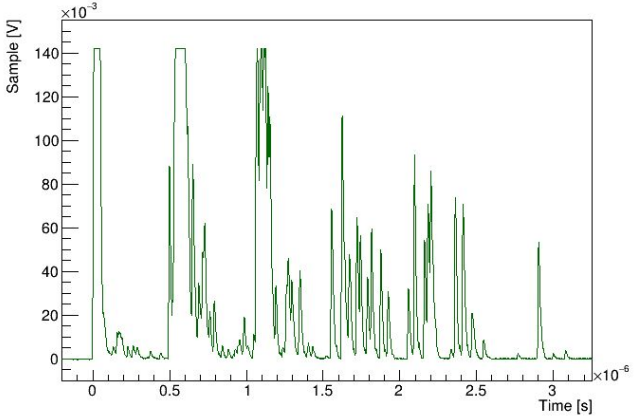
Rame a terra:

- Setup 2: PMT2 vede segnali di ampiezza maggiore

Canale 1 →



Canale 2 →



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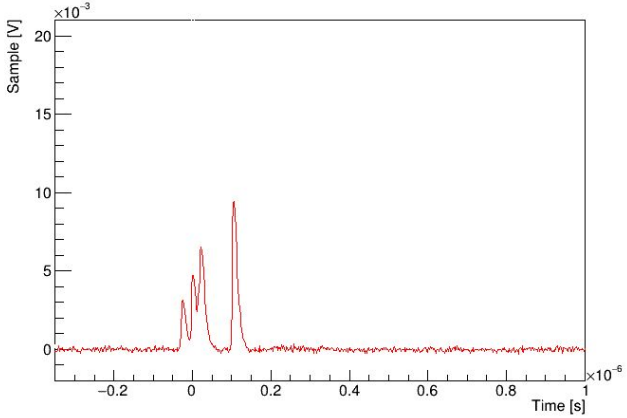
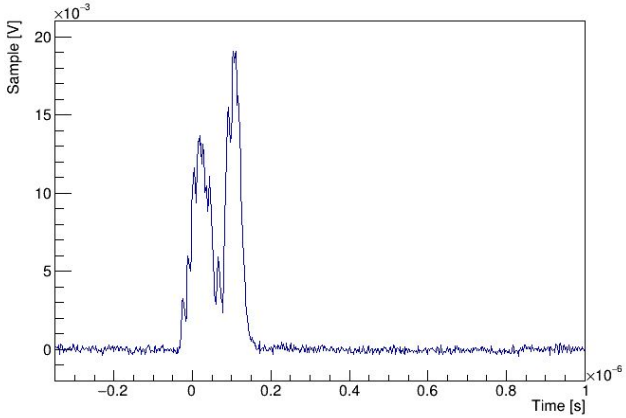
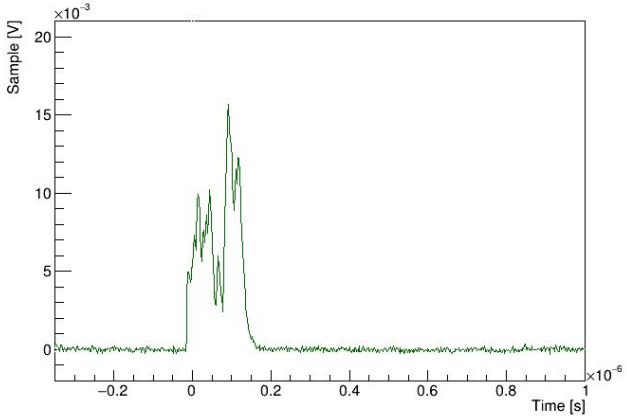


Canale Somma



Canale 2 →



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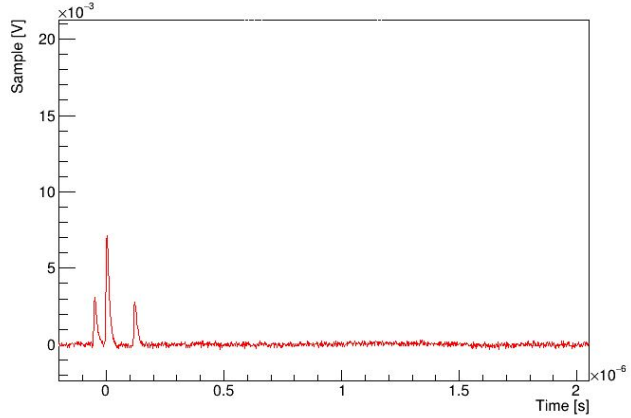
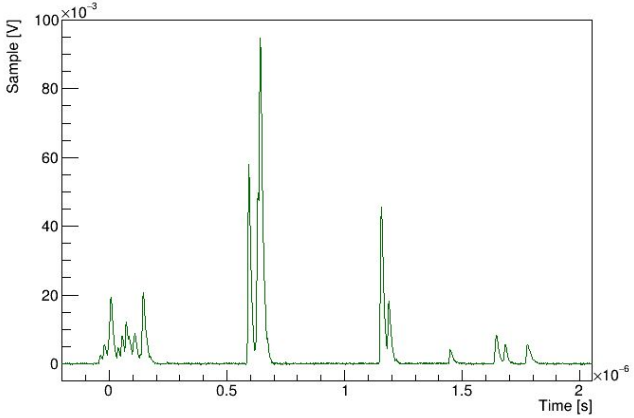
Canale 1 →



Canale 2 →

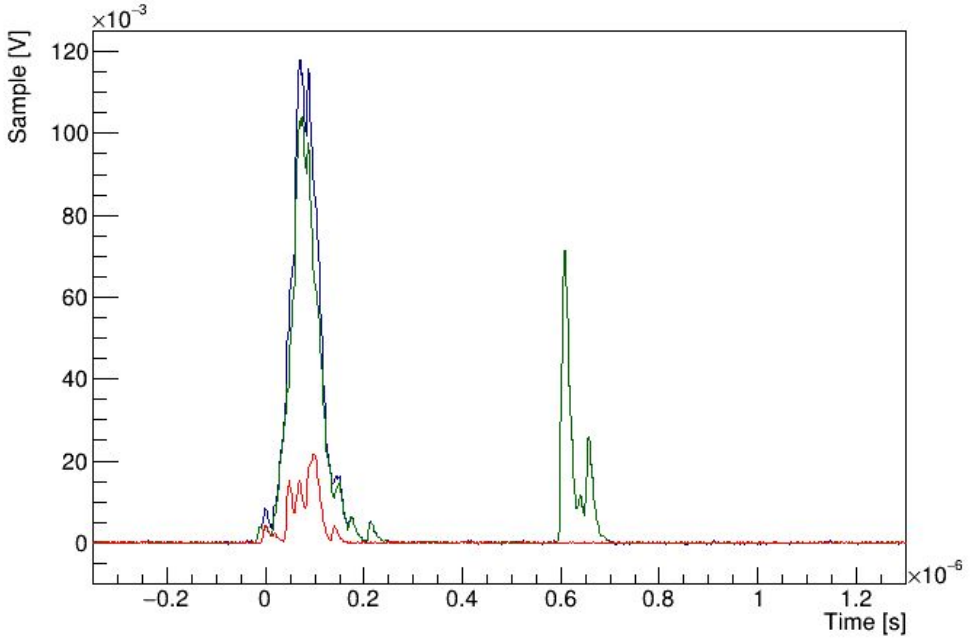


Tipologia segnali: Setup 2

Rame a terra:

- Setup 2: PMT2 vede segnali di ampiezza maggiore

Canale somma;
PMT 1;
PMT 2.

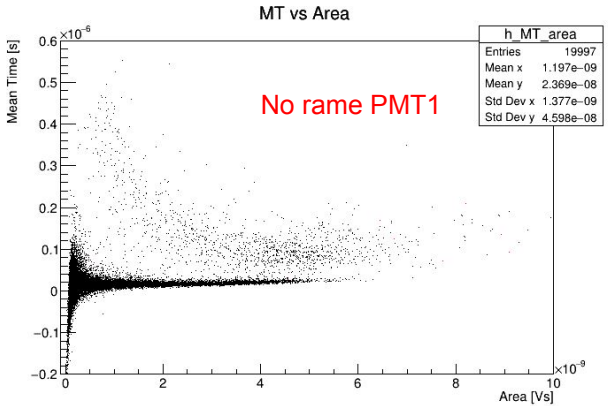


Variabili usate

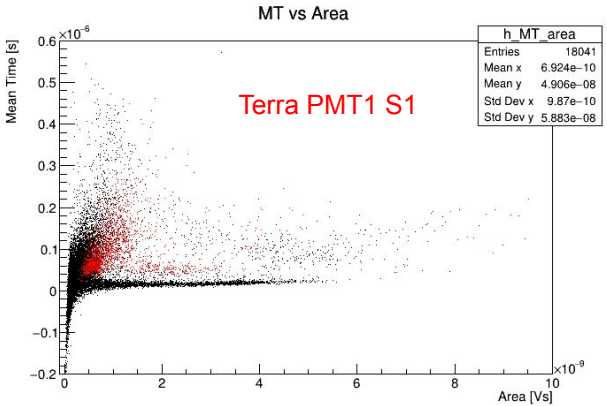
- P: intervallo temporale in cui il segnale supera e rimane oltre la soglia di trigger;
- Area del segnale calcolata su 1000 ns;
- Mean Time: tempo mediato sulla carica in 600 ns;

Mean Time vs Area (PMT 1)

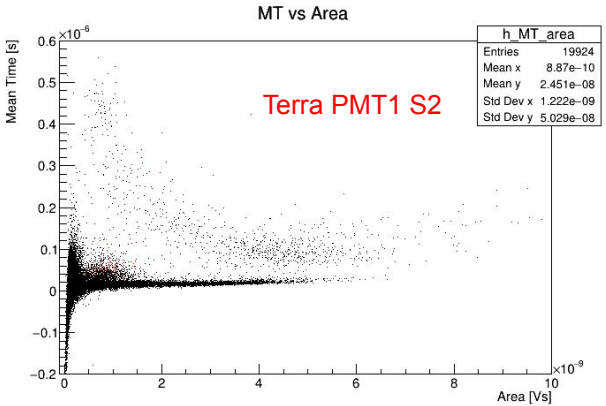
No rame



Rame a terra Setup1



Rame a terra Setup2

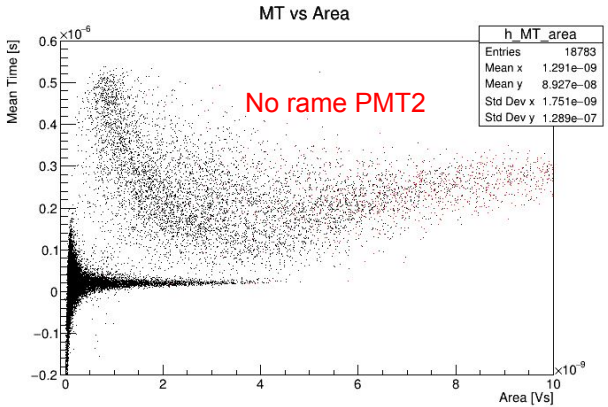


Legenda:

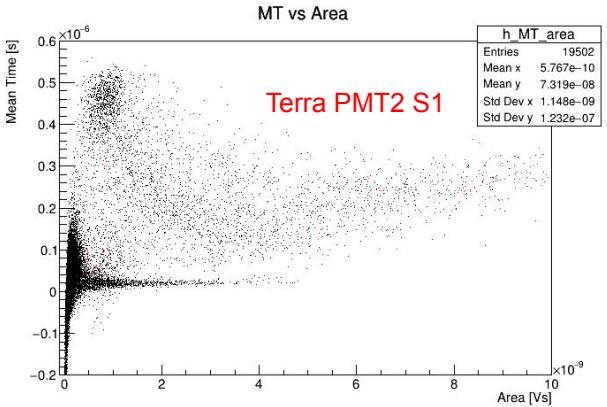
- p≤100ns
- p>100ns

Mean Time vs Area (PMT 2)

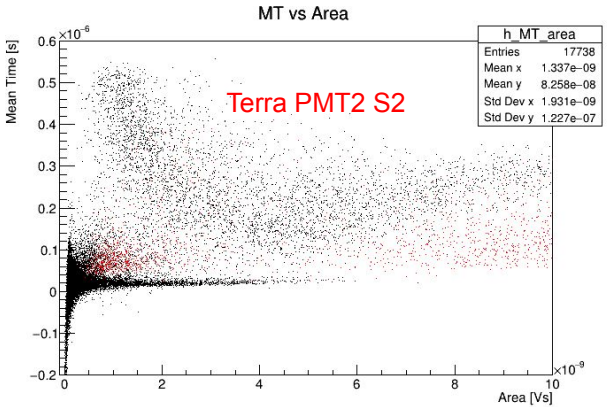
No rame



Rame a terra Setup1



Rame a terra Setup2

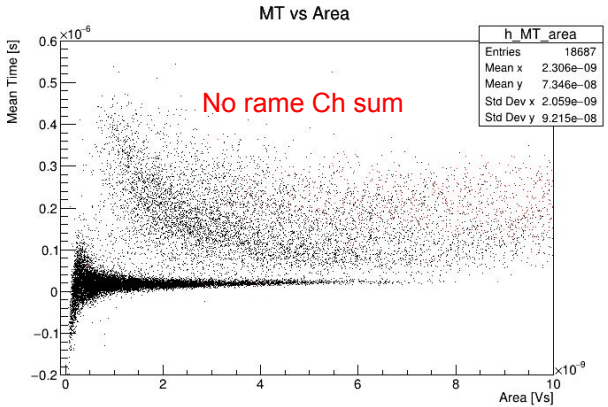


Legenda:

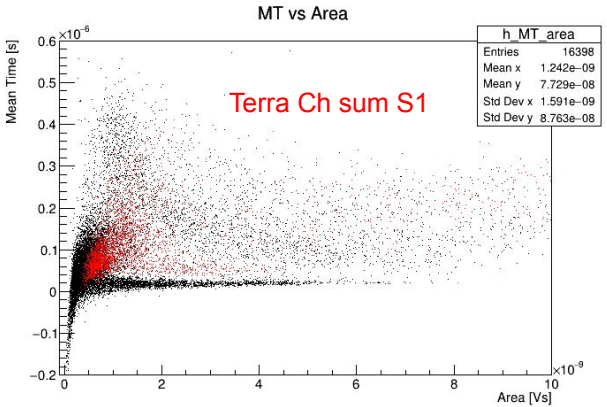
- p≤100ns
- p>100ns

Mean Time vs Area (Canale somma)

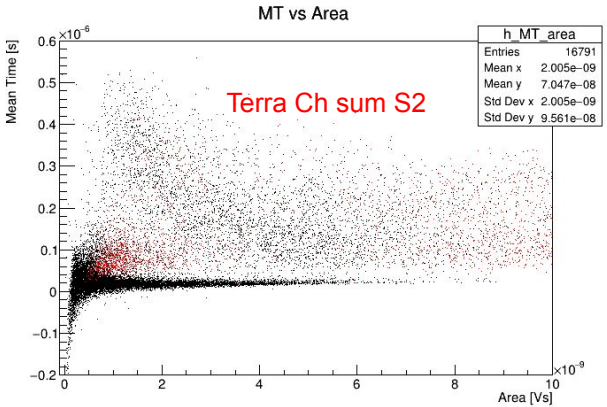
No rame



Rame a terra Setup1



Rame a terra Setup2

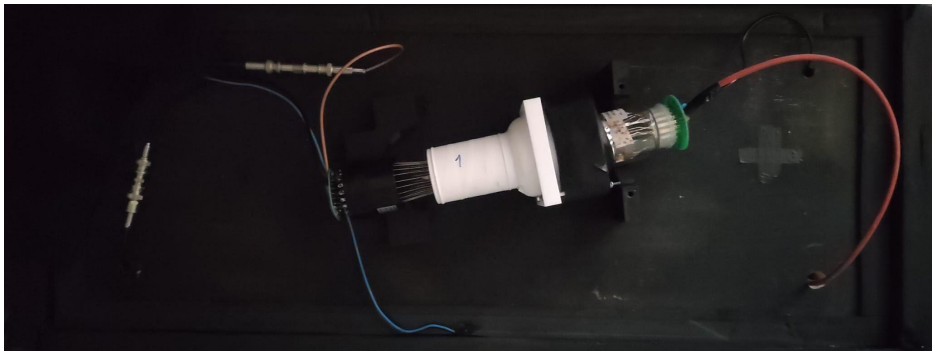


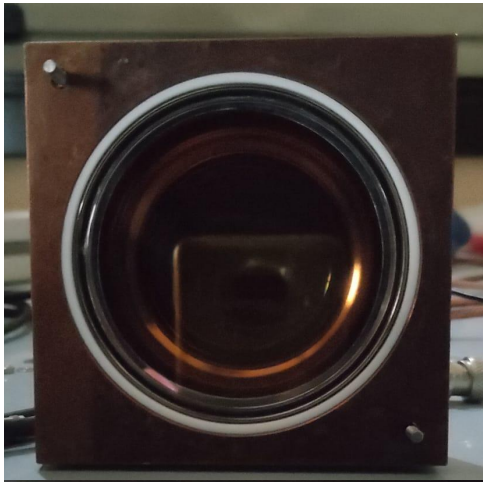
Legenda:

- p≤100ns
- p>100ns

Schermatura nero

- PMT 2 precedente sostituito con il modello XP72B20;
  - In vetro;
  - Alimentazione negativa a -1150 V;
- Dataset di tre tipi: rame a terra, senza rame, con PVC nero a schermare la parte di PTFE bianco;
- Sezione vista solo dal PMT in vetro





Schermatura

- Tre dataset: rame a terra, senza rame, rame a terra con schermatura nera;
- Trigger:
  - coincidenza → and logico;
  - -1 mV;
- Tempo di buio:
  - circa 2 giorni per ciascuno;
- Tempo raccolta dati: 1h

Trigger Rate

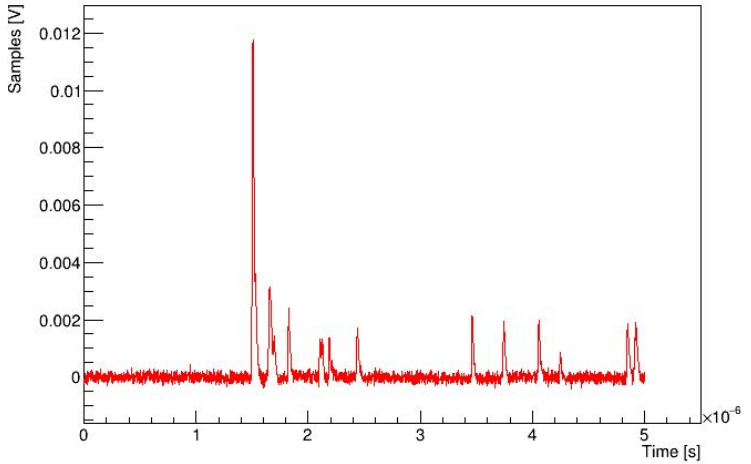
	Rate [Hz]	**Dev std [Hz]**
No rame	0,99	0,02
Terra	4,67	0,04
Corona nera	0,96	0,02

Tipologia segnali:

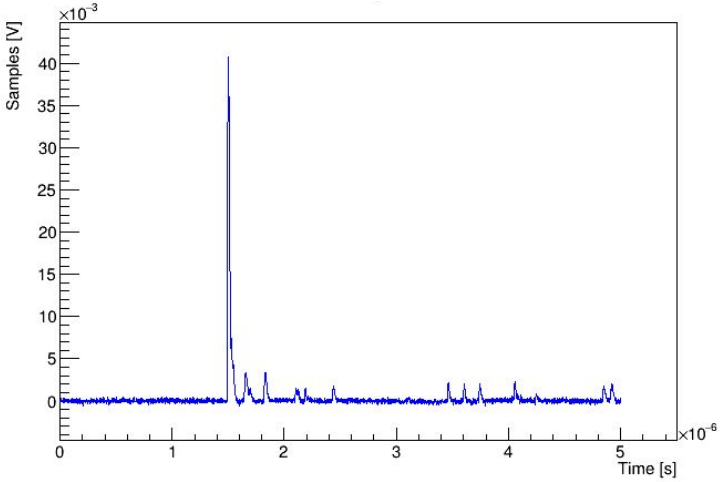
No rame e rame con schermatura :

- No eventi Bell;

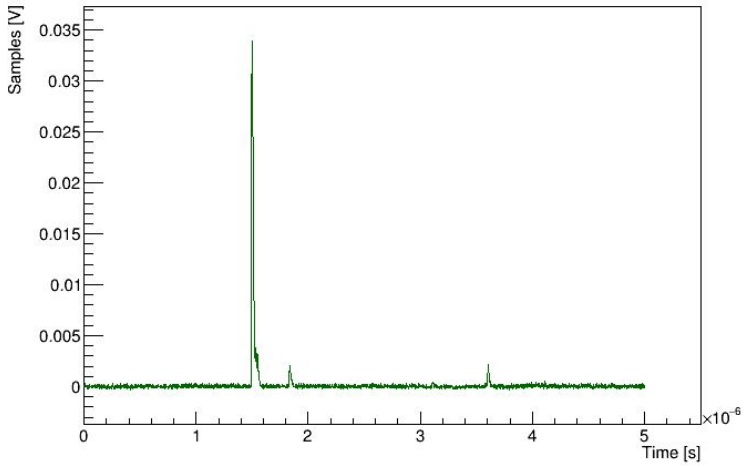
PMT vetro →



Canale Somma



PMT 1 →



Tipologia segnali:

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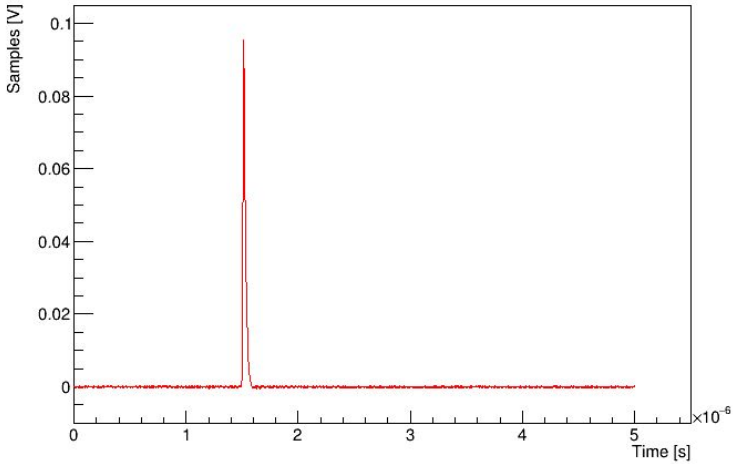
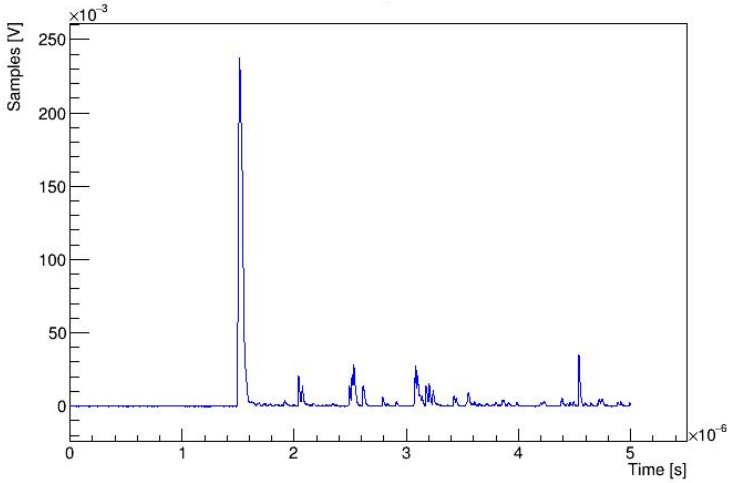
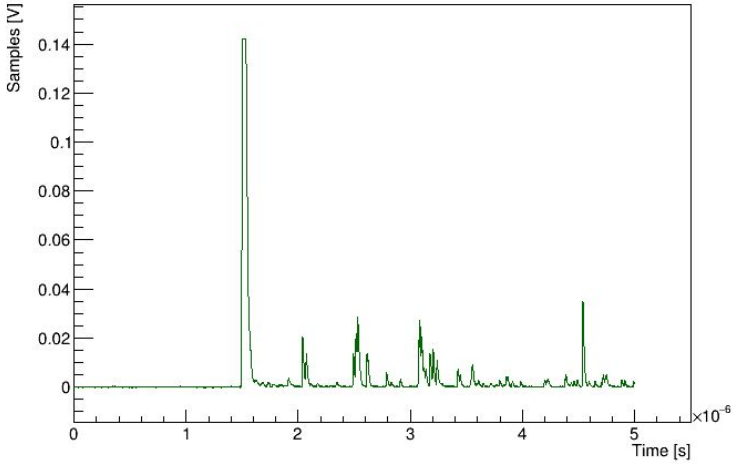
PMT vetro →



Canale Somma



PMT 1 →

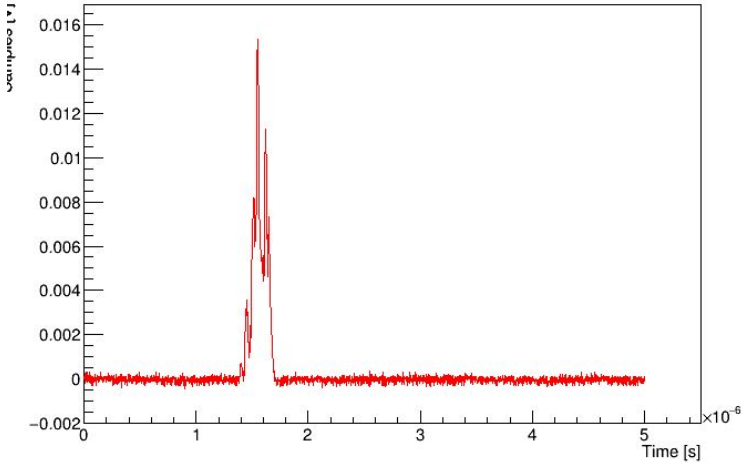


Tipologia segnali:

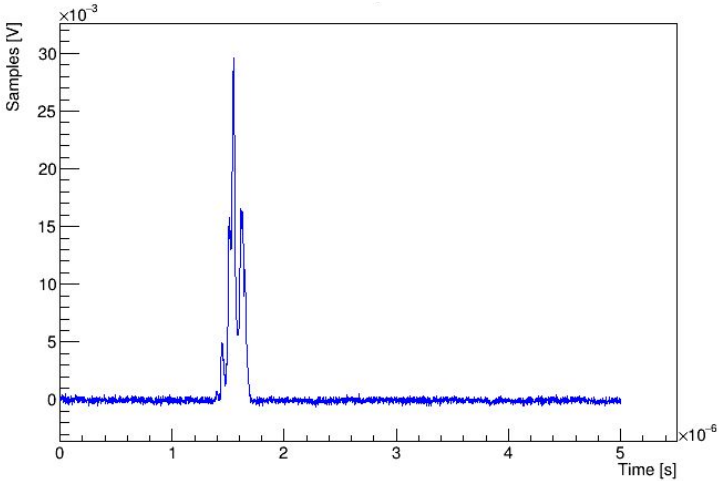
Rame a terra:

- PMT in vetro vede segnali di ampiezza maggiore

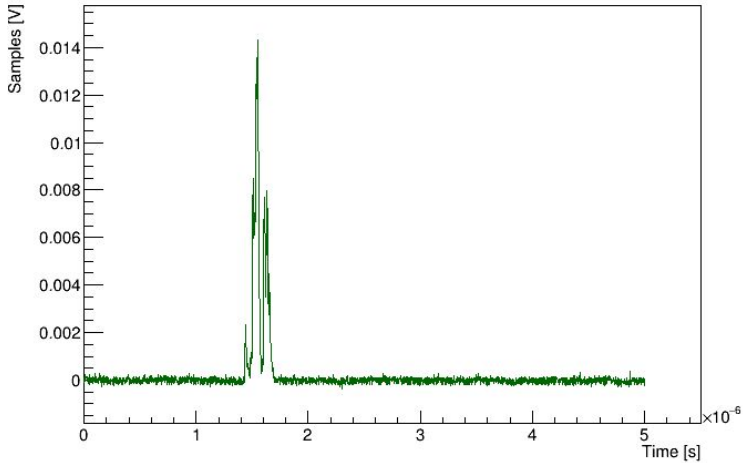
PMT vetro



Canale Somma



PMT1

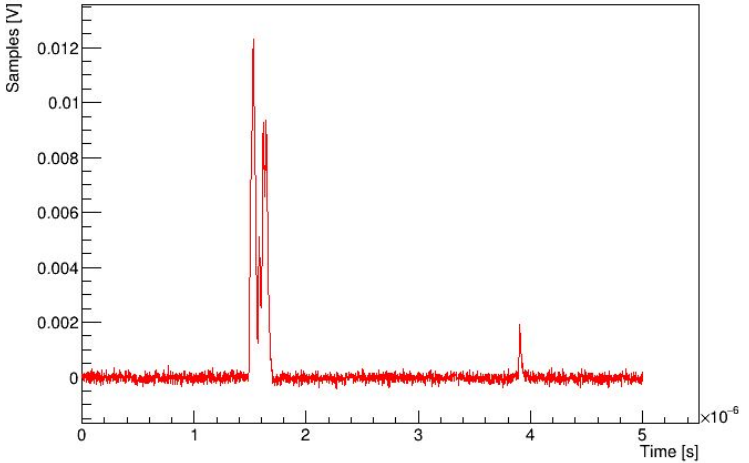


Tipologia segnali:

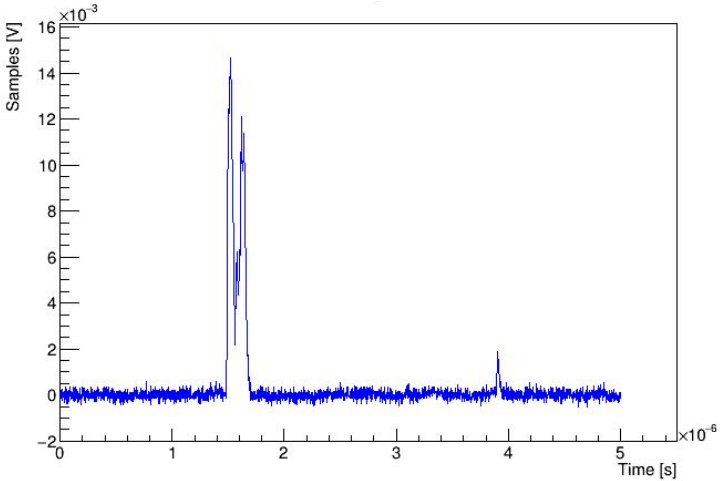
Rame a terra:

- PMT in vetro vede segnali di ampiezza maggiore

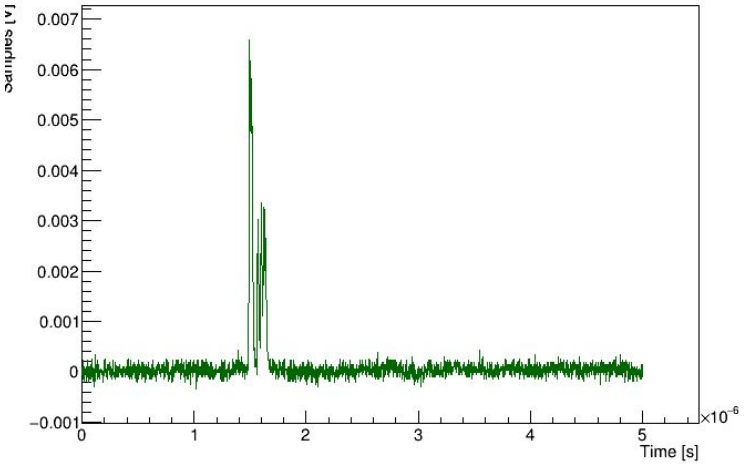
PMT vetro



Canale Somma



PMT1

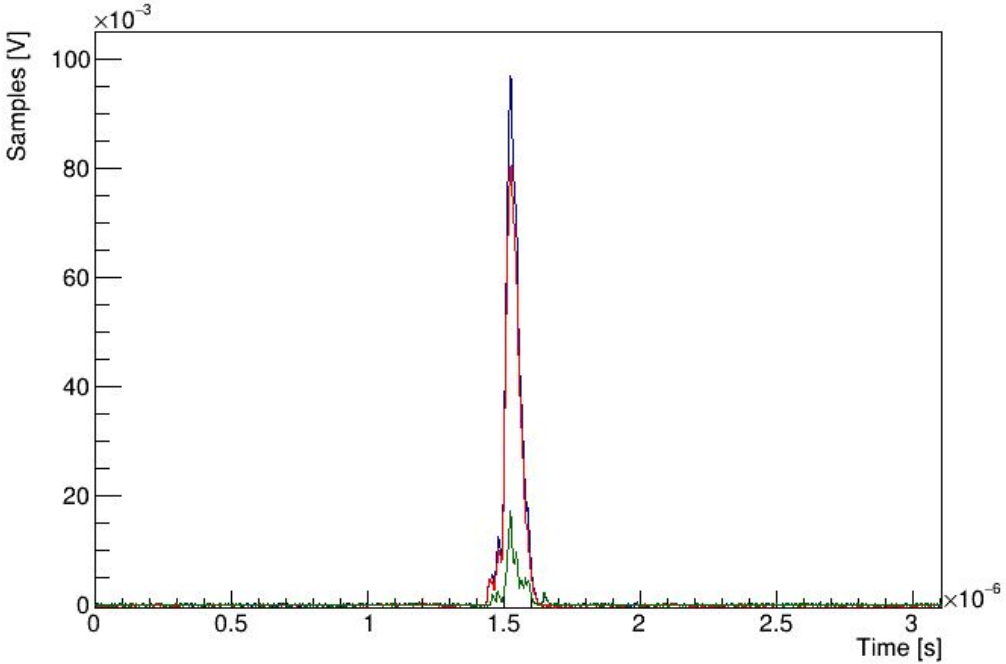


Tipologia segnali:

Rame a terra:

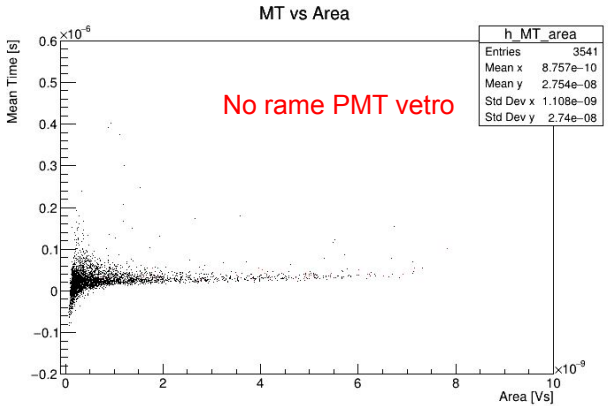
- PMT in vetro vede segnali di ampiezza maggiore

Canale somma;
PMT vetro;
PMT 1.

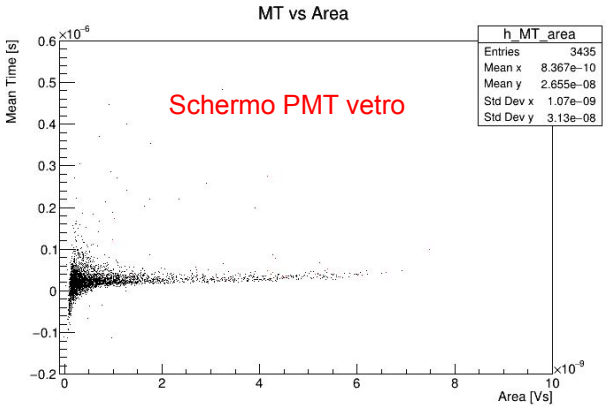


Mean Time vs Area (PMT vetro)

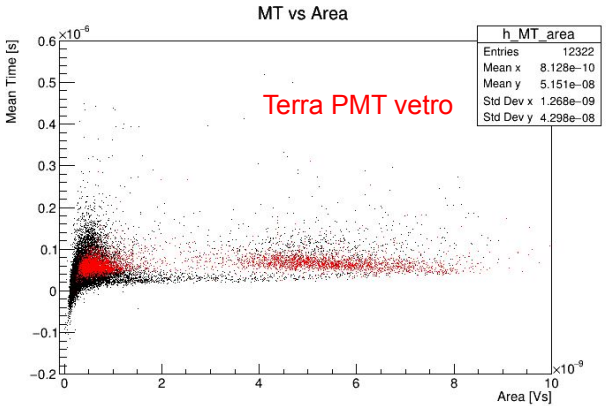
No rame



Rame a terra schermatura



Rame a terra

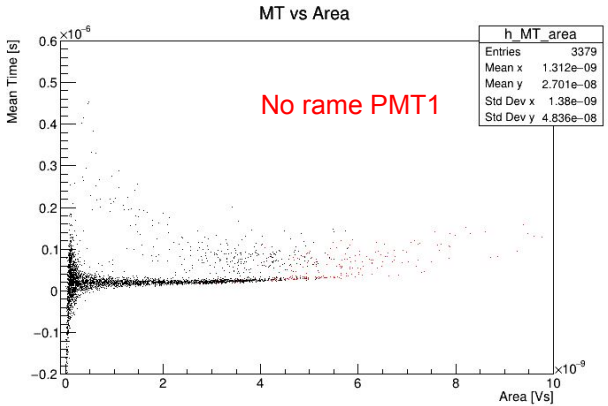


Legenda:

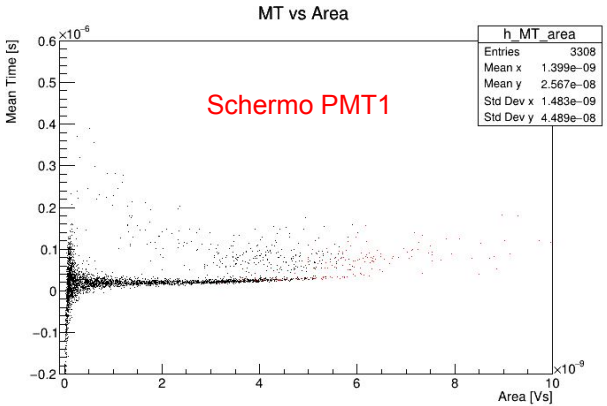
- p≤100ns
- p>100ns

Mean Time vs Area (PMT1)

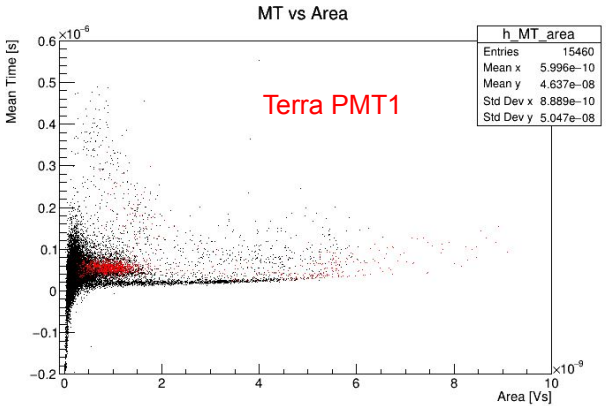
No rame



Rame a terra schermatura



Rame a terra

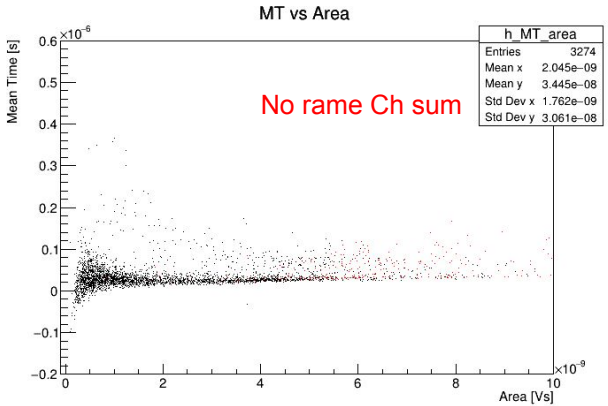


Legenda:

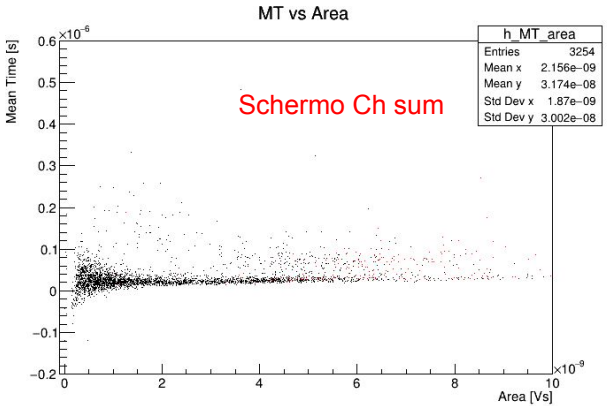
- p≤100ns
- p>100ns

Mean Time vs Area (Canale somma)

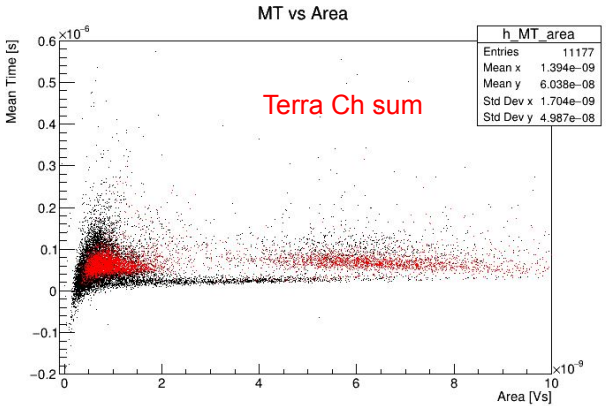
No rame



Rame a terra schermatura



Rame a terra



Legenda:

- p≤100ns
- p>100ns

Step futuri

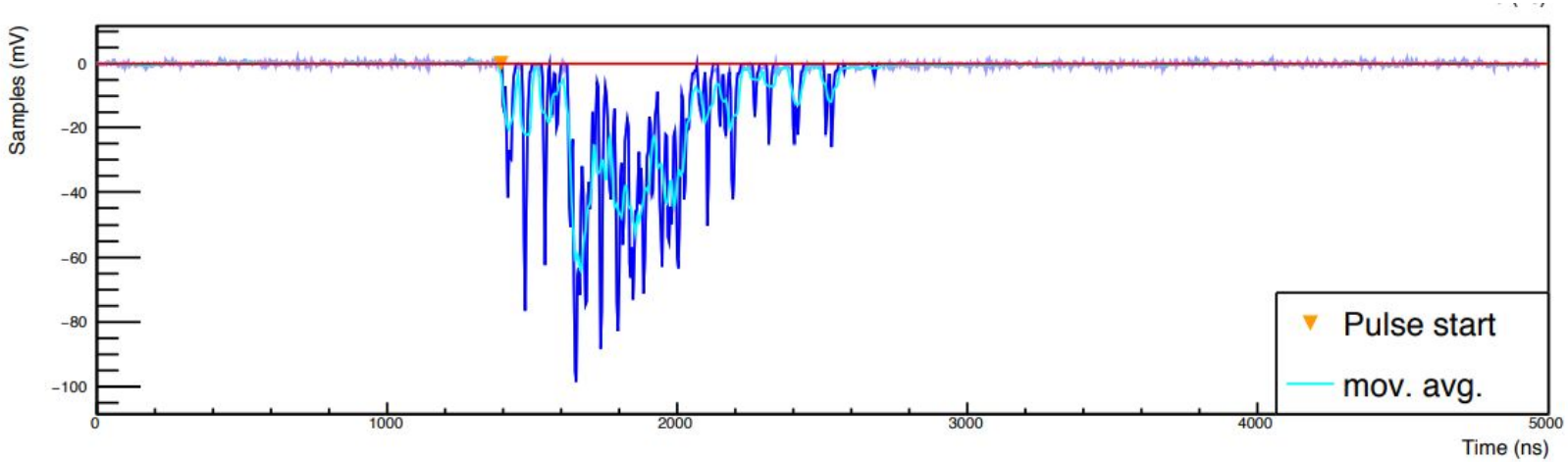
- Sostituzione pezzo di PTFE con pezzo in Delrin;
- Gate di 125 ns per trigger di coincidenza;
- Test per vedere se Pmt in vetro produce stesso effetto;
- Test per vedere se alimentazione positiva cambia effetto;

Fine

Back up

Scopo

- Studiare eventi di noise di tipo bell



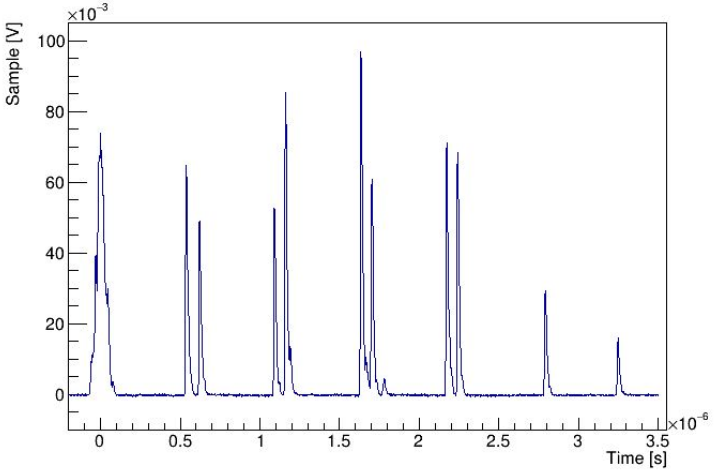
https://arxiv.org/pdf/2205.13876.pdf

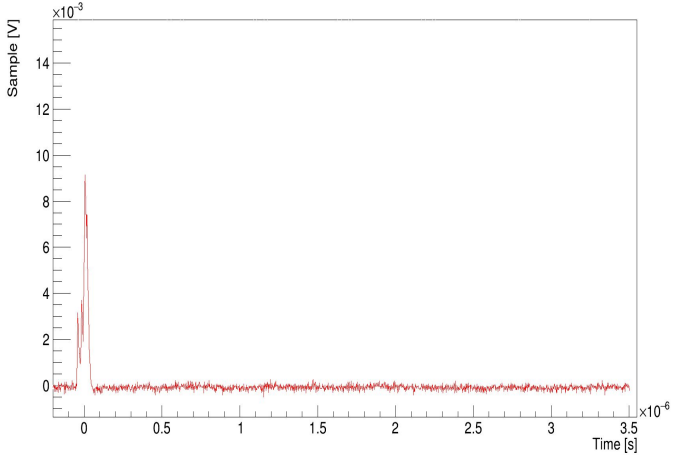
Variabili usate

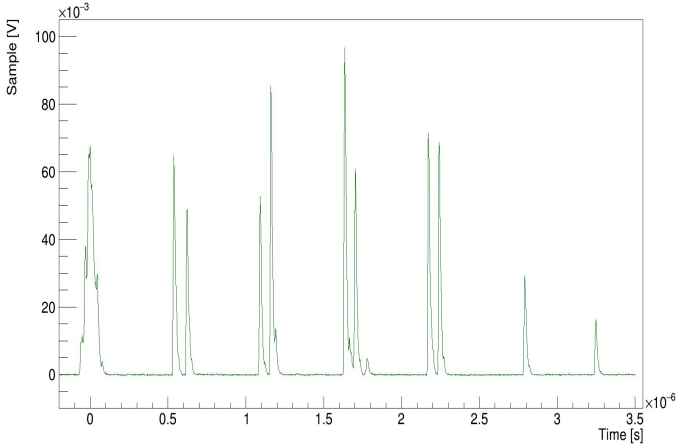
- P: intervallo temporale in cui supera e rimane oltre la soglia di trigger;
- Area del segnale calcolata su 1000 ns;
- Mean Time: tempo mediato sulla carica in 600 ns;

Tipologia segnali

Rame non a terra.







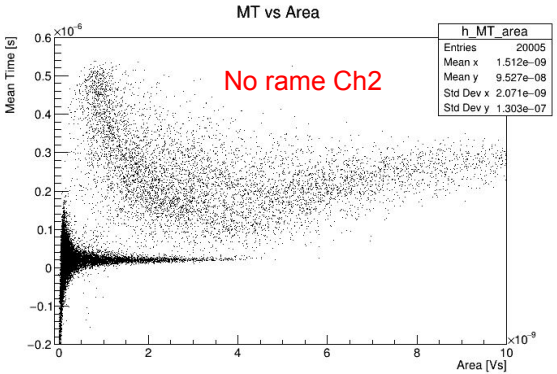
Variabili usate

- P: intervallo temporale in cui supera la soglia di trigger;
- Area del segnale calcolata su 1000 ns;
- Mean Time: tempo mediato sulla carica in 600 ns;
- CoM: Charge over maximum;

Mean Time vs Area (Canale 2)

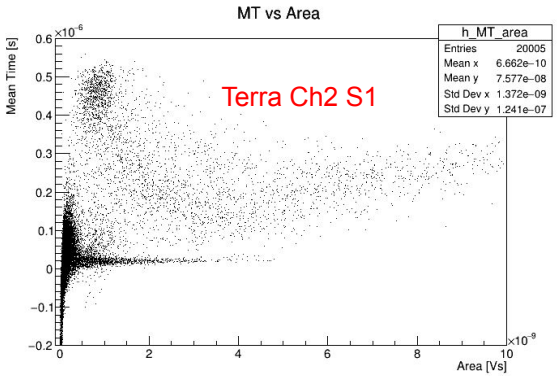
Setup1 ⇒

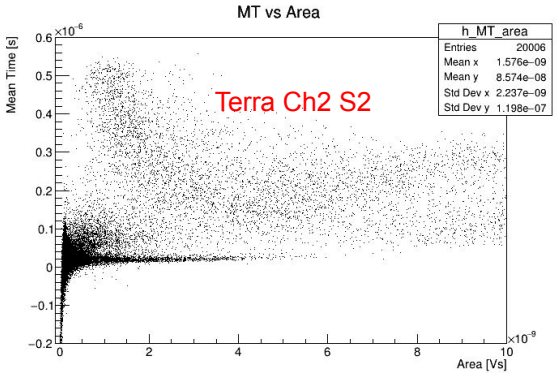
No rame



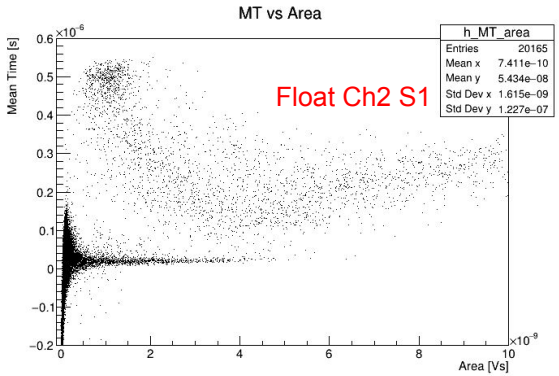
Setup 2 ⇒

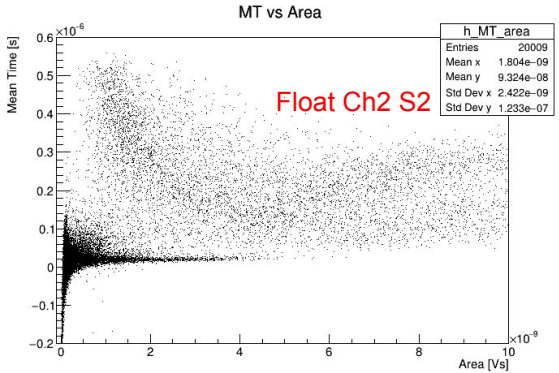
Rame a terra





Rame non a terra

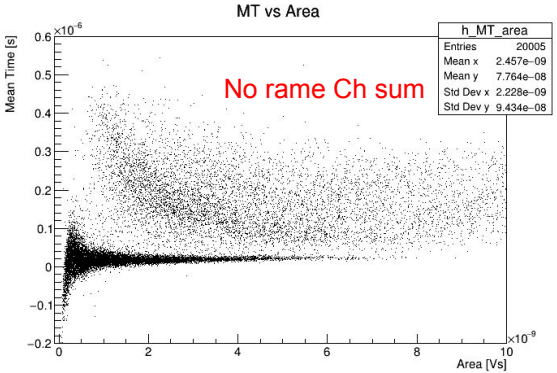




Mean Time vs Area (Canale somma)

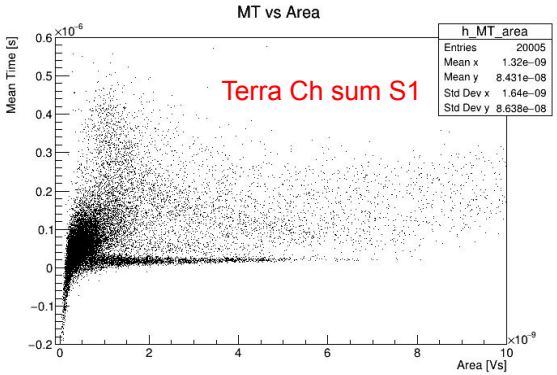
Setup1 ⇒

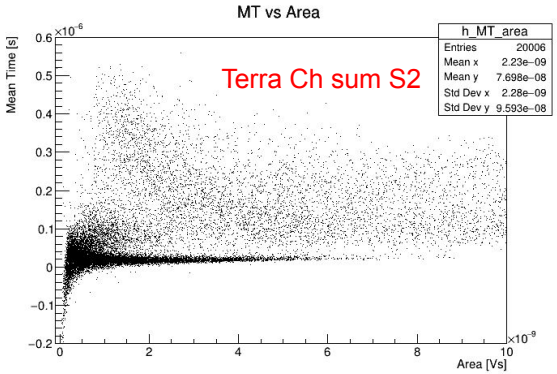
No rame



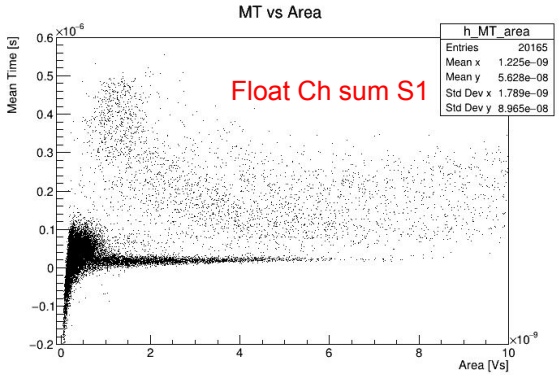
Setup 2 ⇒

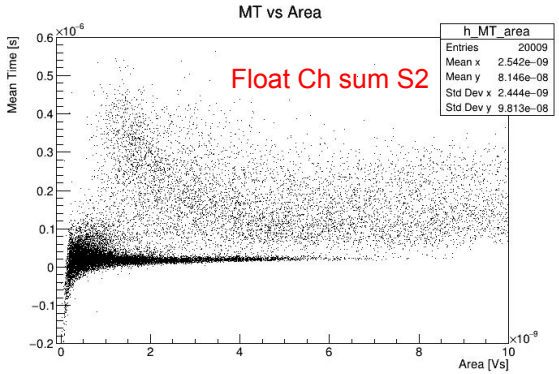
Rame a terra





Rame non a terra





Tipologia segnali

Con rame:

- Stessi eventi senza rame;
- p è la durata in cui il segnale è maggiore della soglia di trigger (1mV);
- Eventi con parametro p > 100 ns;
  - No rame:
    - PMT1: 0,04%
    - PMT2: 6,11%
  - Rame a terra setup 1:
    - PMT1: 9,81%;
    - PMT2: 2,50%
  - Rame a terra setup 2:
    - PMT1: 0,41%
    - PMT2: 11,33%

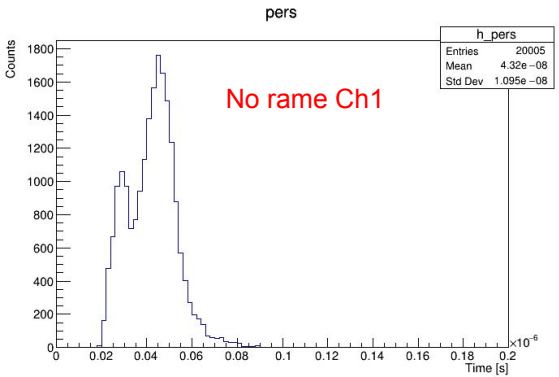
Tipologia segnali

- Stessa tipologia di eventi: spike, bell eventi con code;
- Eventi con parametro p > 100 ns;
  - Rame a terra 1:
    - PMT1: 9,8%;
    - PMT in vetro: 34,6%;
  - No rame:
    - PMT1 : 5,4% ;
    - PMT in vetro: 0,9% ;
  - Rame con schermatura:
    - PMT1: 4,4% ;
    - PMT in vetro: 0,8%.

p (Canale 1)

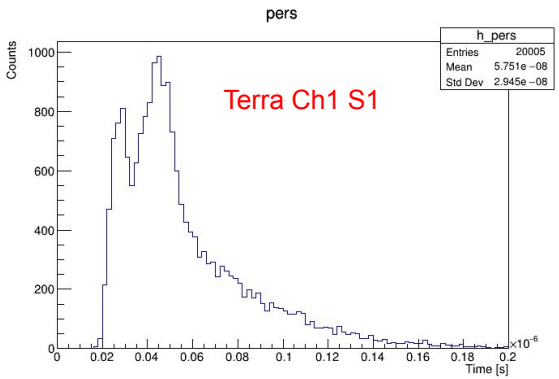
Setup1 ⇒

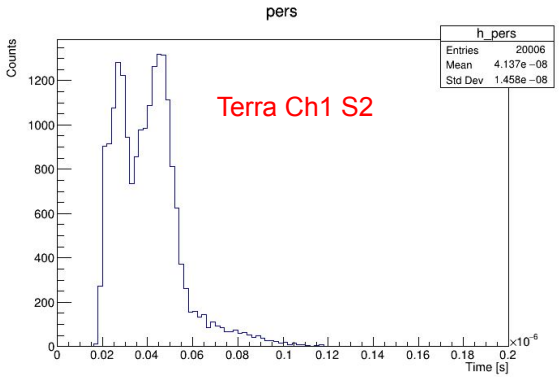
No rame



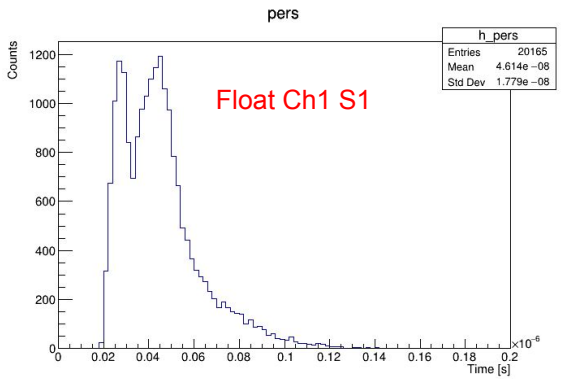
Setup 2 ⇒

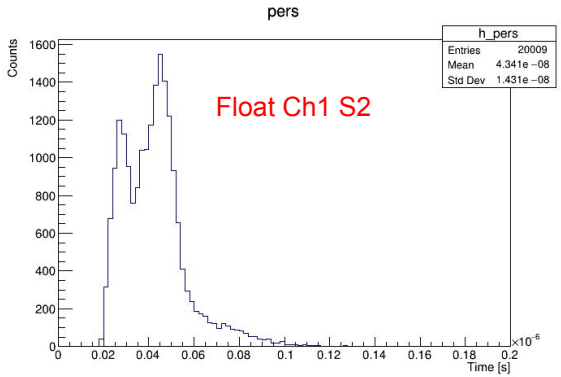
Rame a terra





Rame non a terra

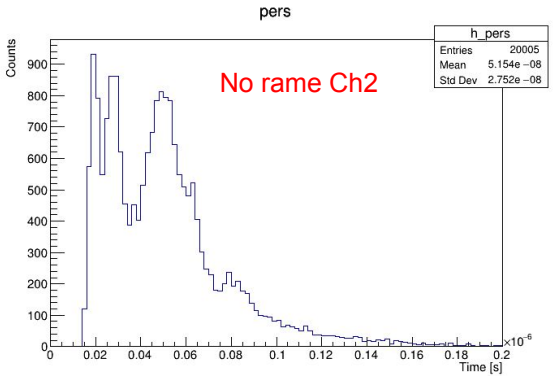




p (Canale 2)

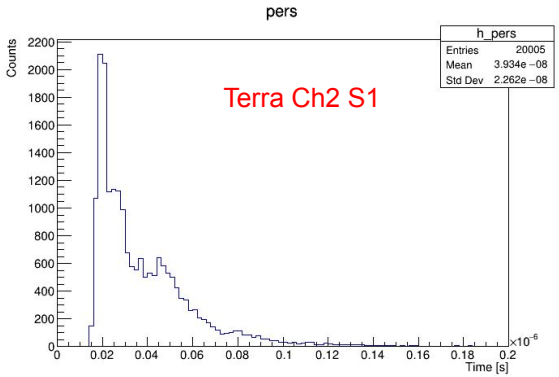
Setup1 ⇒

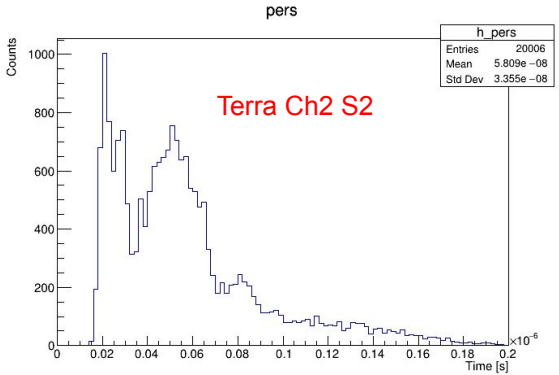
No rame



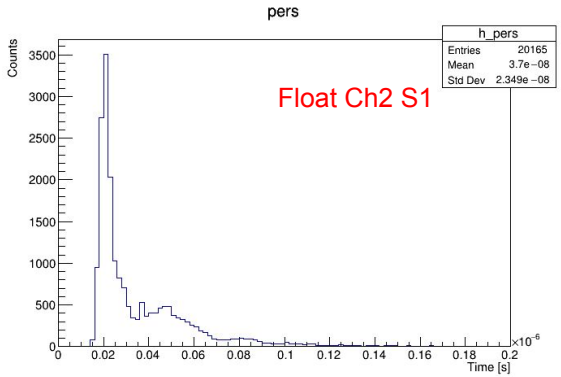
Setup 2 ⇒

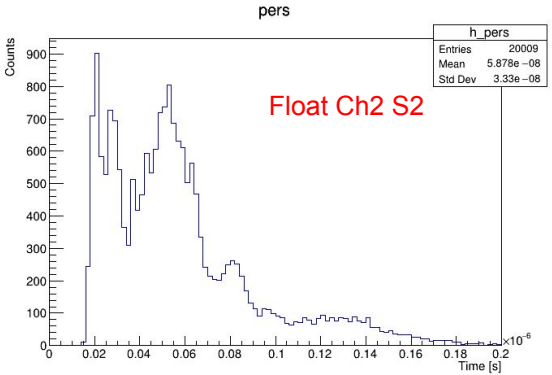
Rame a terra





Rame non a terra

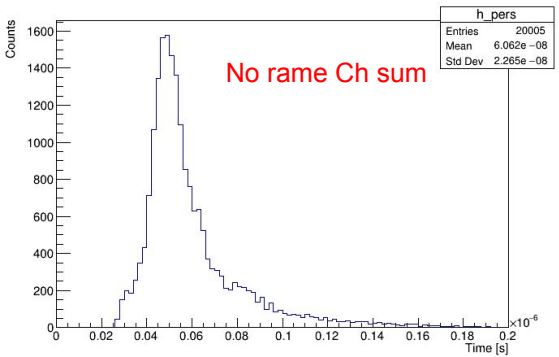




p (Canale Somma)

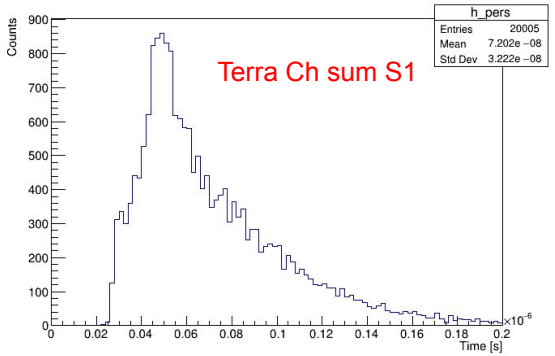
Setup1 ⇒

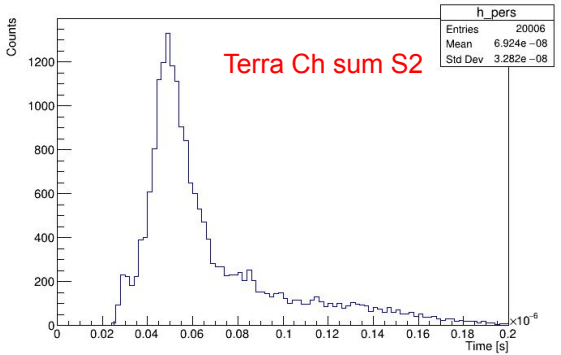
No rame



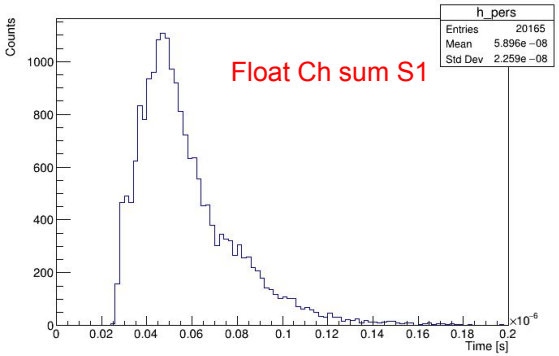
Setup 2 ⇒

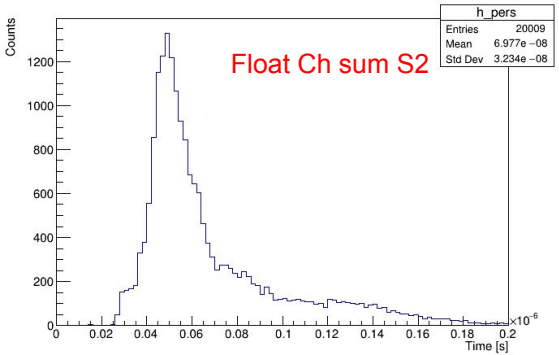
Rame a terra





Rame non a terra

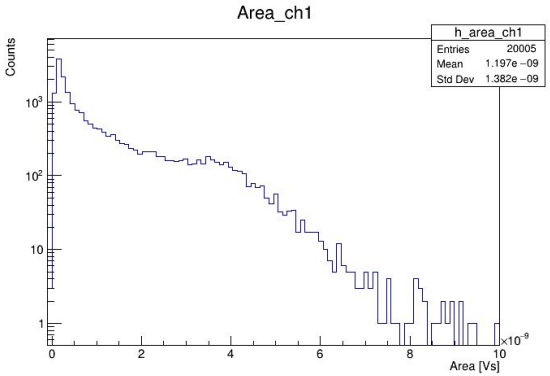




Area (Canale 1)

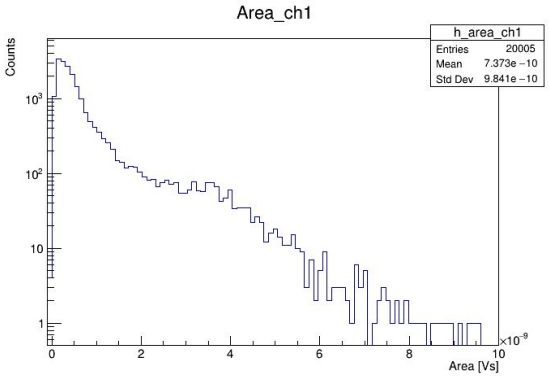
Setup1 ⇒

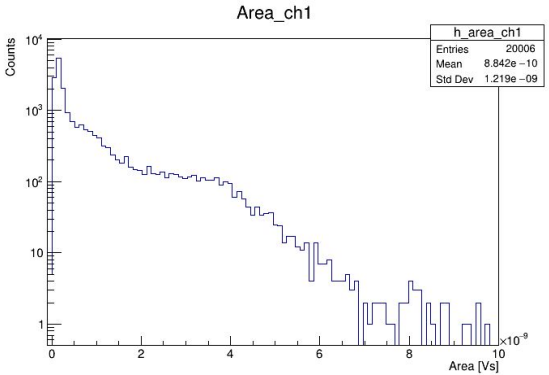
No rame



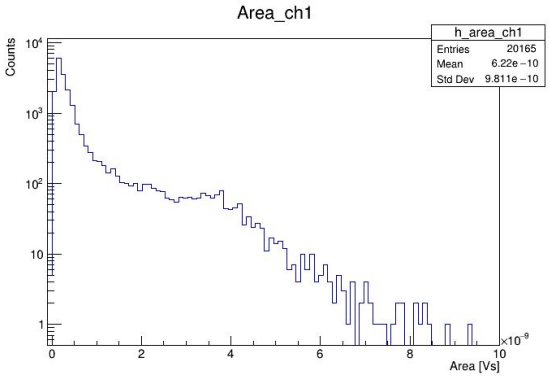
Setup 2 ⇒

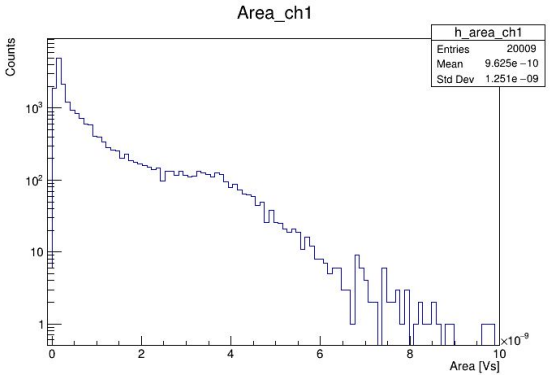
Rame a terra





Rame non a terra

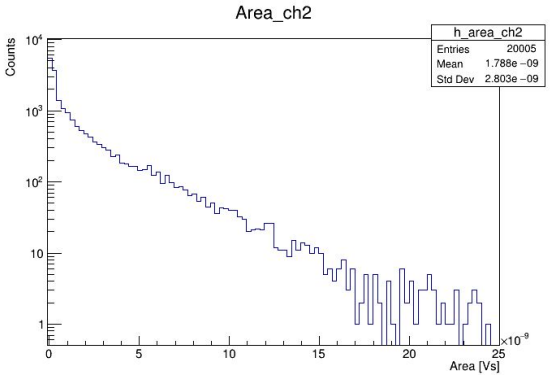




Area (Canale 2)

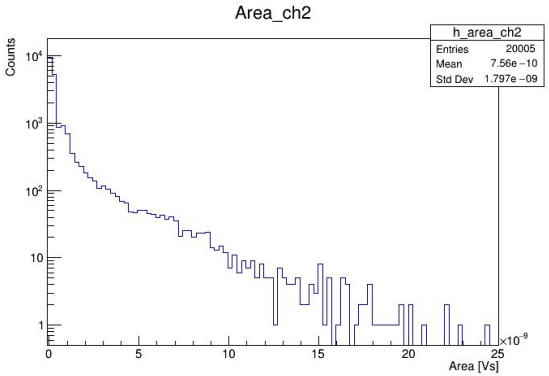
Setup1 ⇒

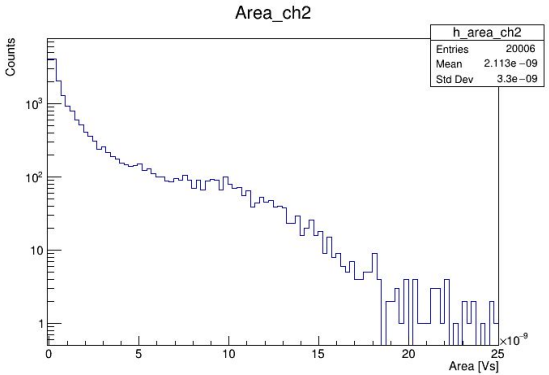
No rame



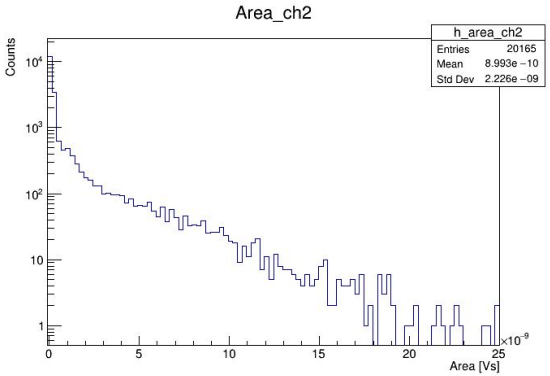
Setup 2 ⇒

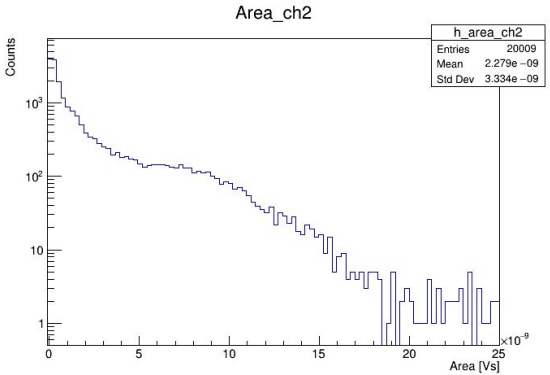
Rame a terra





Rame non a terra





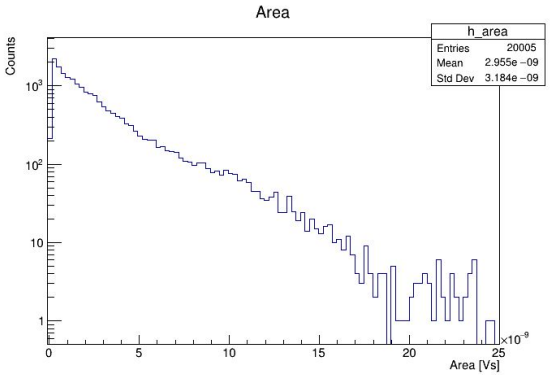
Area (Canale somma)

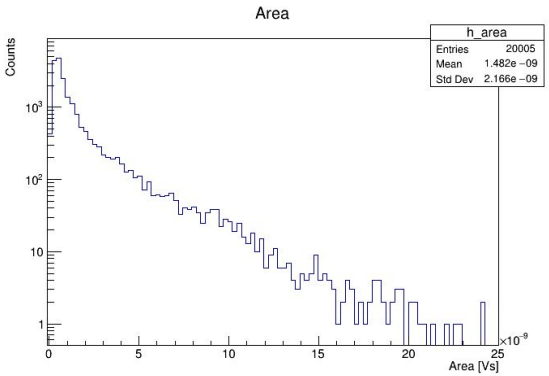
Rame a terra

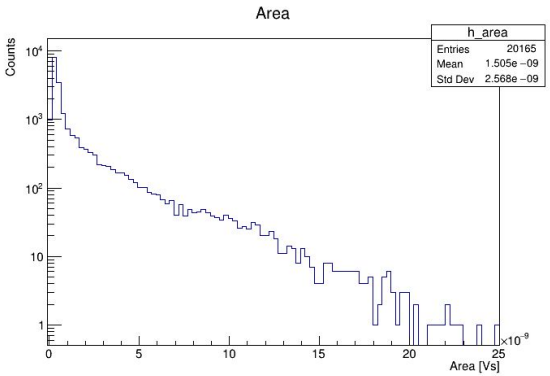
Rame non a terra

Setup1 ⇒

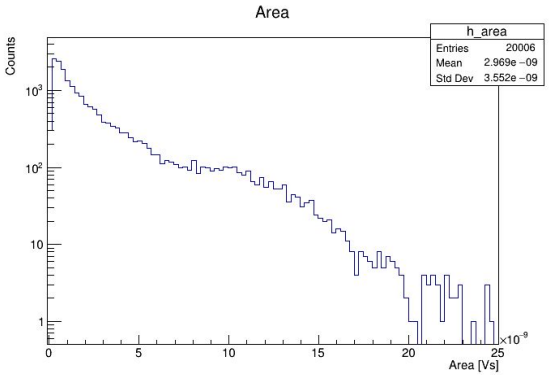
No rame

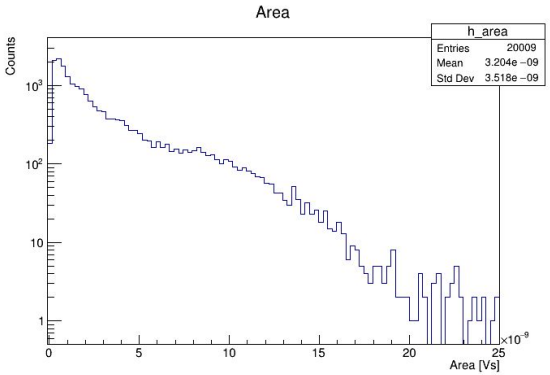






Setup 2 ⇒

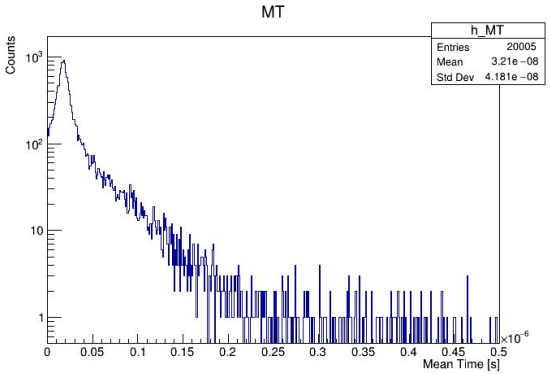




Mean Time (Canale 1)

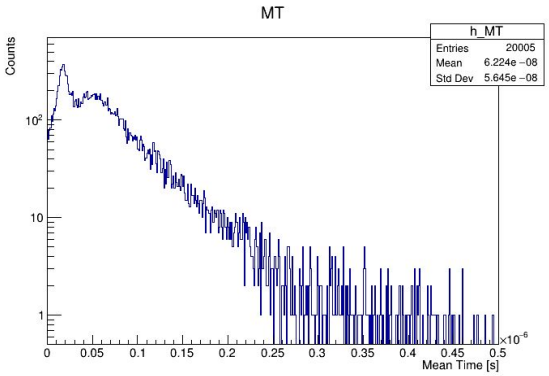
Setup1 ⇒

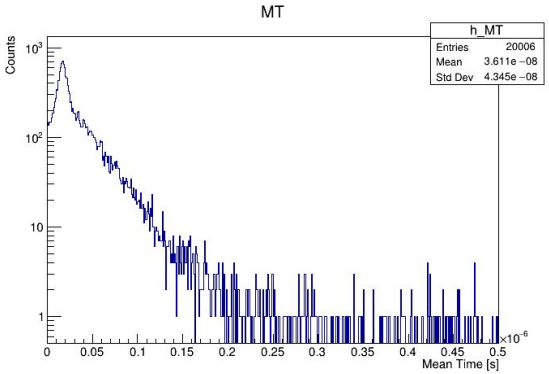
No rame



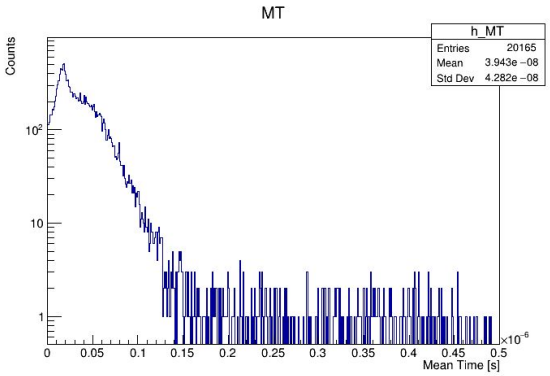
Setup 2 ⇒

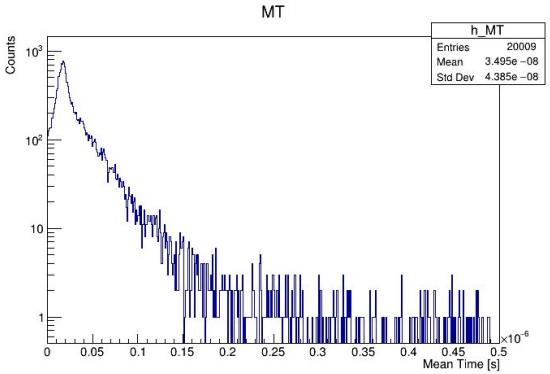
Rame a terra





Rame non a terra

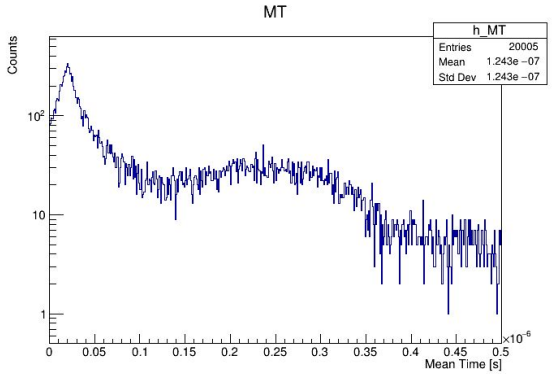




Mean Time (Canale 2)

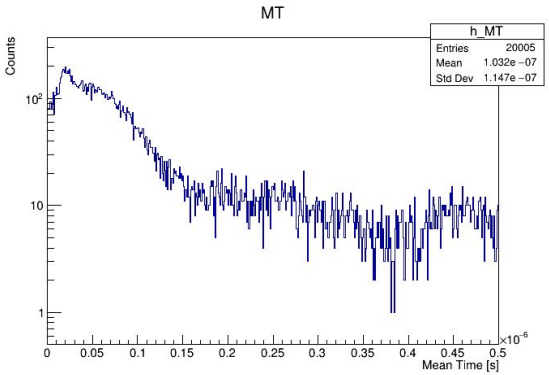
No rame

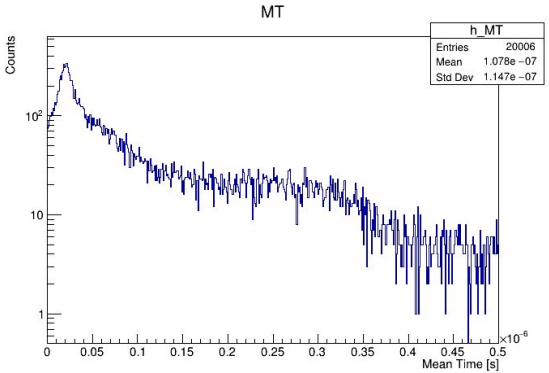
Setup1 ⇒



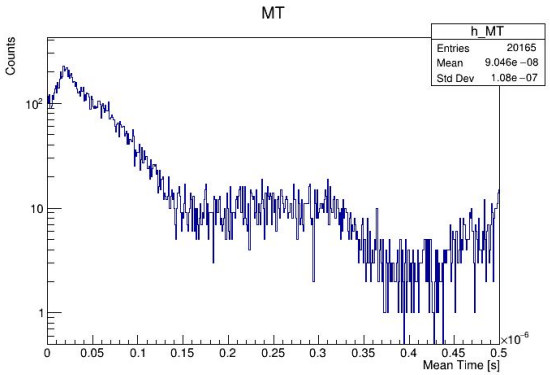
Setup 2 ⇒

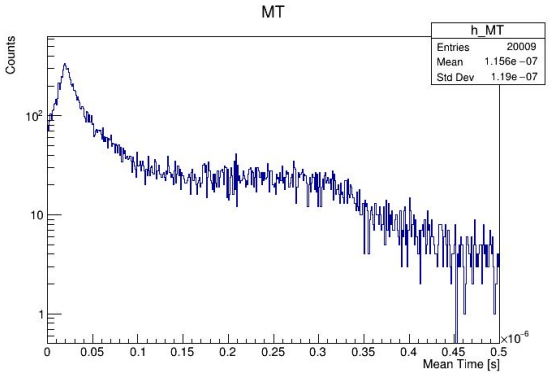
Rame a terra





Rame non a terra





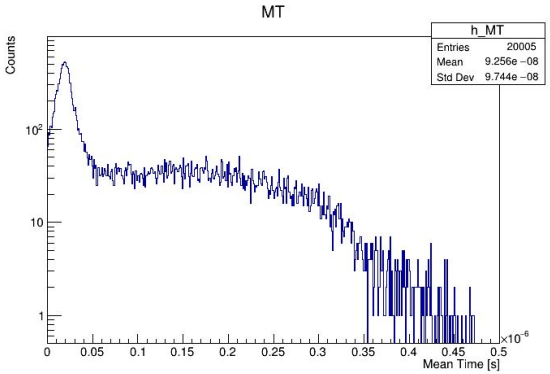
Mean Time (Canale somma)

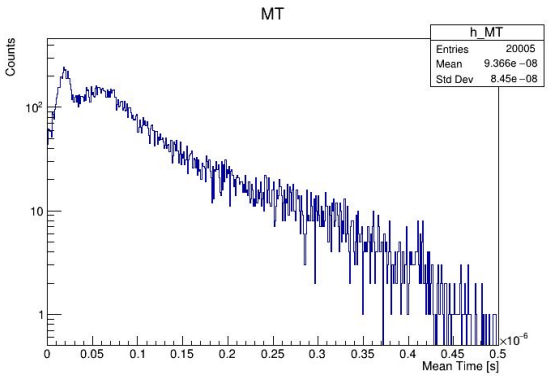
Rame a terra

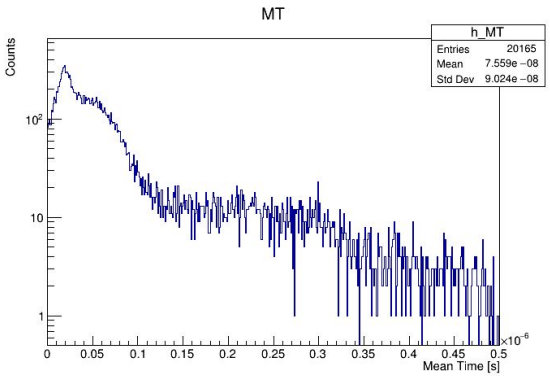
Rame non a terra

Setup1 ⇒

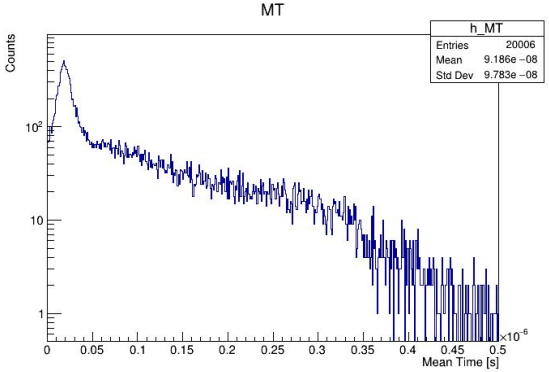
No rame

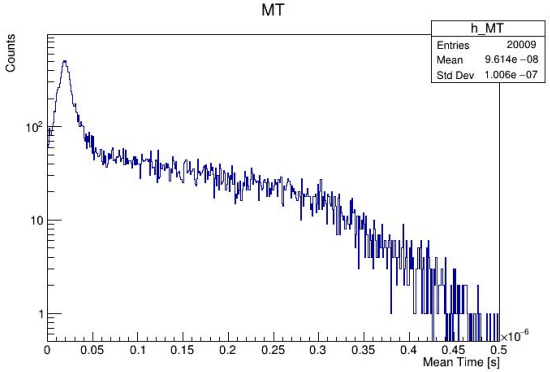


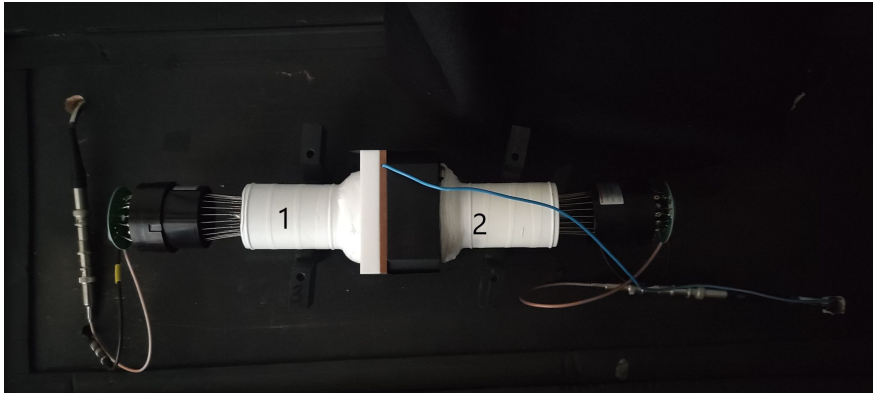




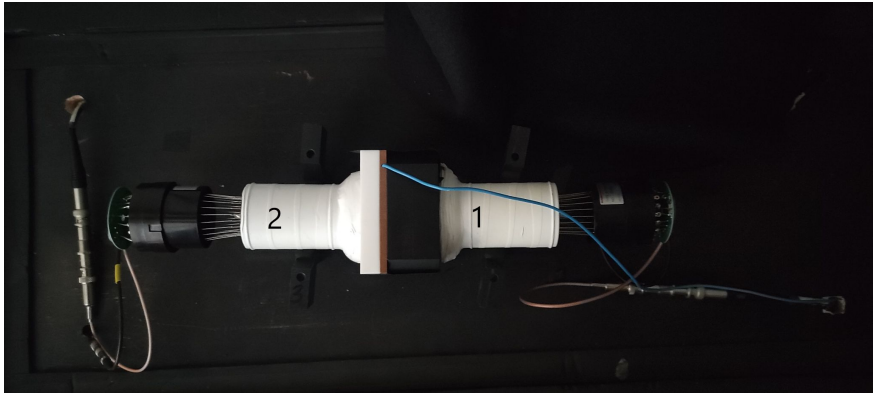
Setup 2 ⇒



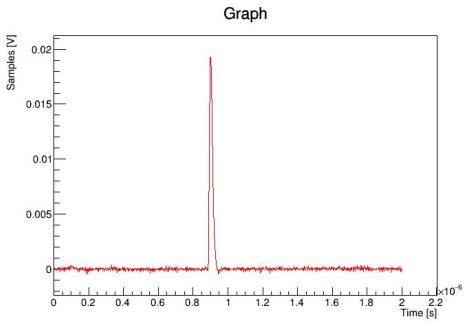


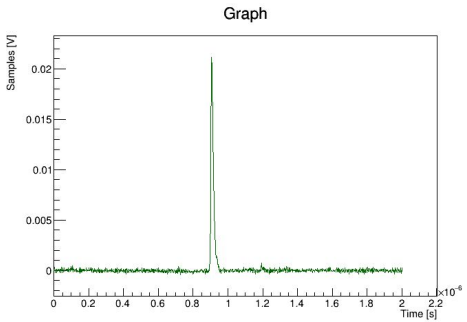


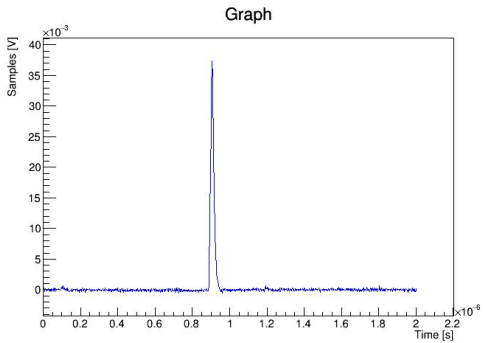
Setup 2

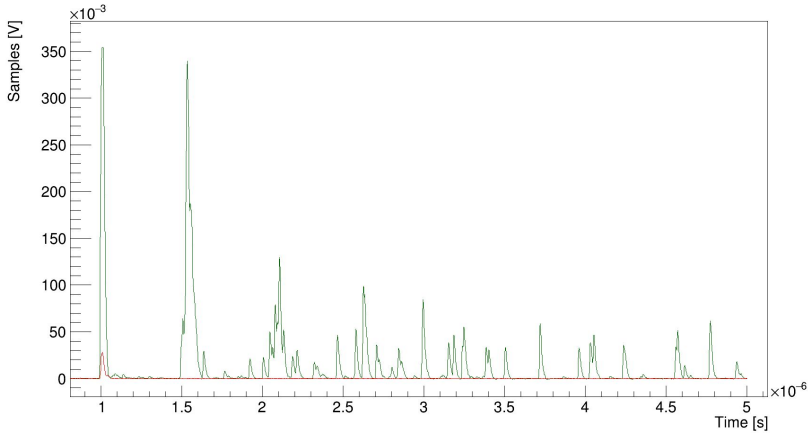


Setup 1

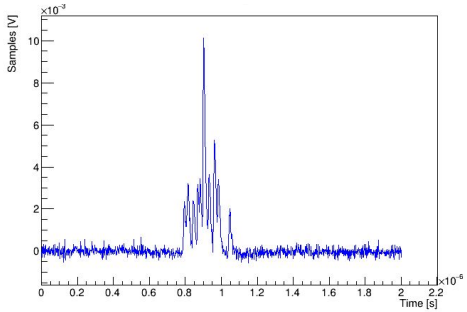

Graph
Samples [V]
Time [s]

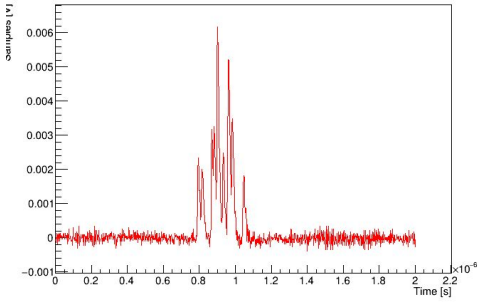

Graph
Samples [V]
Time [s]

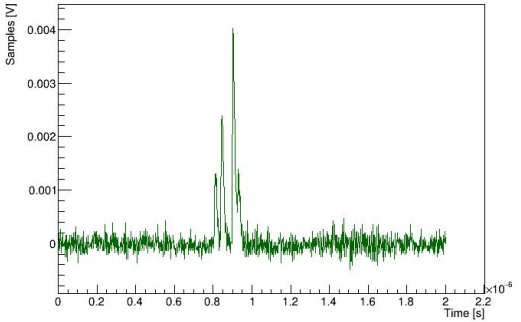

Graph
Samples [V]
Time [s]

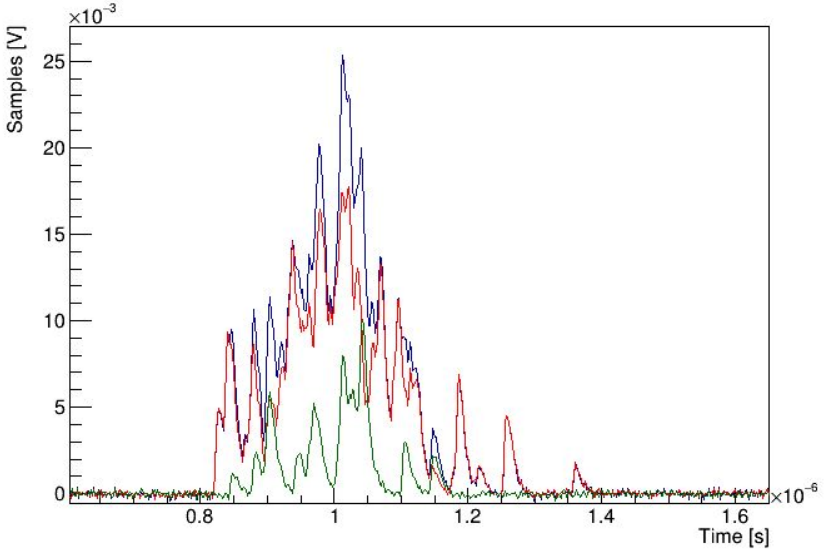

Samples [V]
Time [s]

No rame

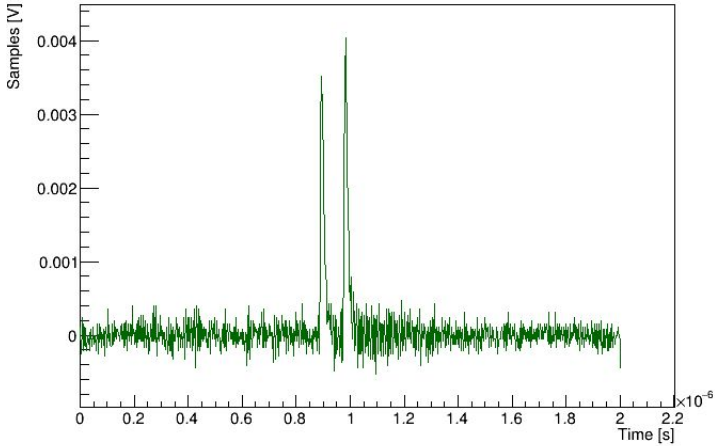


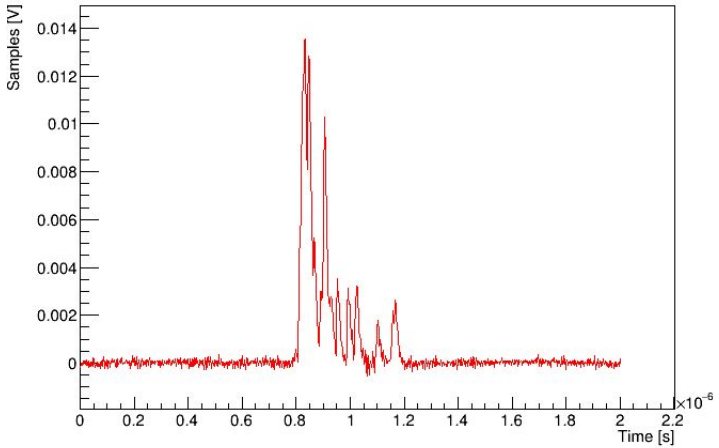


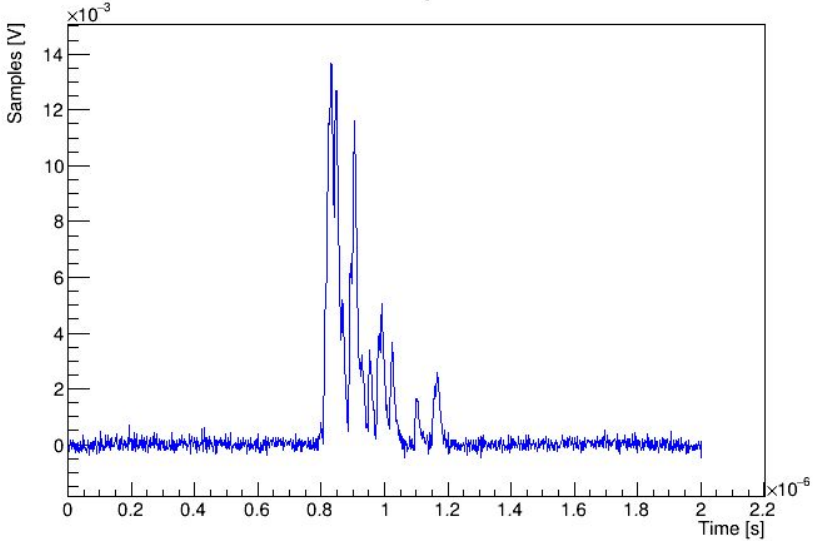




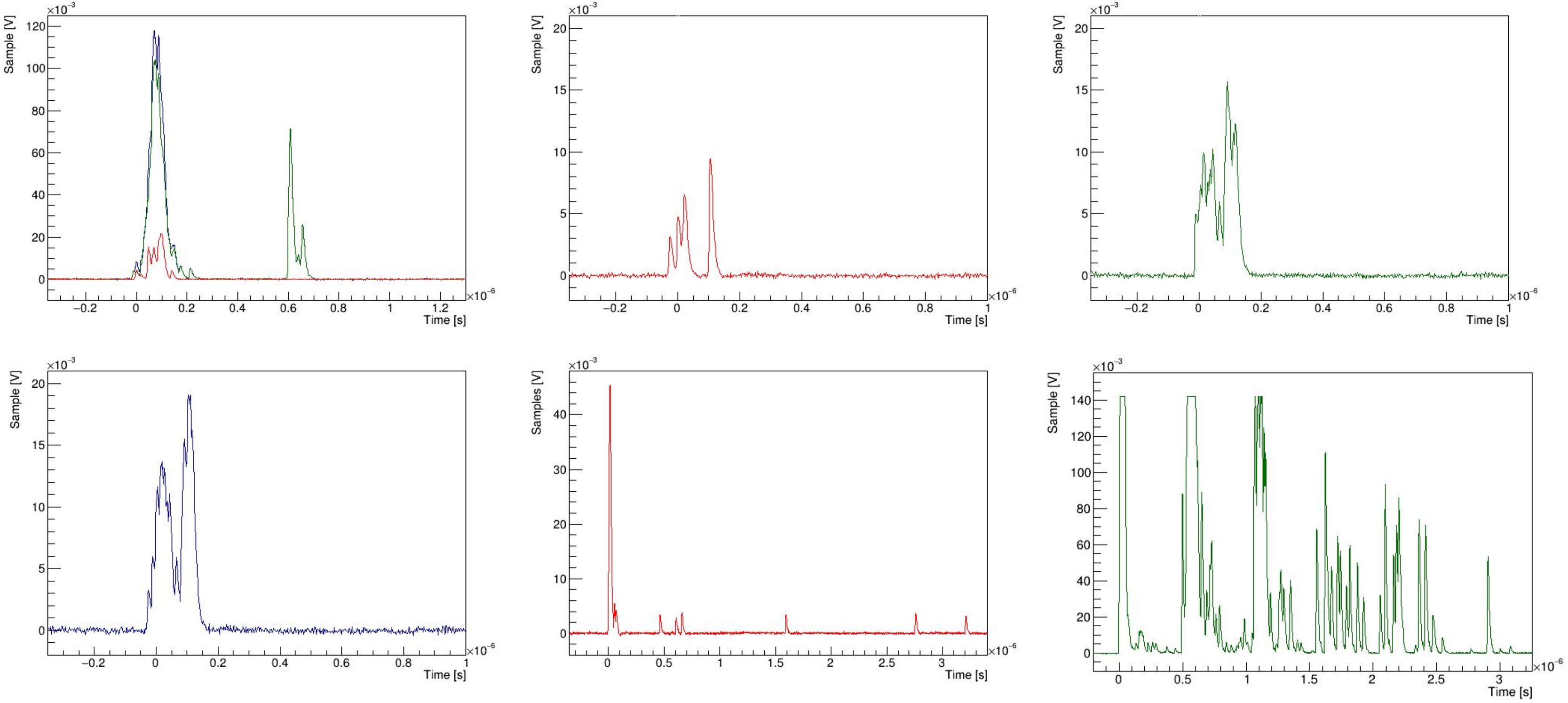
Setup 1 rame a terra



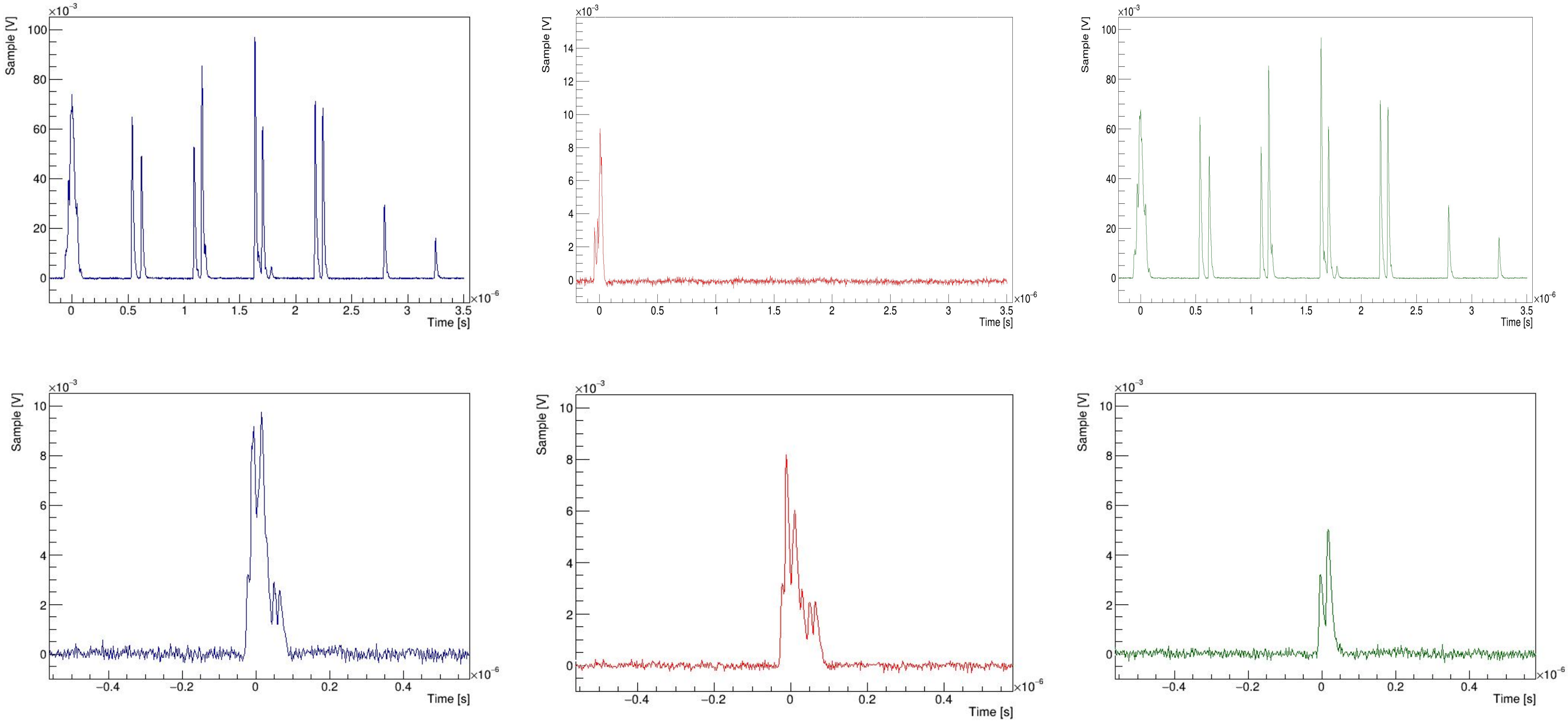




Setup 2 rame a terra



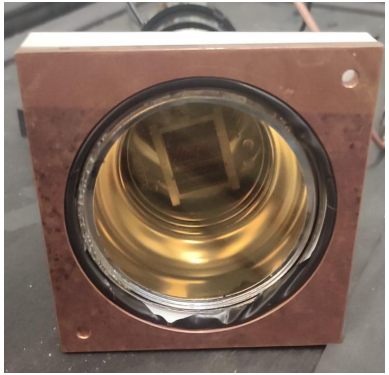
Setup 2 rame a terra

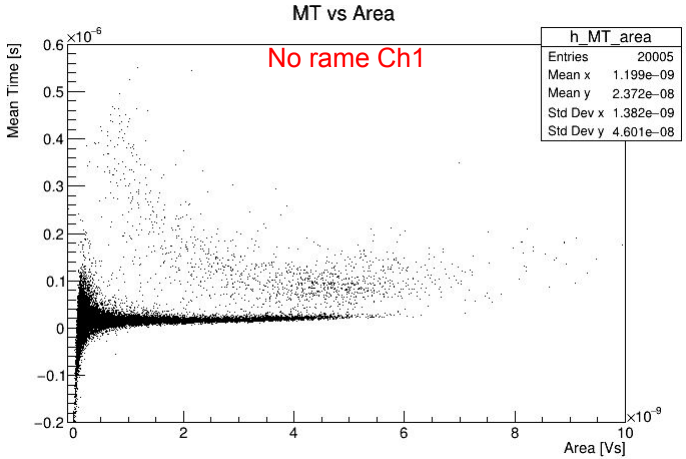


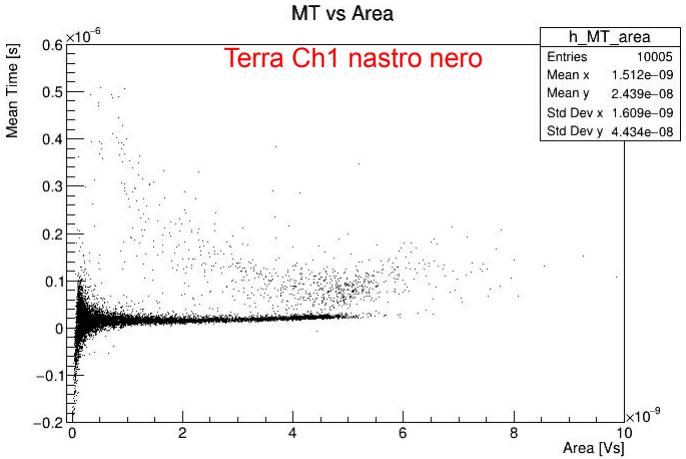
Rame float

Rame con nastro nero

- Studiato solo il setup 1;
- Nessuna differenza apparente con il caso no rame;
- Entrambi hanno due giorni di buio.
- Grafici MT vs Area per canale 1.







Tagli con le variabili

Durata eventi (persistance)

Differenze spettri canale somma rame - no rame - float (per setup)

Variabili X1, X2, ES, tau, CoM

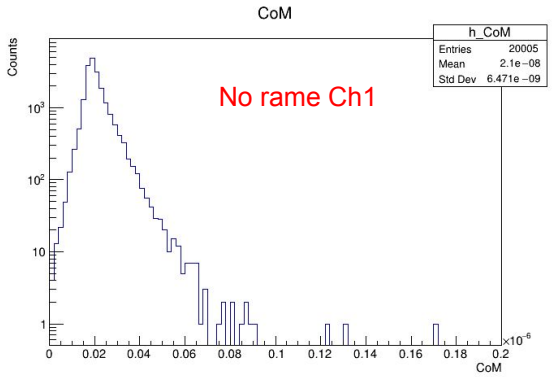
Scatter plot Mt vs integrald→ tagli Mtd e integrald per togliere eventi Bell

- Pers non utilizzabile per il setup 2, troppi eventi di rumore dovuti al canale 2.

CoM (Canale 1)

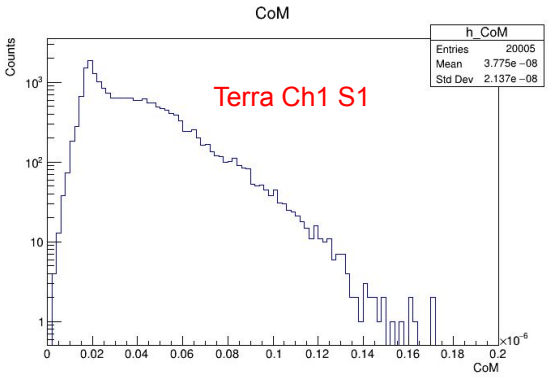
Setup1 ⇒

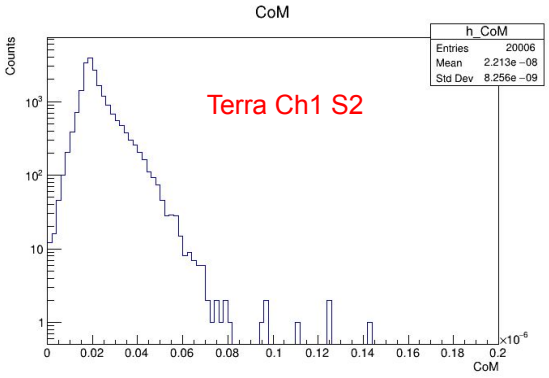
No rame



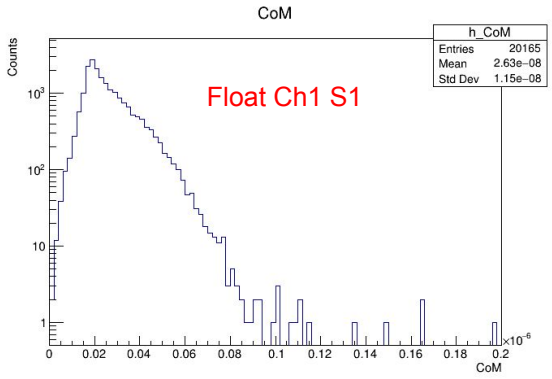
Setup 2 ⇒

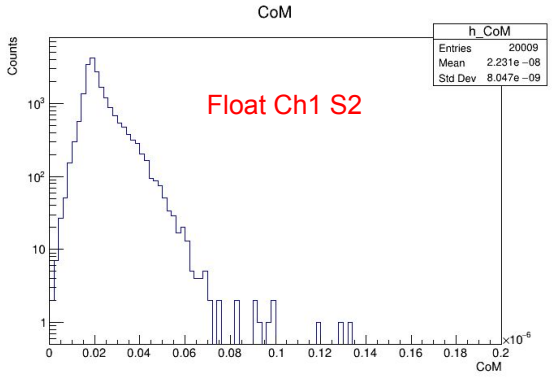
Rame a terra





Rame non a terra

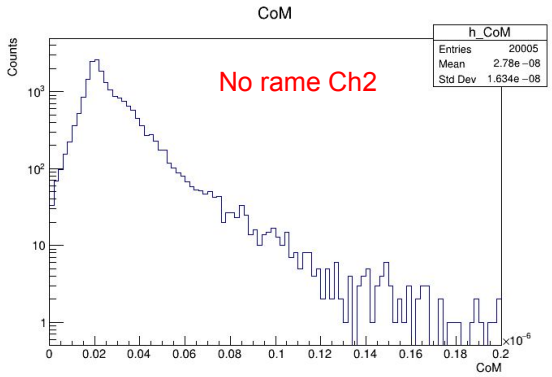




CoM (Canale 2)

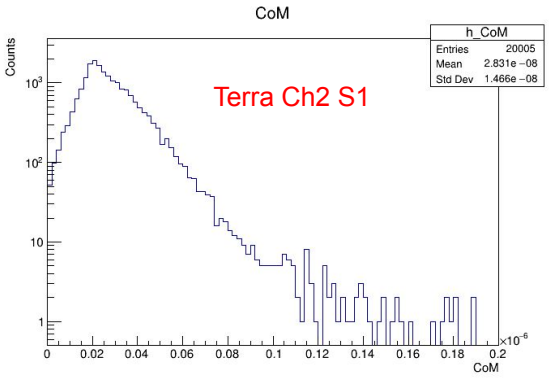
Setup1 ⇒

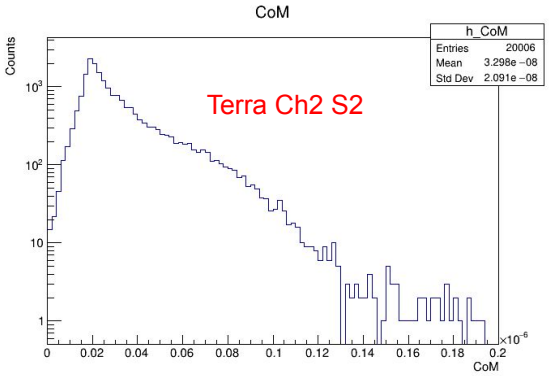
No rame



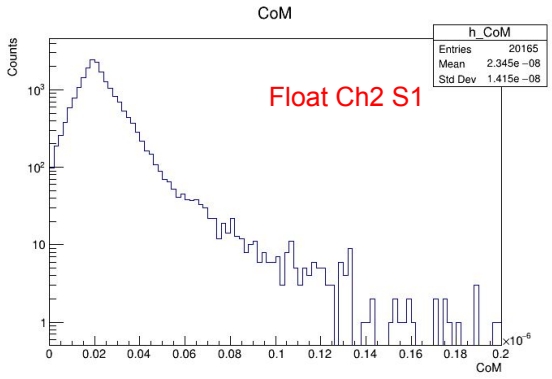
Setup 2 ⇒

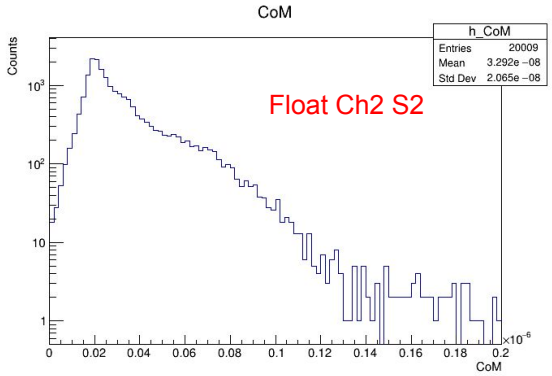
Rame a terra





Rame non a terra

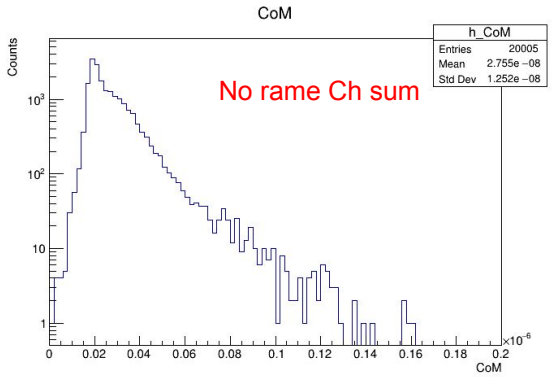




CoM (Canale Somma)

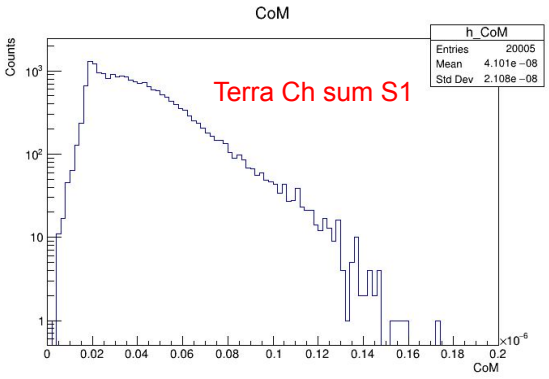
Setup1 ⇒

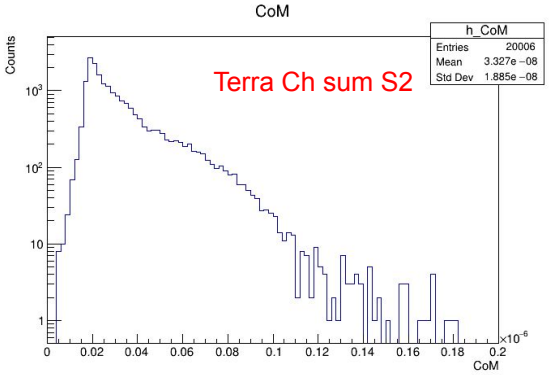
No rame



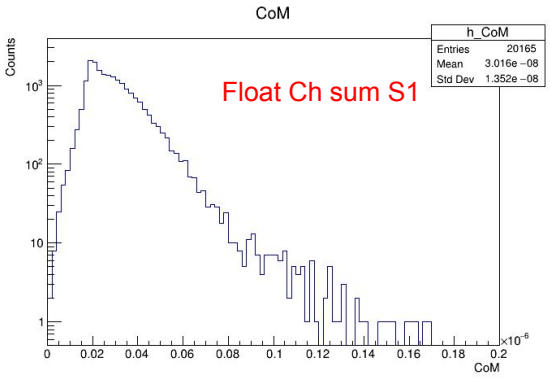
Setup 2 ⇒

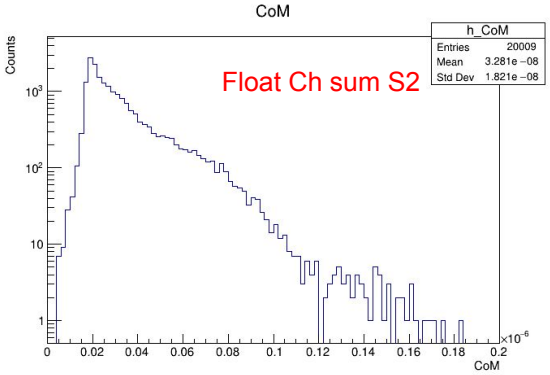
Rame a terra





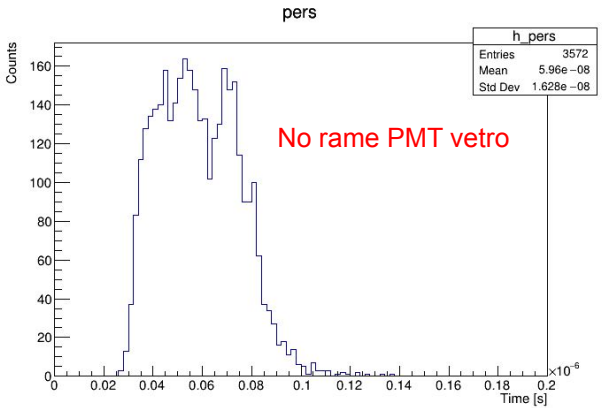
Rame non a terra



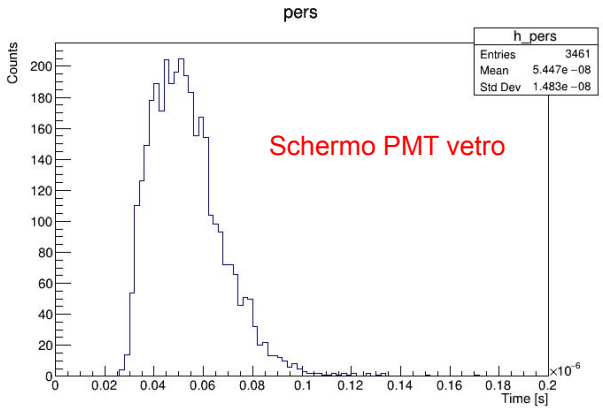


p (PMT vetro)

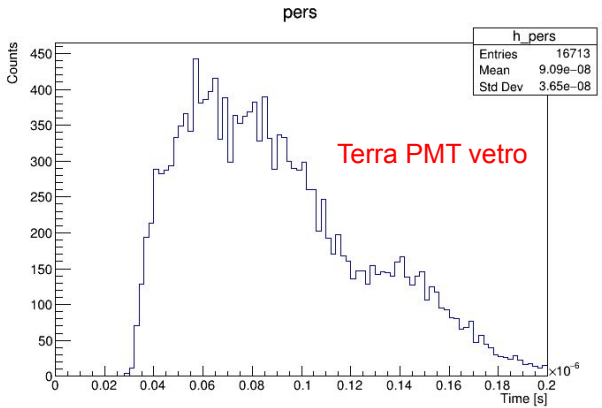
No rame



Rame a terra schermatura

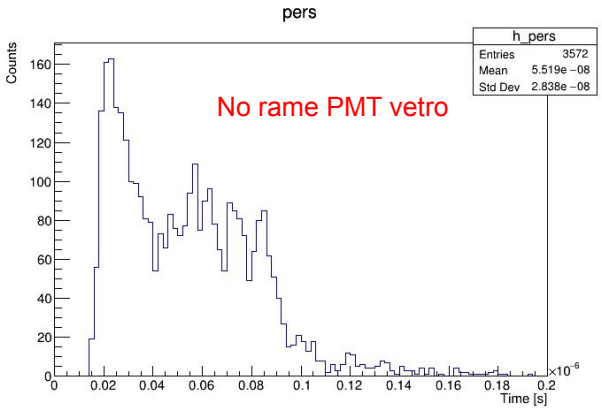


Rame a terra

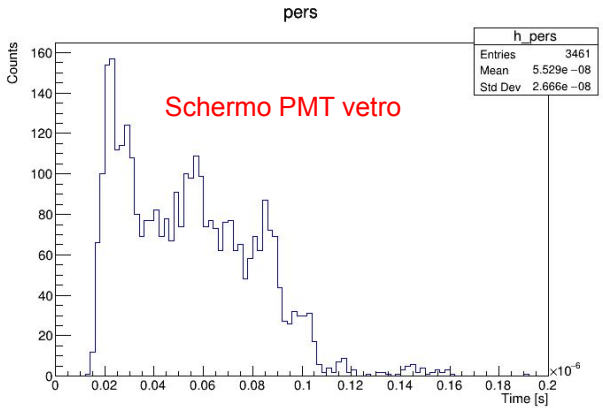


p (PMT1)

No rame



Rame a terra schermatura



Rame a terra