Enrico Fermi Physics Club

Experiment

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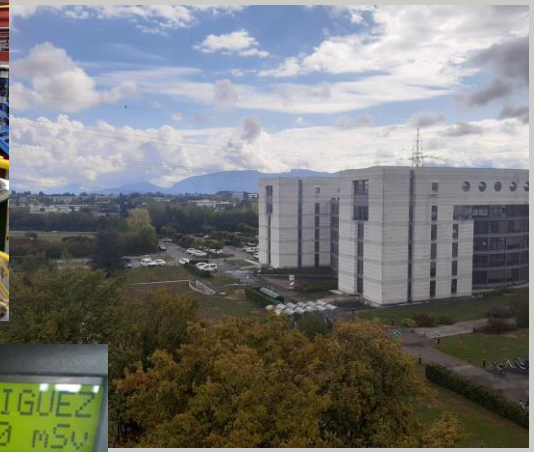
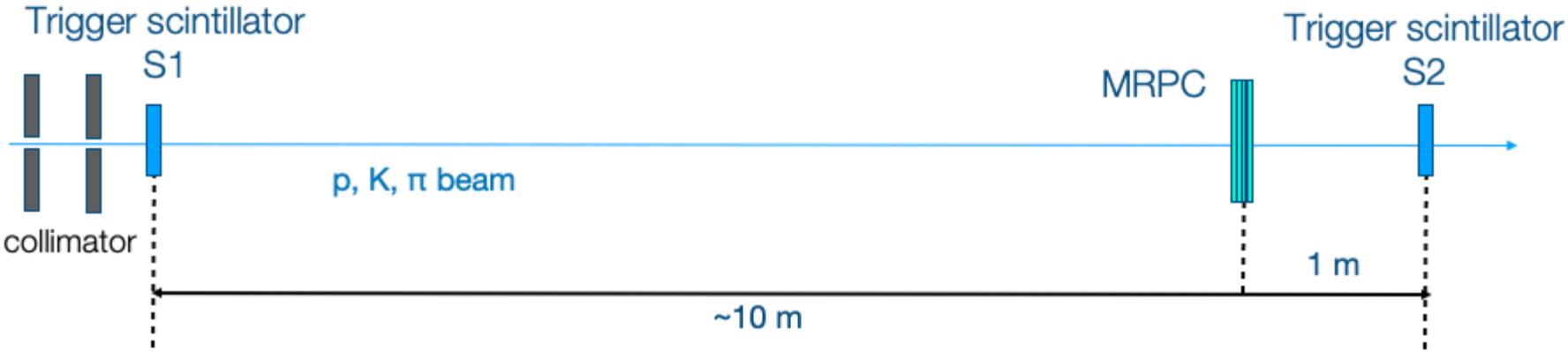
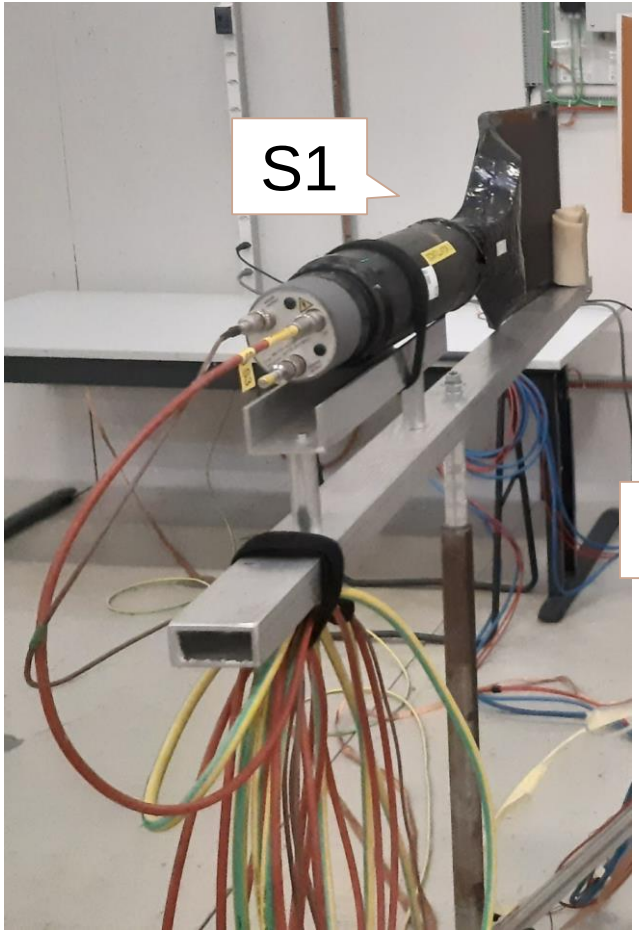
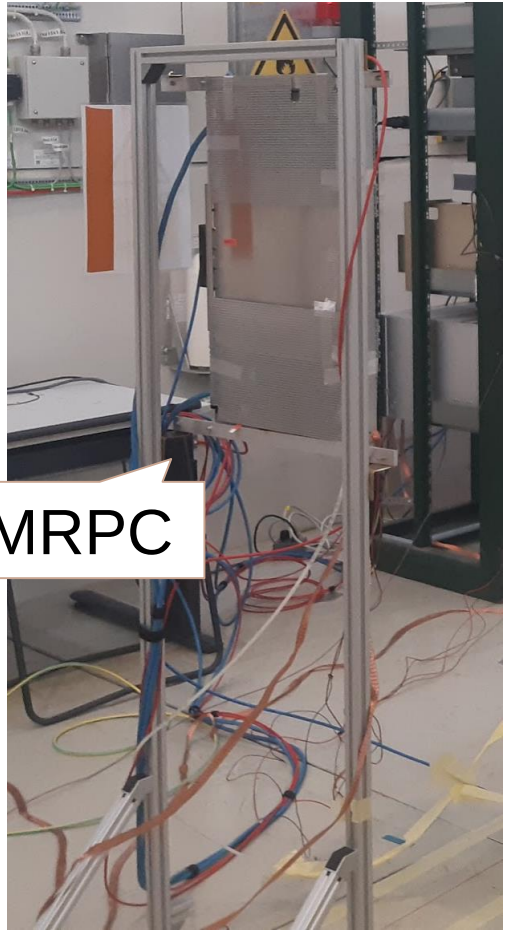
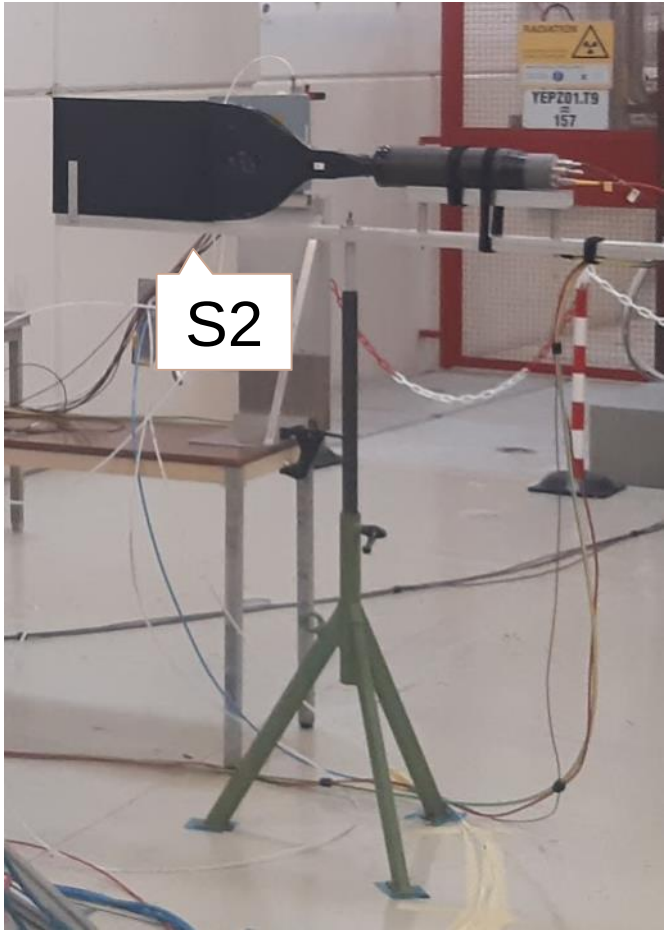


Proposal's setup

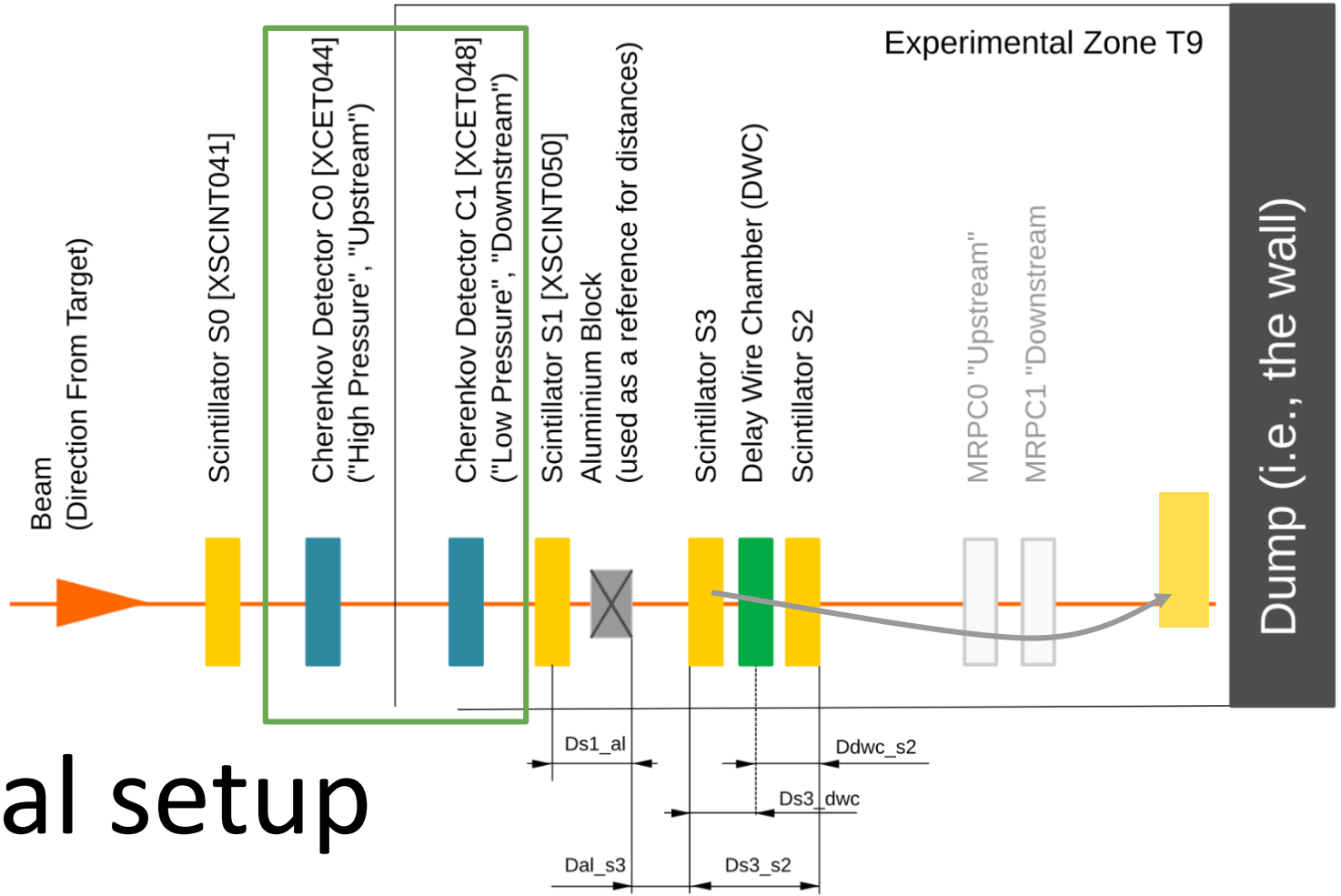



S1

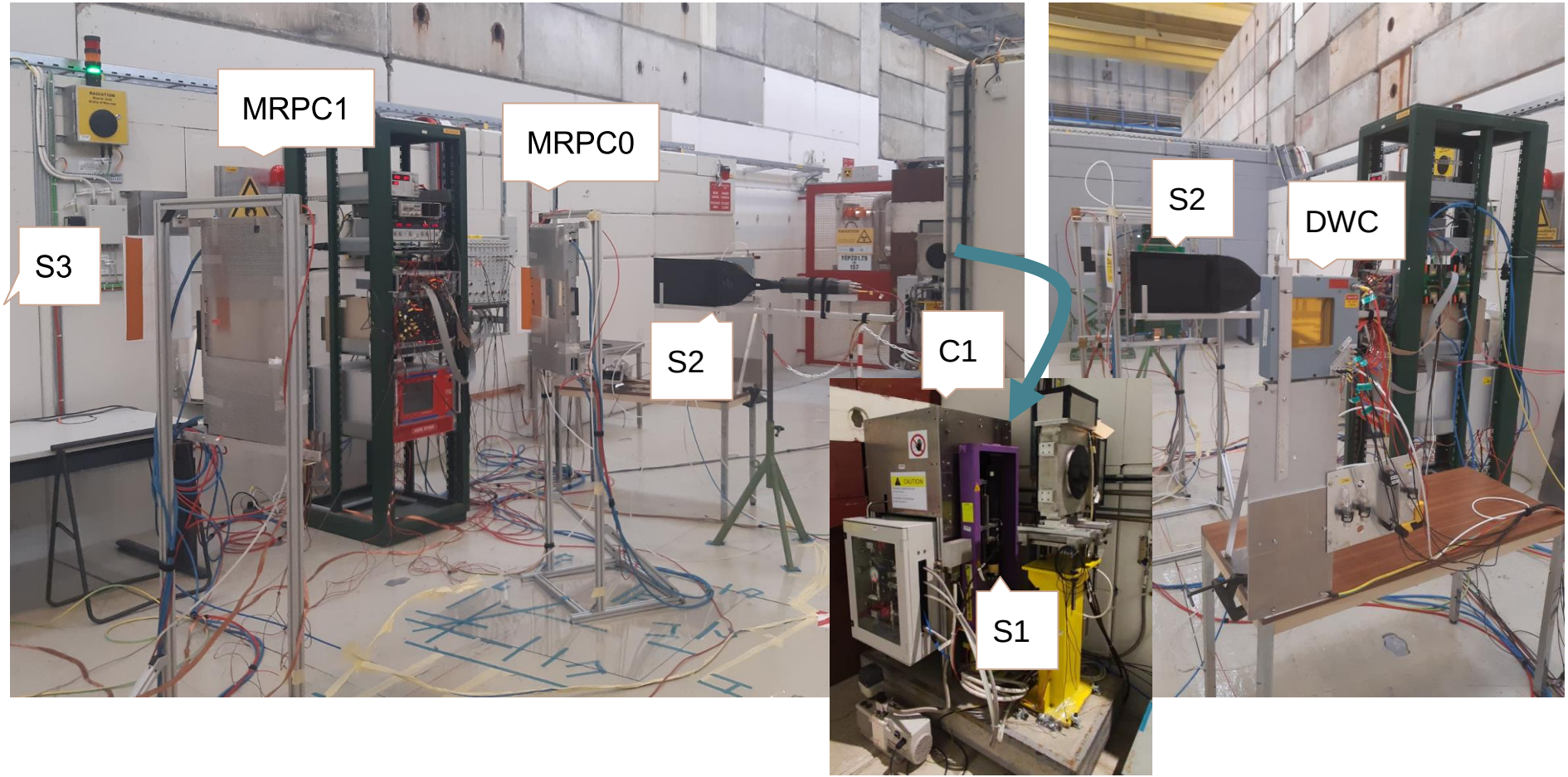

MRPC


S2

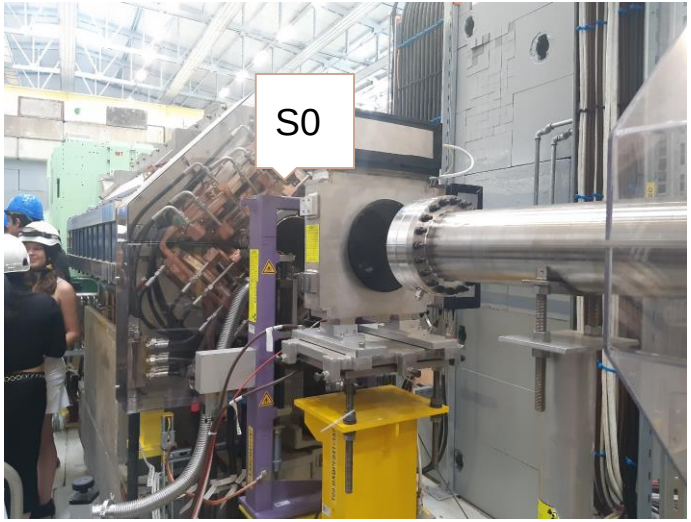
Final setup

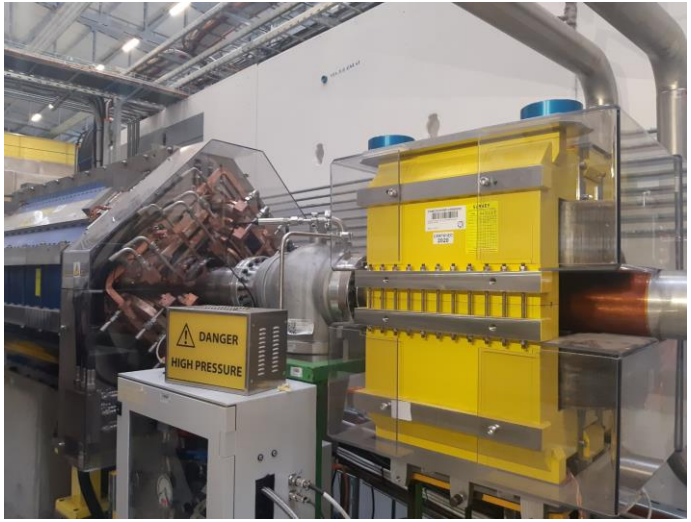

Experimental Zone T9
Beam
(Direction From Target)
Scintillator S0 [XSCINT041]
Cherenkov Detector C0 [XCET044]
("High Pressure", "Upstream")
Cherenkov Detector C1 [XCET048]
("Low Pressure", "Downstream")
Scintillator S1 [XSCINT050]
Aluminium Block
(used as a reference for distances)
Scintillator S3
Delay Wire Chamber (DWC)
Scintillator S2
MRPC0 "Upstream"
MRPC1 "Downstream
Dump (i.e., the wall)
Ds1_al
Ddwc_s2
Ds3_dwc
Dal_s3
Ds3_s2

Experimental zone

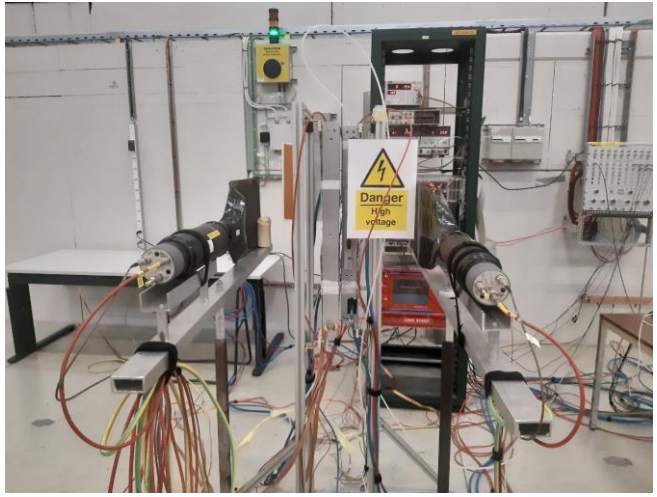


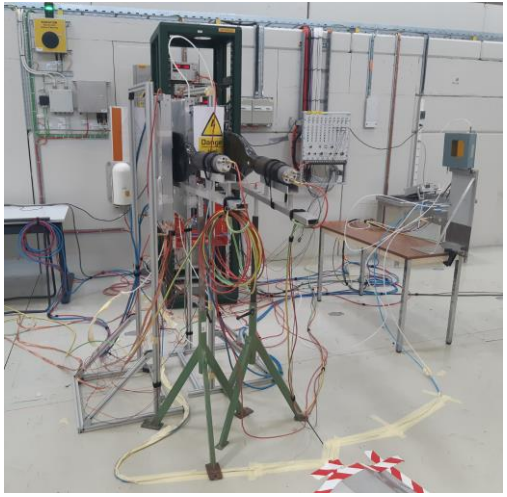

YEAP-EHPPET9


S0

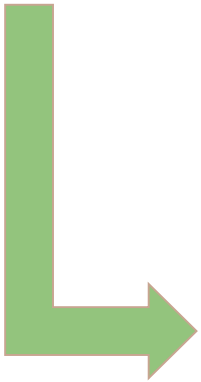

DANGER
HIGH PRESSURE


DWC
MRPC

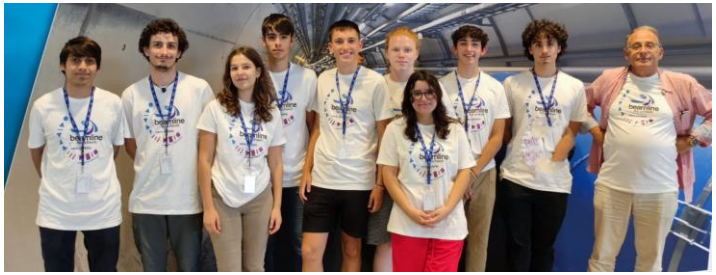

Danger
High
voltage

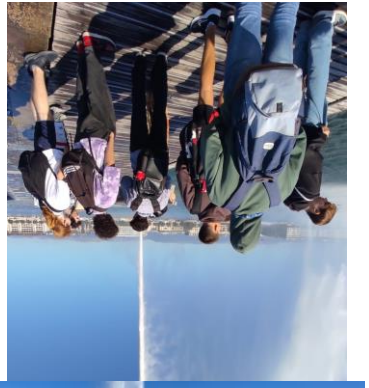


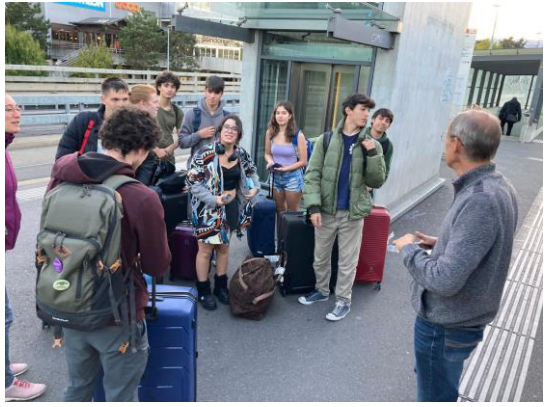
Before starting with Data Analysis…

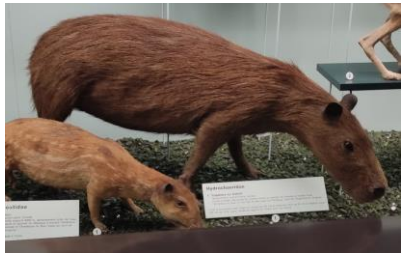


What have we learnt Beyond Physics?



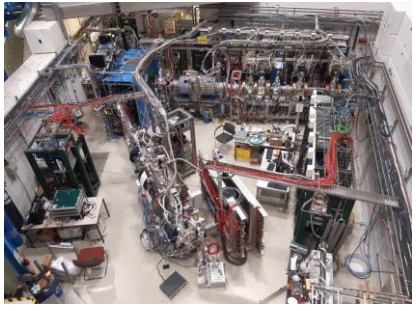




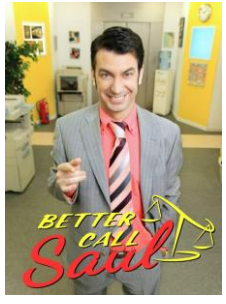



collectif de
récupération de cycles
PECLOT 13

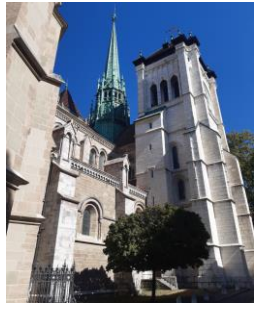

HIGGS BOSON
RULES APPLY
NO SPIN !



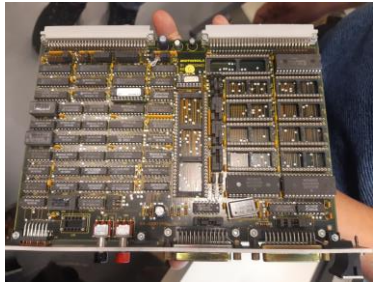

STONKS!


BETTER
CALL
Saul


UNITED NATIONS NATIONS UNIES




LE FÉMINISME SERA DÉPASSÉ QUAND
LE MACHISME SERA TRÉPASSÉ.



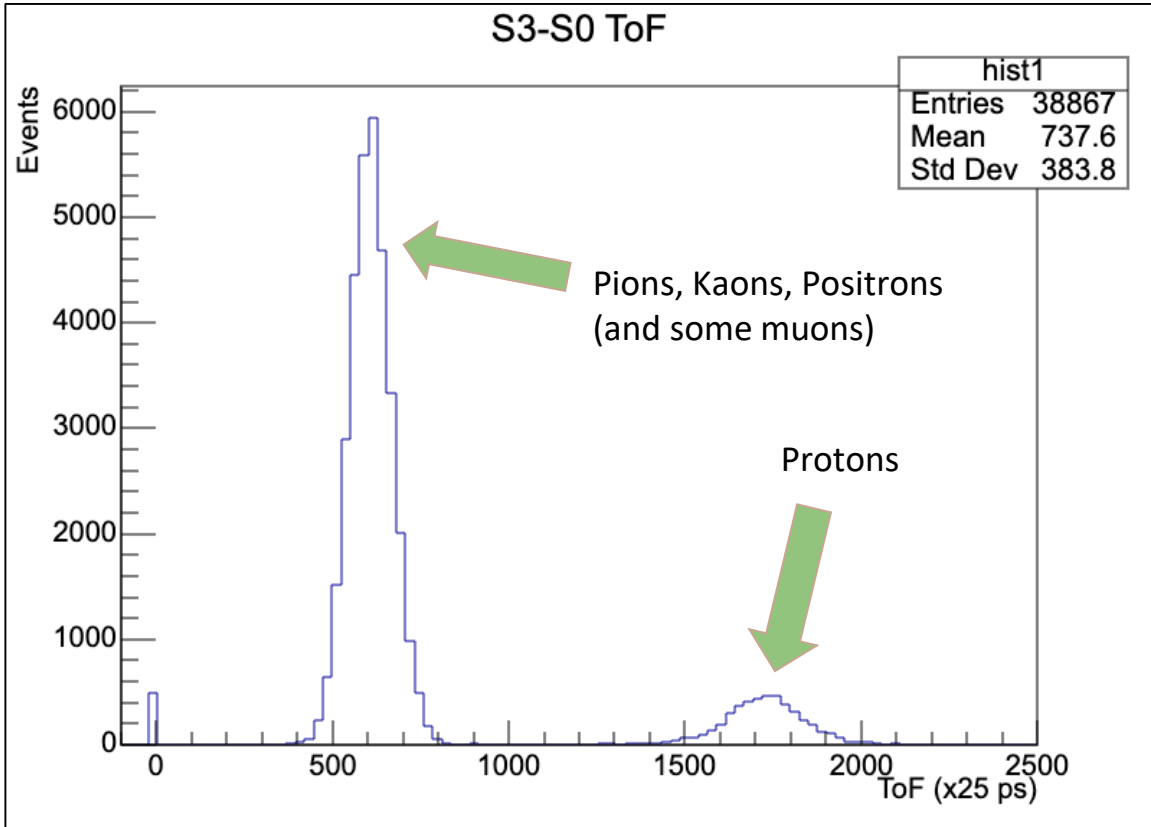
Control Data: Runs Analysis

RUN summary						
P/ GeV/c	MRPC1 at 0°				MRPC1 at 30°	
	R134a / SF6 50/50			E-Freon/He 50-50	R134a / SF6 50/50	E-Freon/He 50/50
	e+	H+	pi-	H+	H+	H+
0.6						1
1		1			1	13
2						1
3		2				
4.5		1			2	2
6		3			2	1
15	1	1	1		1	

Control Data: Runs Analysis

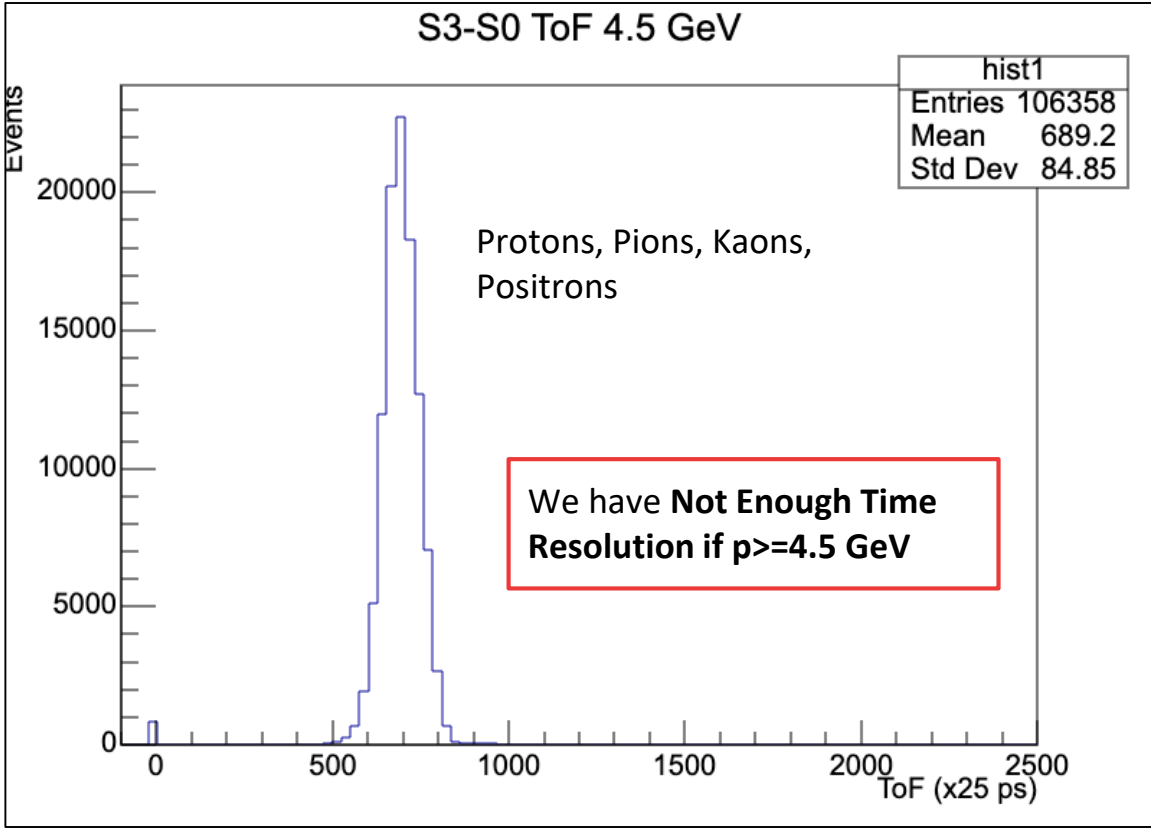
ToF Measurements

1 GeV



ToF Measurements

4.5 GeV

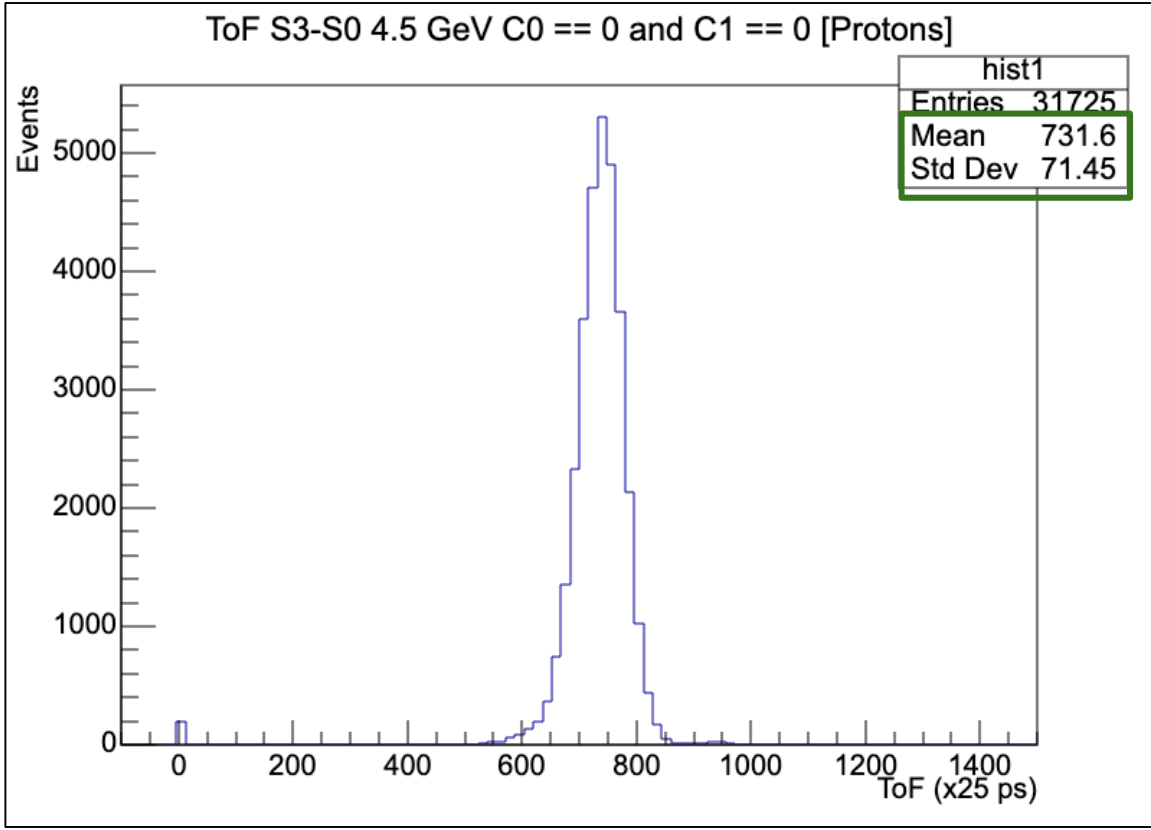


5.3 ToF + Cerenkov Measurements

Cerenkov 0 == 0

Cerenkov 1 == 0

Heavy particles -> Protons

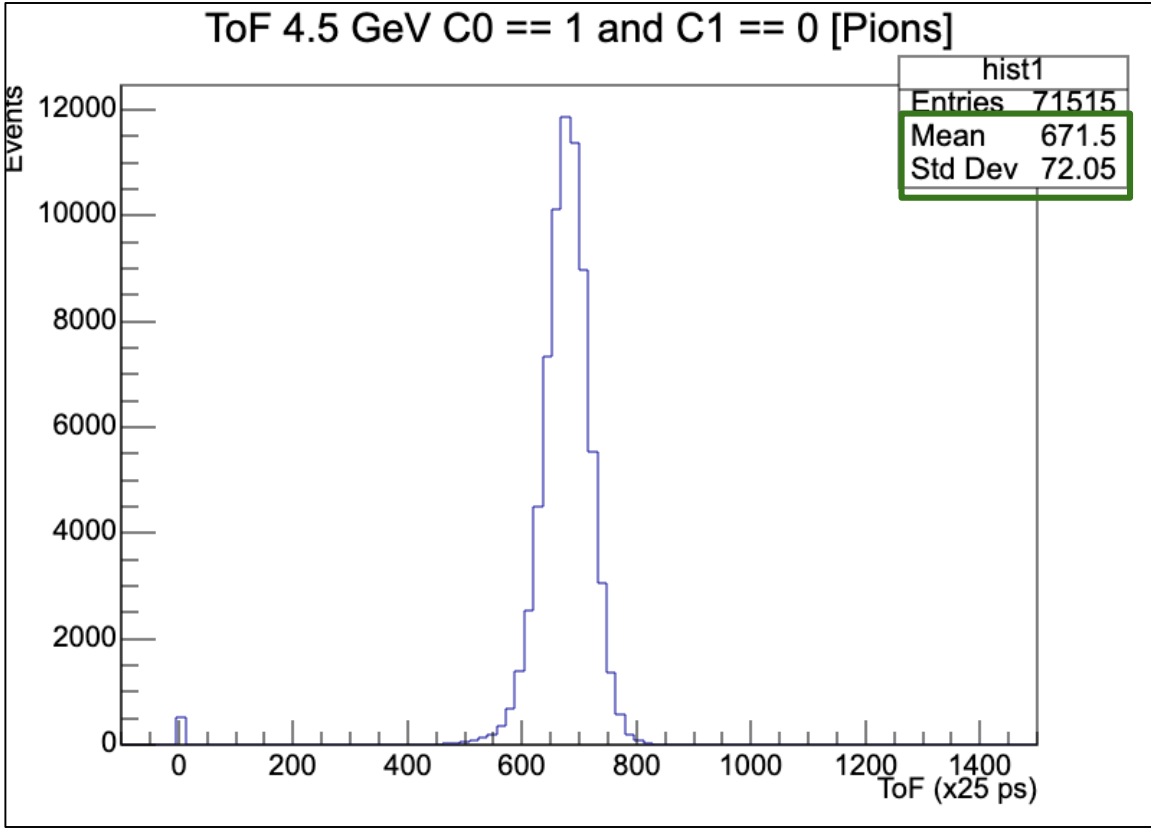


5.3 ToF + Cerenkov Measurements

Cerenkov 0 == 1

Cerenkov 1 == 0

Lighter particles -> Pions /Kaons

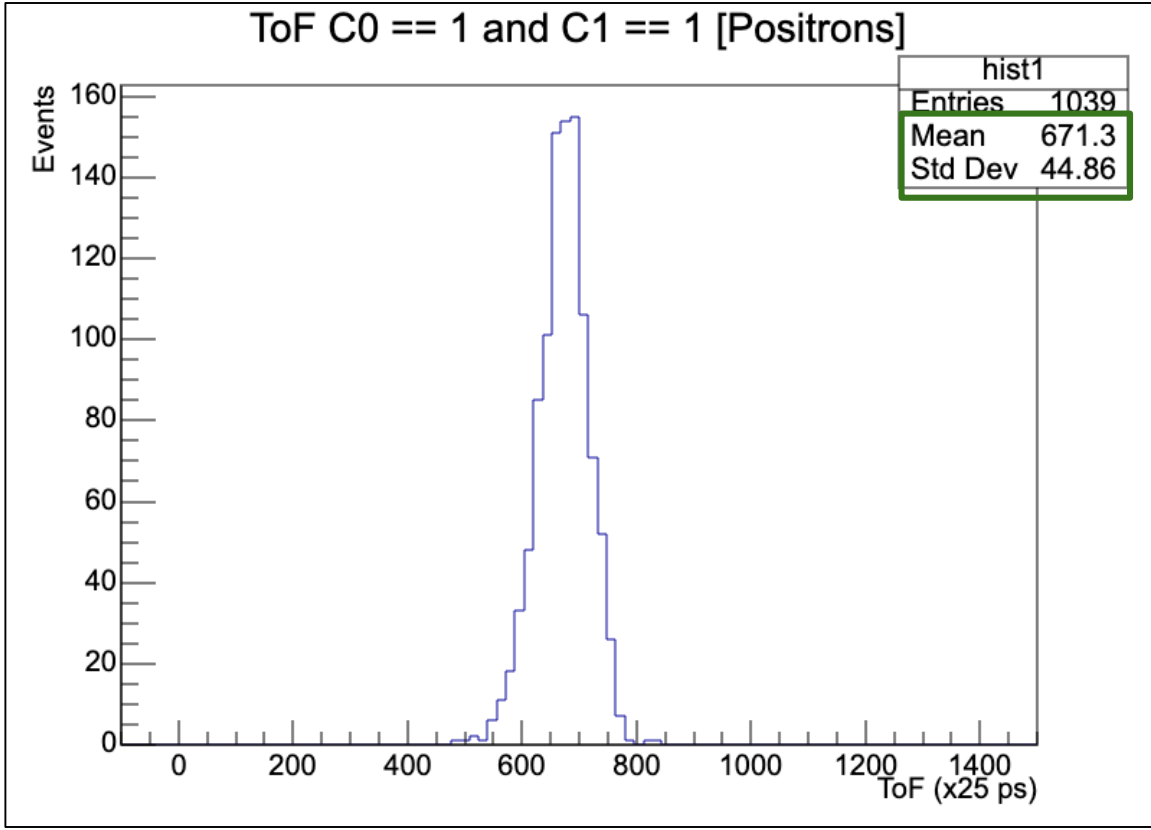


5.3 ToF + Cerenkov Measurements

Cerenkov 0 == 1

Cerenkov 1 == 1

Lighter lighter particles -> positrons

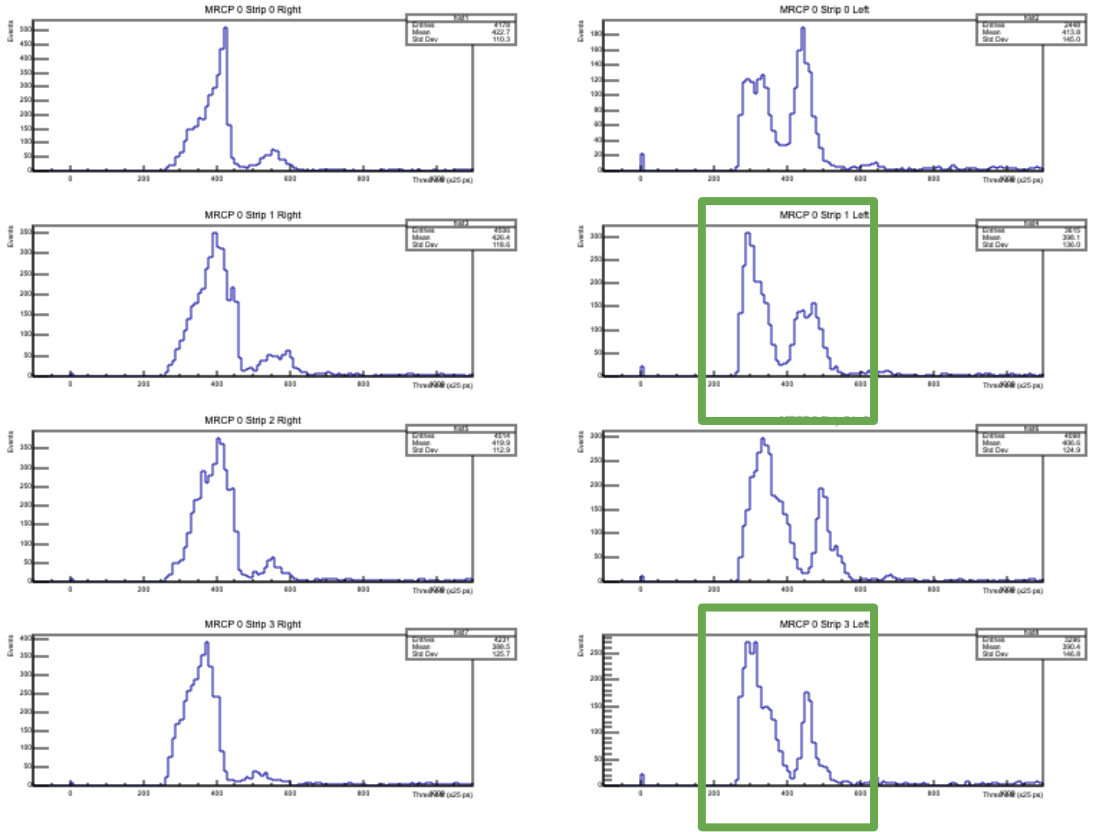


Control Data: Runs Analysis

5.4 Raw Threshold Time Estimation

2 MRCPs x 8 Strips x 2 Configurations

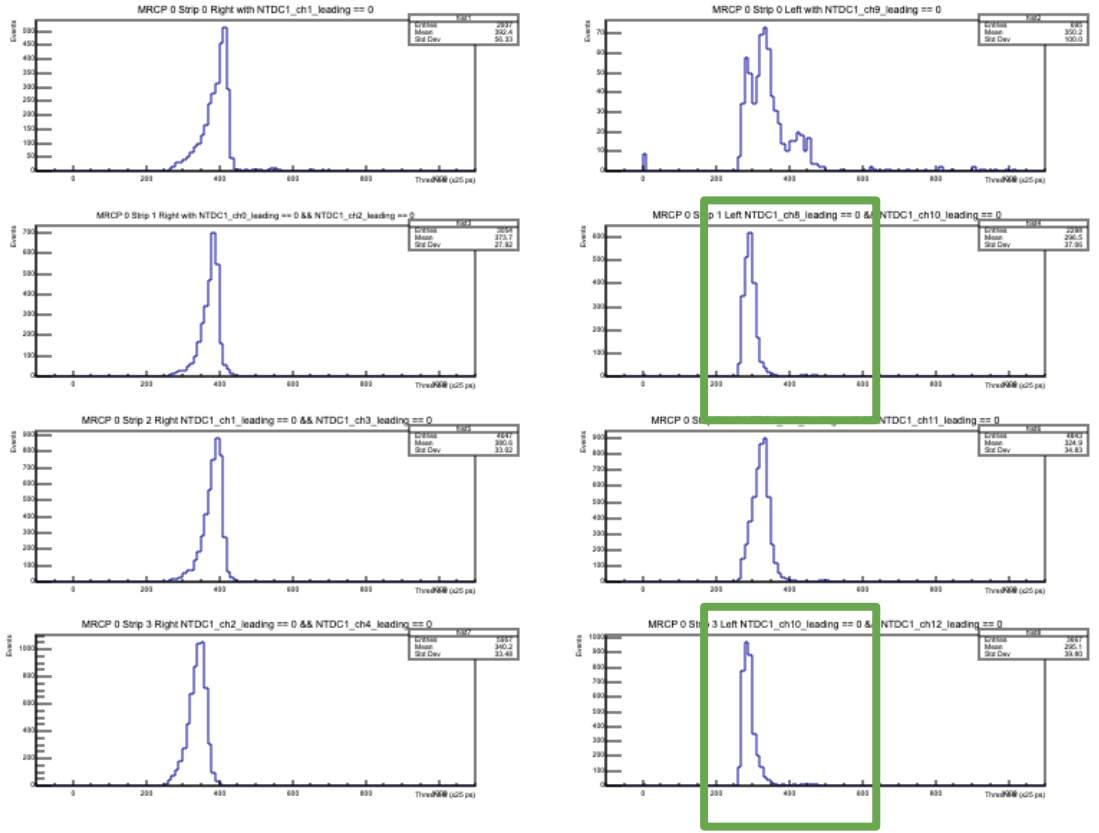
MRCP 0 Strips 0-1-2-3
Left + Right
(4.5 GeV)



4.5 Correction Threshold Time Estimation

1 Particle Hits Only 1 Strip

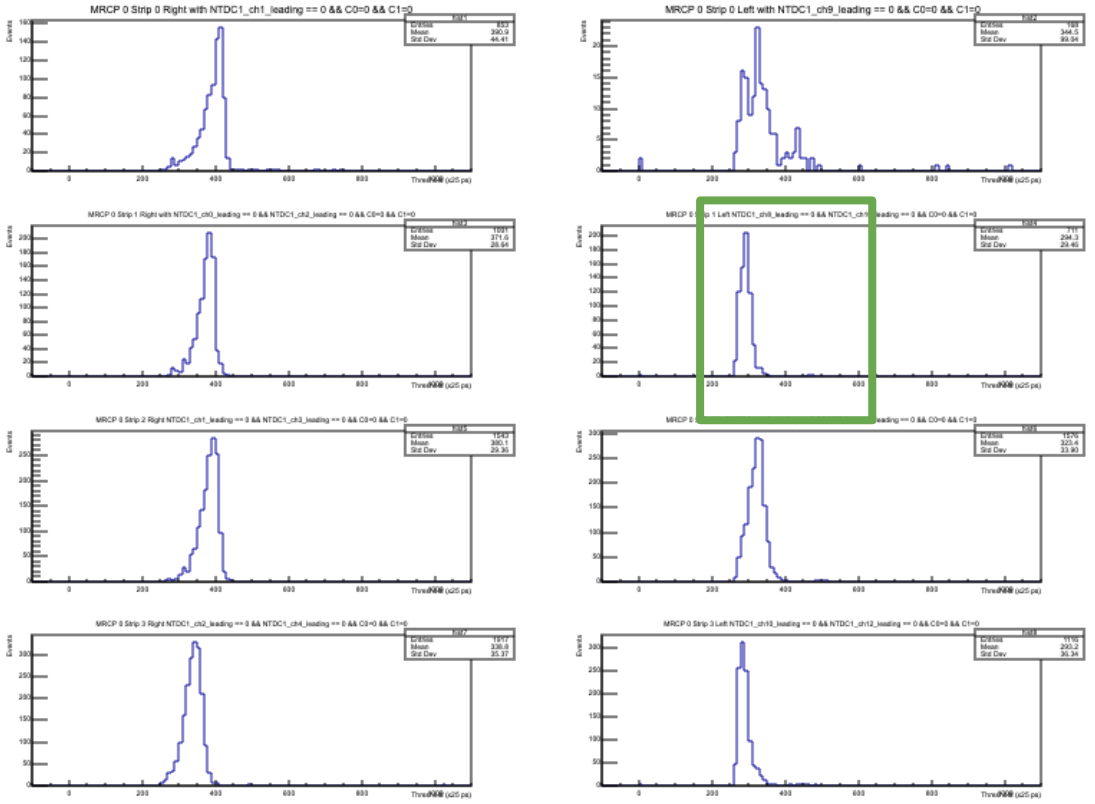
MRCP 0 Strips 0-1-2-3 Left + Right



4.5 Correction Threshold Time Stimation

1 Particle Hits Only 1 Strip
+
Cerenkov 0 / Cerenkov 1 == 0
(Protons)

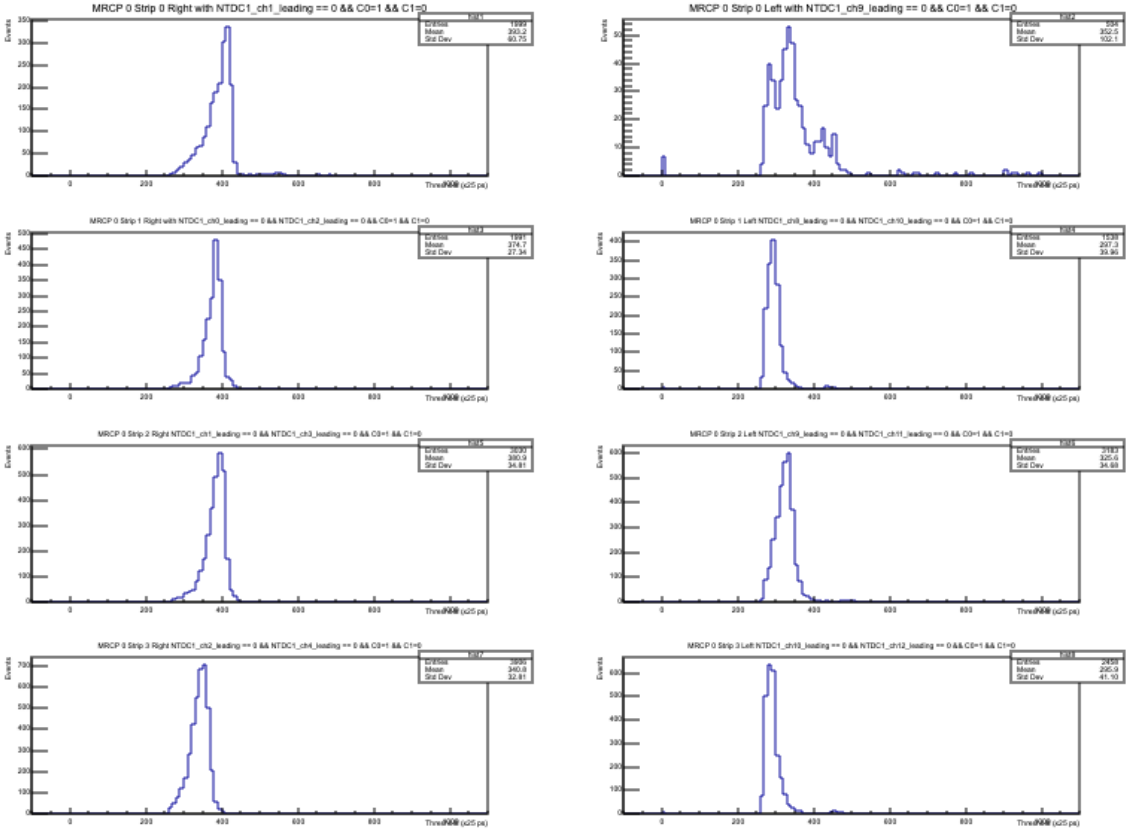
MRCP 0 Strips 0-1-2-3
Left + Right



4.5 Correction Threshold Time Estimation

1 Particle Hits Only 1 Strip
+
Cerenkov == 1 / Cerenkov 1 == 0
(Pions)

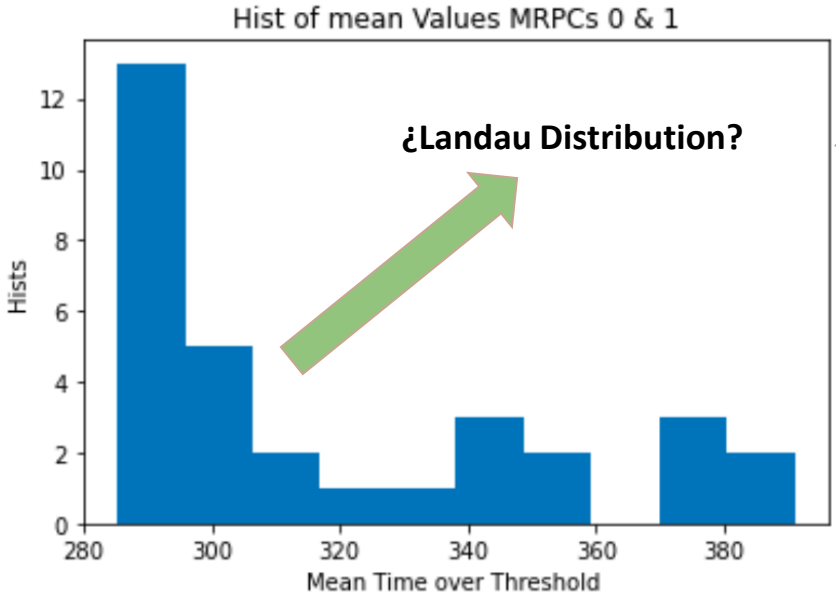
MRCP 0 Strips 0-1-2-3
Left + Right



4.5 Final Estimation Threshold

32 Plots in Total

Mean Distribution for Both MRCPs

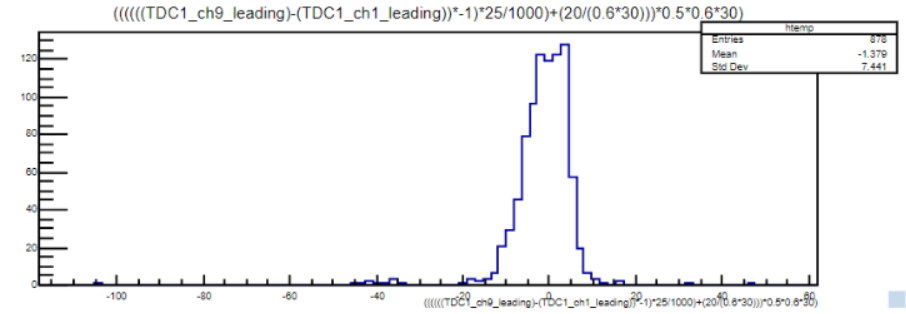


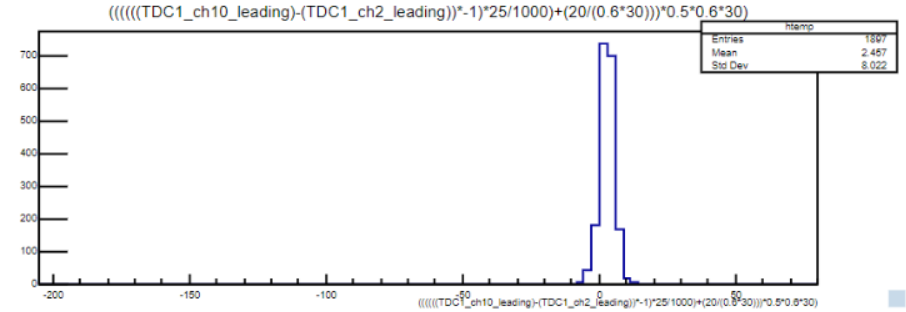
We should take the MEDIAN of Distribution

IN DATA ANALYSIS WE GOT

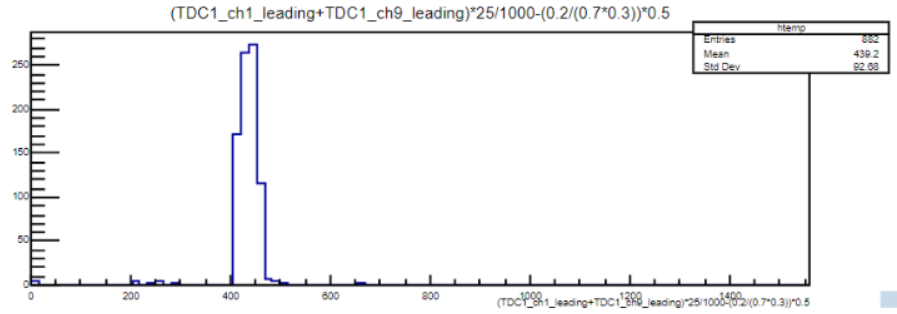
SOME PROMISING RESULTS!!!

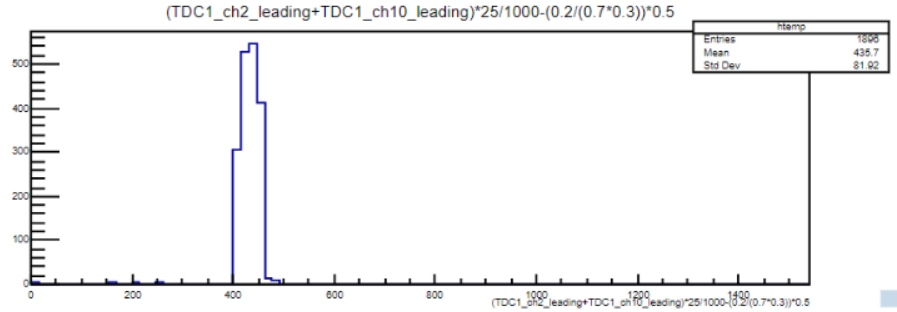
POSITION PROFILE



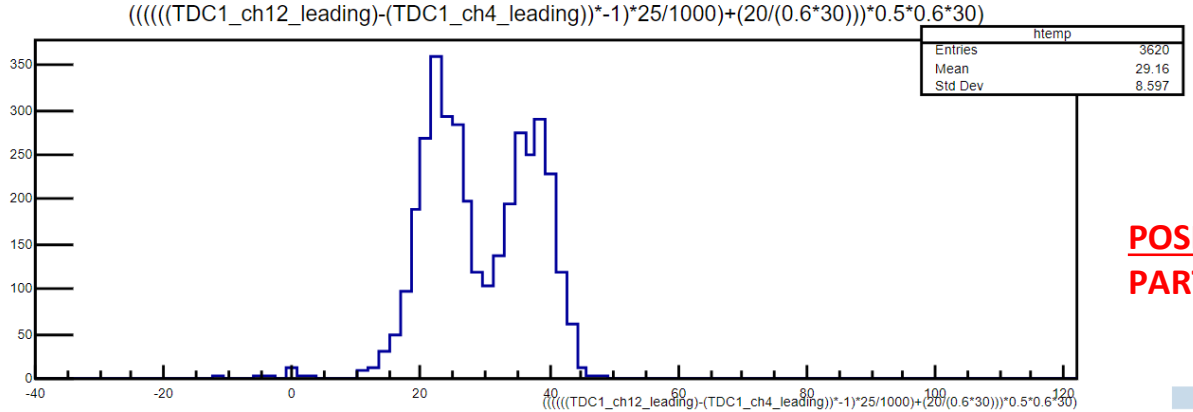


TEMPORAL PROFILE



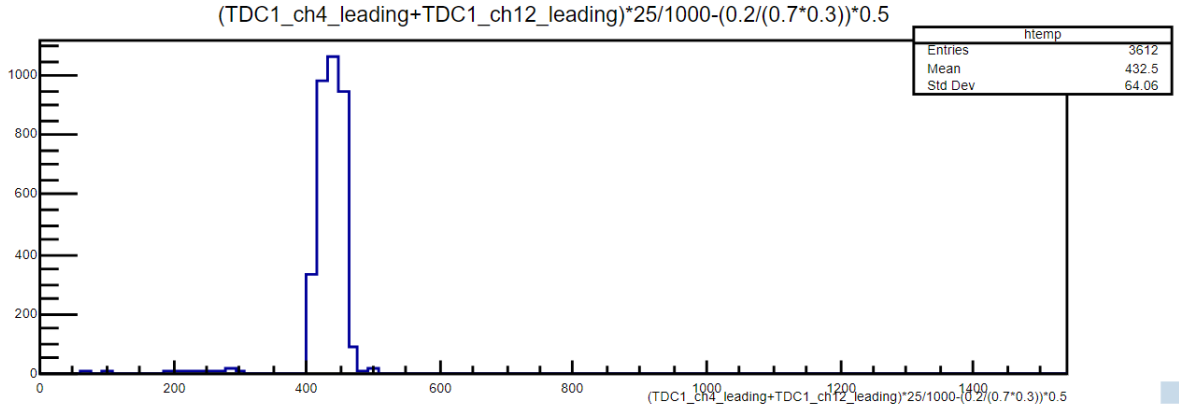


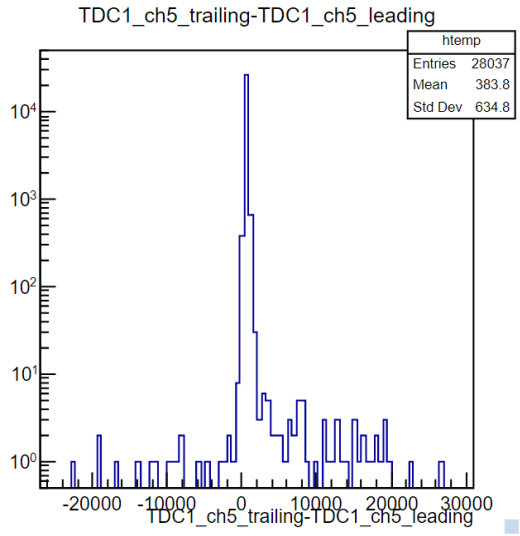
BUT ALSO SOME ISSUES DETECTED…



POSITION PROFILE OF PARTICLES HITTING MRPC

TEMPORAL PROFILE

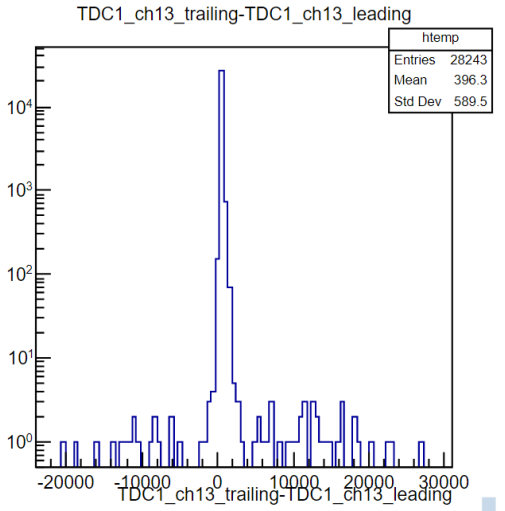




CHARGE DEPOSITED IN BOTH

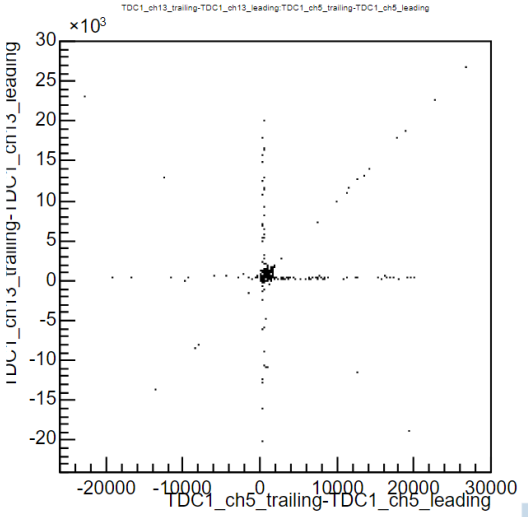
LEFT **RIGHT**

SIDES OF THE STRIP



Mmm…

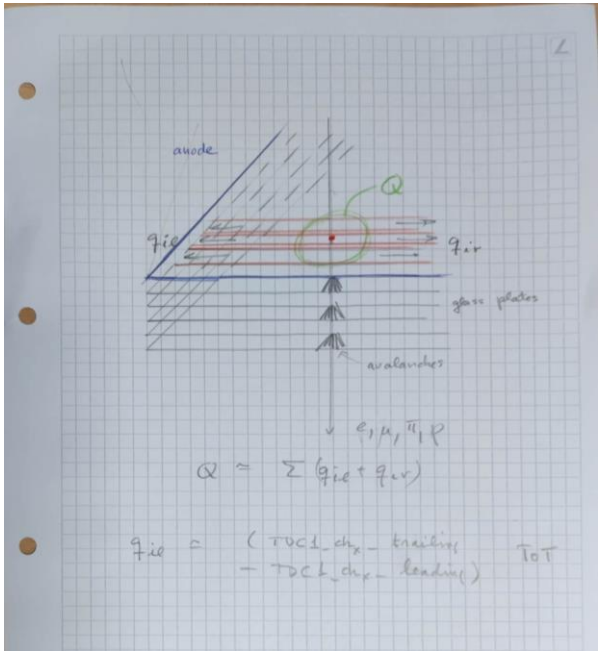
NICE!

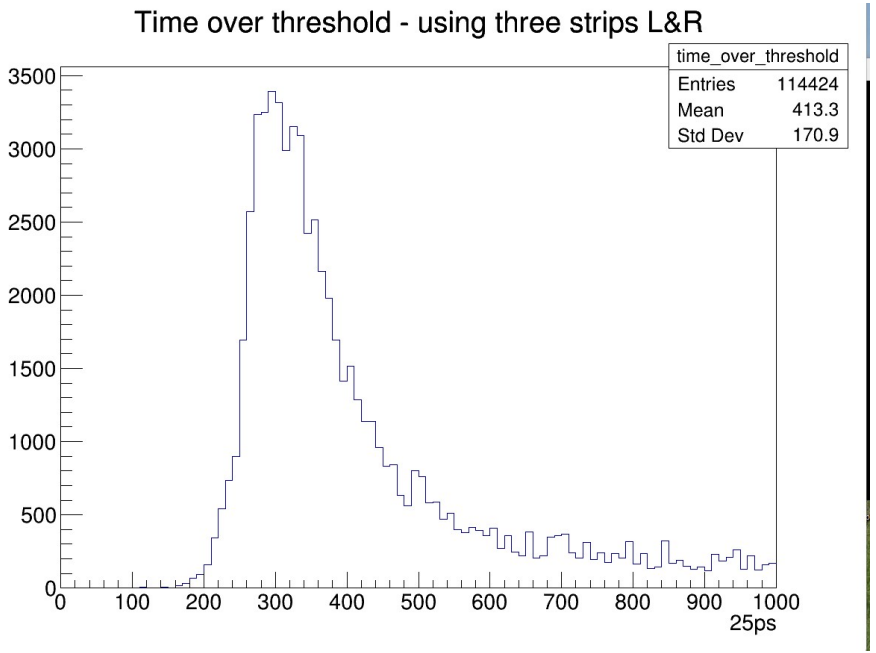


OUR PATH TO THE NOBEL IS STILL OPEN!!

PRIZE

1) Obtain a more **Ligit** way to obtain time over **Threshold**

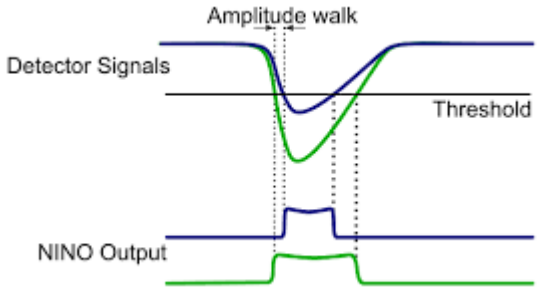




Consider **AVERAGE** between **STRIPS**

Fit to **Landau Distribution**

2) **Relationship** Between **Threshold** and **Induced Charged**

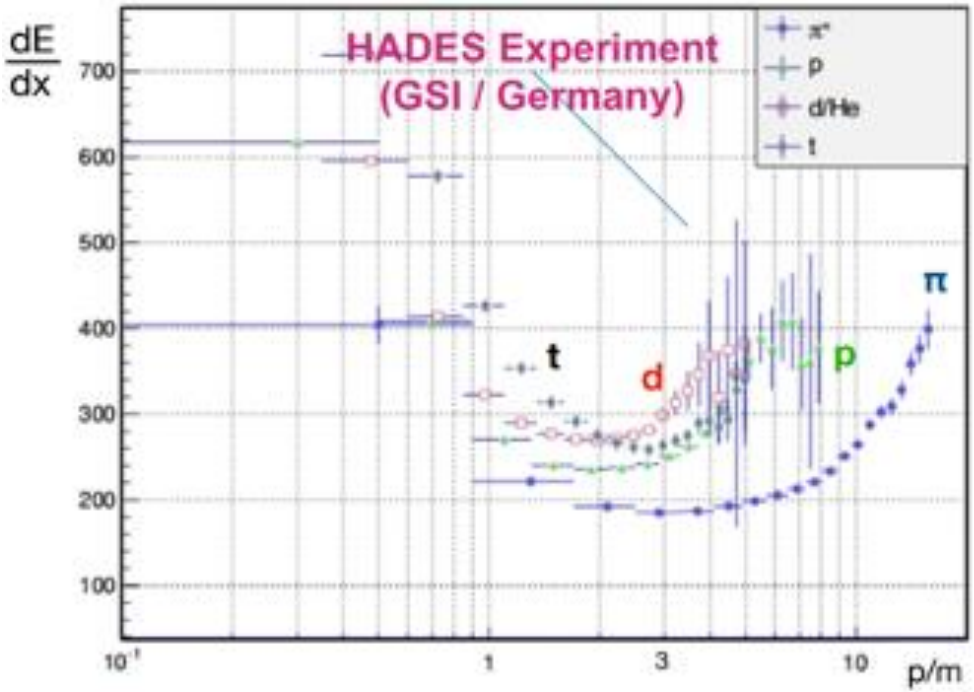


- Built a **Circuit** to obtain **Charge** from **Nino Card**
- **Fit** different **time Thresholds** to their **Induced Charge**

3) **Use Different Gases Mixtures Data**

- **50 % Helium - 50 % Ecofreon Gas**
- **40 % Helium - 60 % Ecofreon Gas**
- **Check any difference on Threshold**

4) Check **MRPC Mass Dependency** through **Induced Charge**



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Any Questions? Because we do have lot