

Preamble

As agreed, I have started to register to the ECFA meeting in Paris.
I have submitted an abstract to try to get a talk for GRAiNITA.

I think that we should aim at showing preliminary plots obtained on the test beam.

We would show :

Hits from muon beam to demonstrate that we confirm the estimate on nPhE from cosmics muons

Something with the new HL comparing with water ?

That we see the fibers ... and eventually if possible give an idea of the non-uniformity ???

A n^{th} look at the test beam data or do we see what we expect ?

General requirements :

- v3 processing
- general cuts : `("(muonType==20&&eventType==4)&&hitTotCor<1500 &&diffTrack2<1") ;`
- `muonType==20` (crosses all GRAINITA)

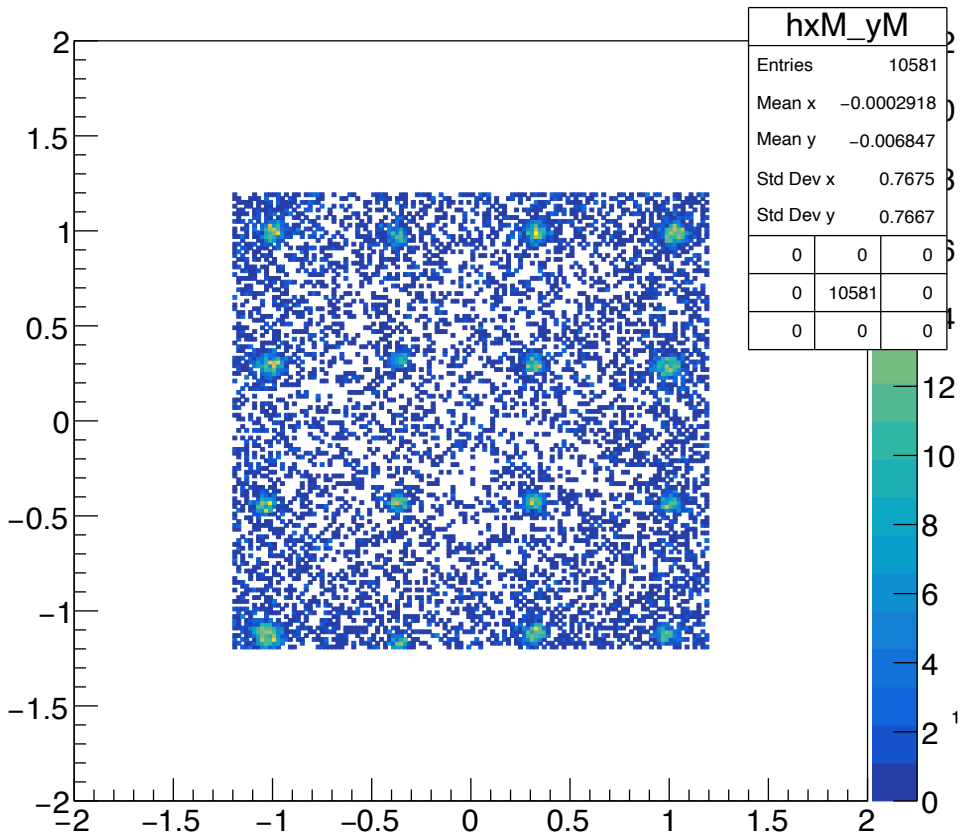
- Fiber size
- Signal shape
- Signal around the fiber and towards uniformity

A lot of plots in the backup slides if you have insomnia ;)

Muon 59 – 60, Troll1 HL bad SSIB

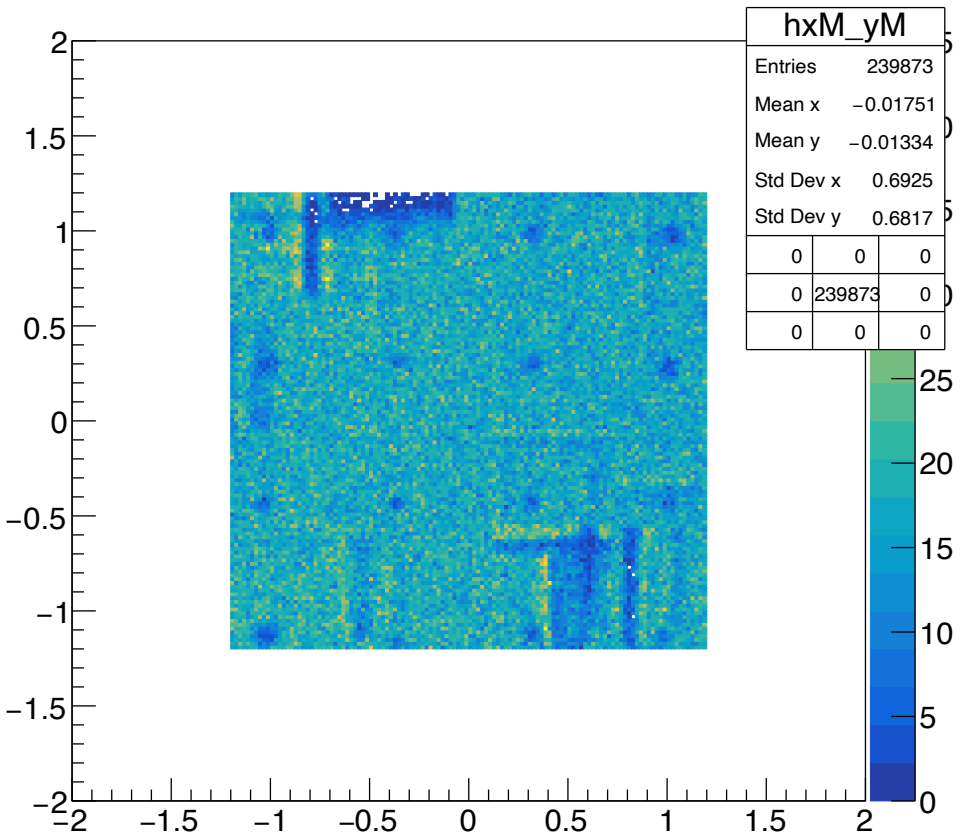
hitTotCor<200

xM vs yM

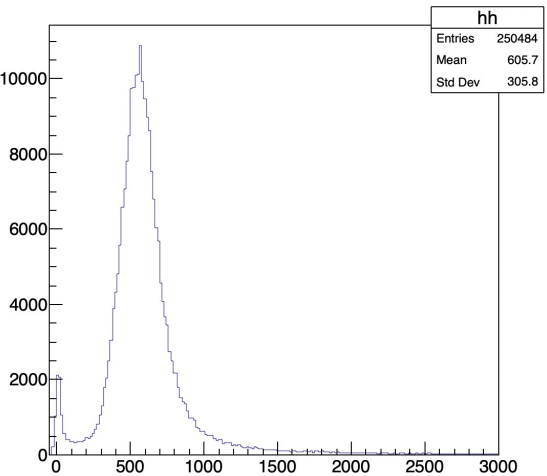


hitTotCor>200

xM vs yM

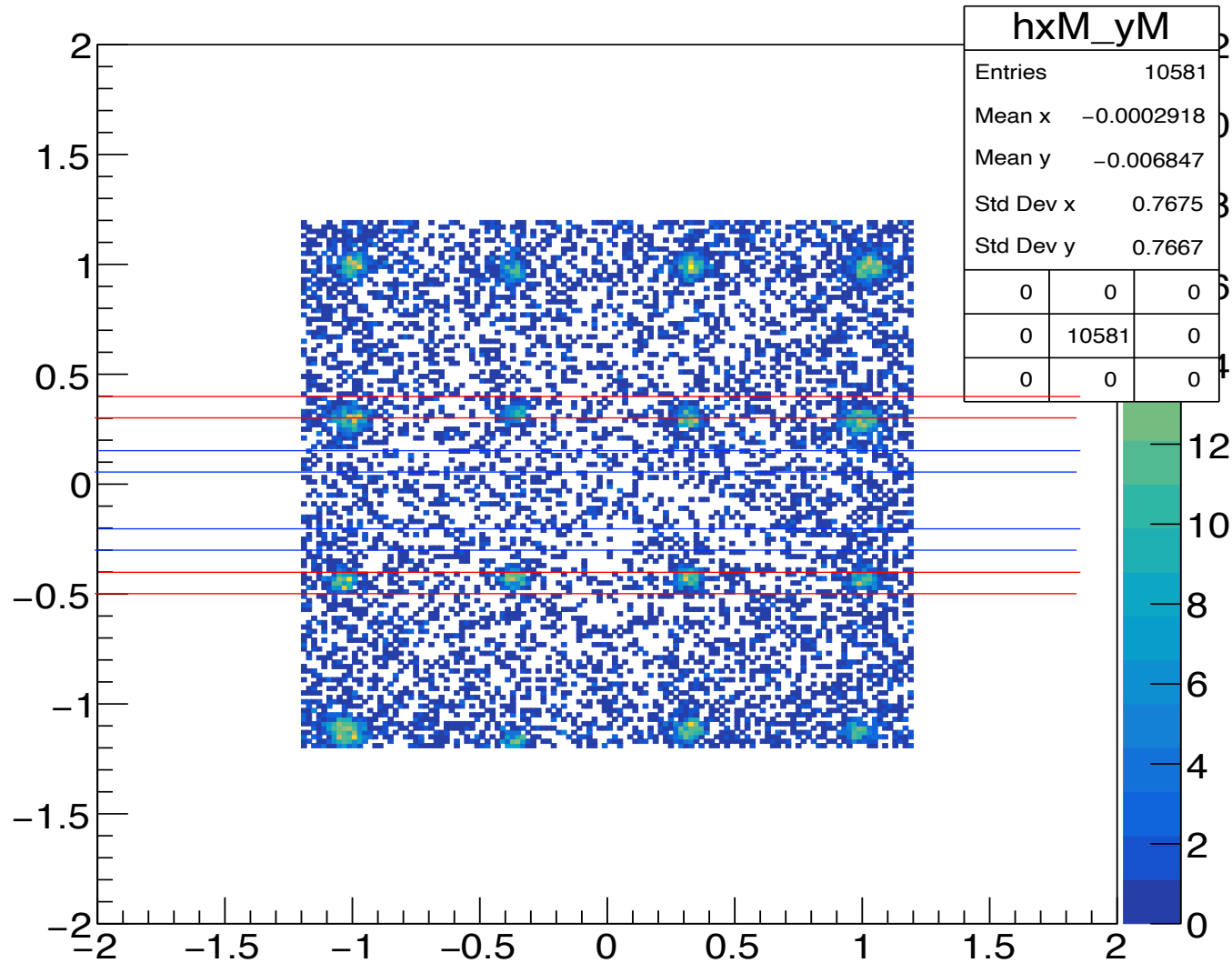


hitTotCor

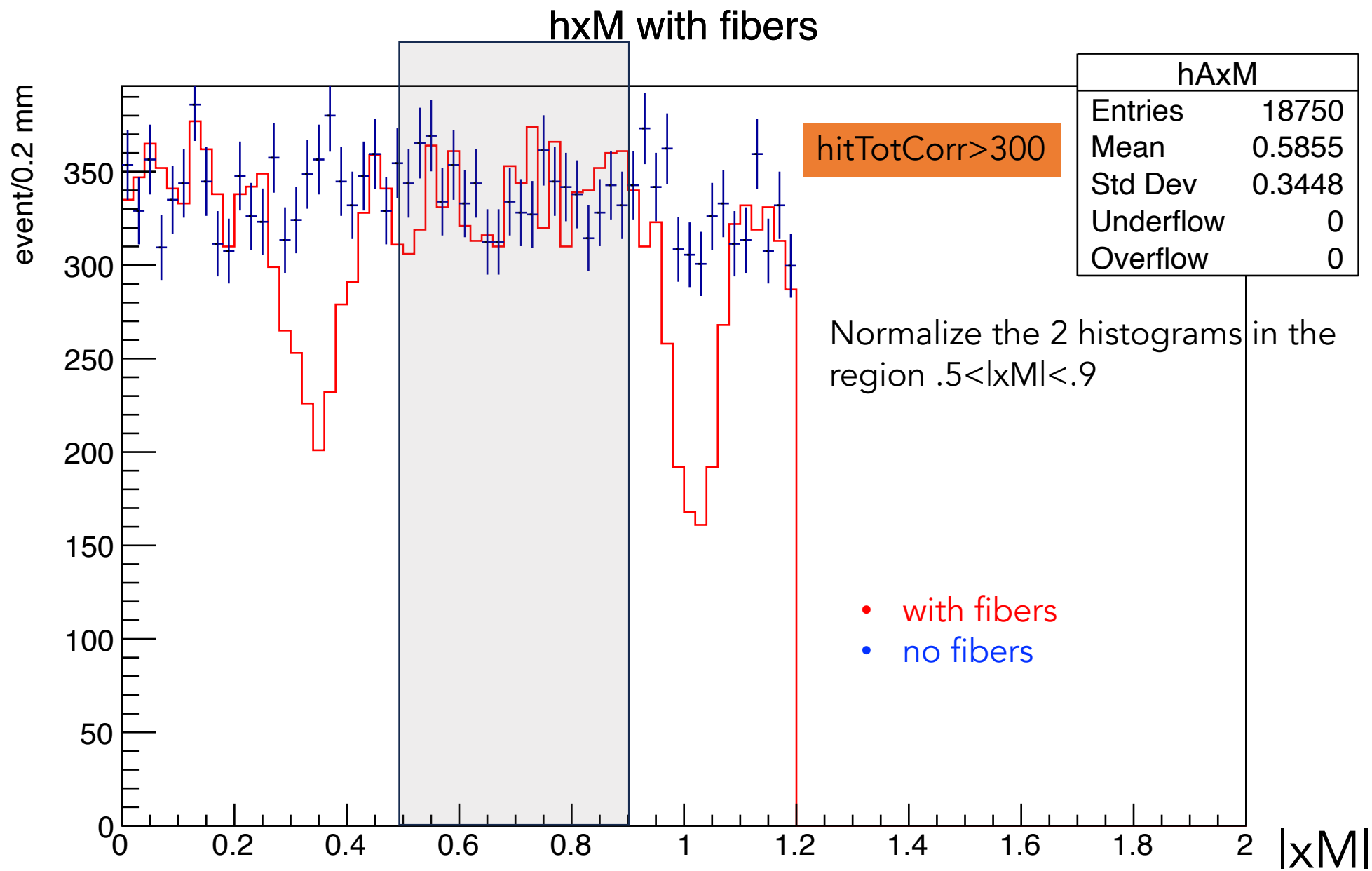
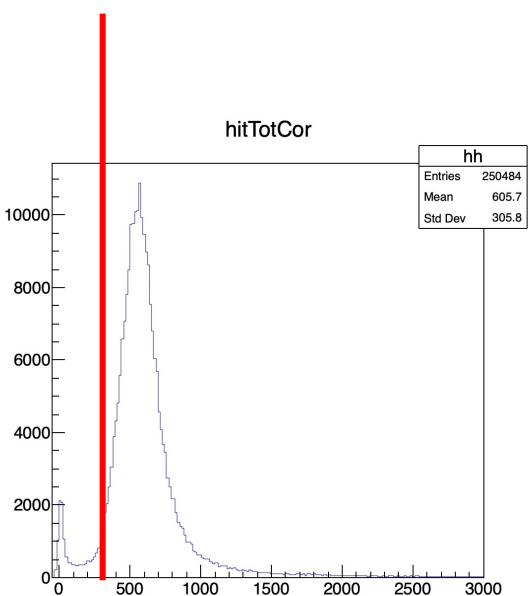


Focus on:

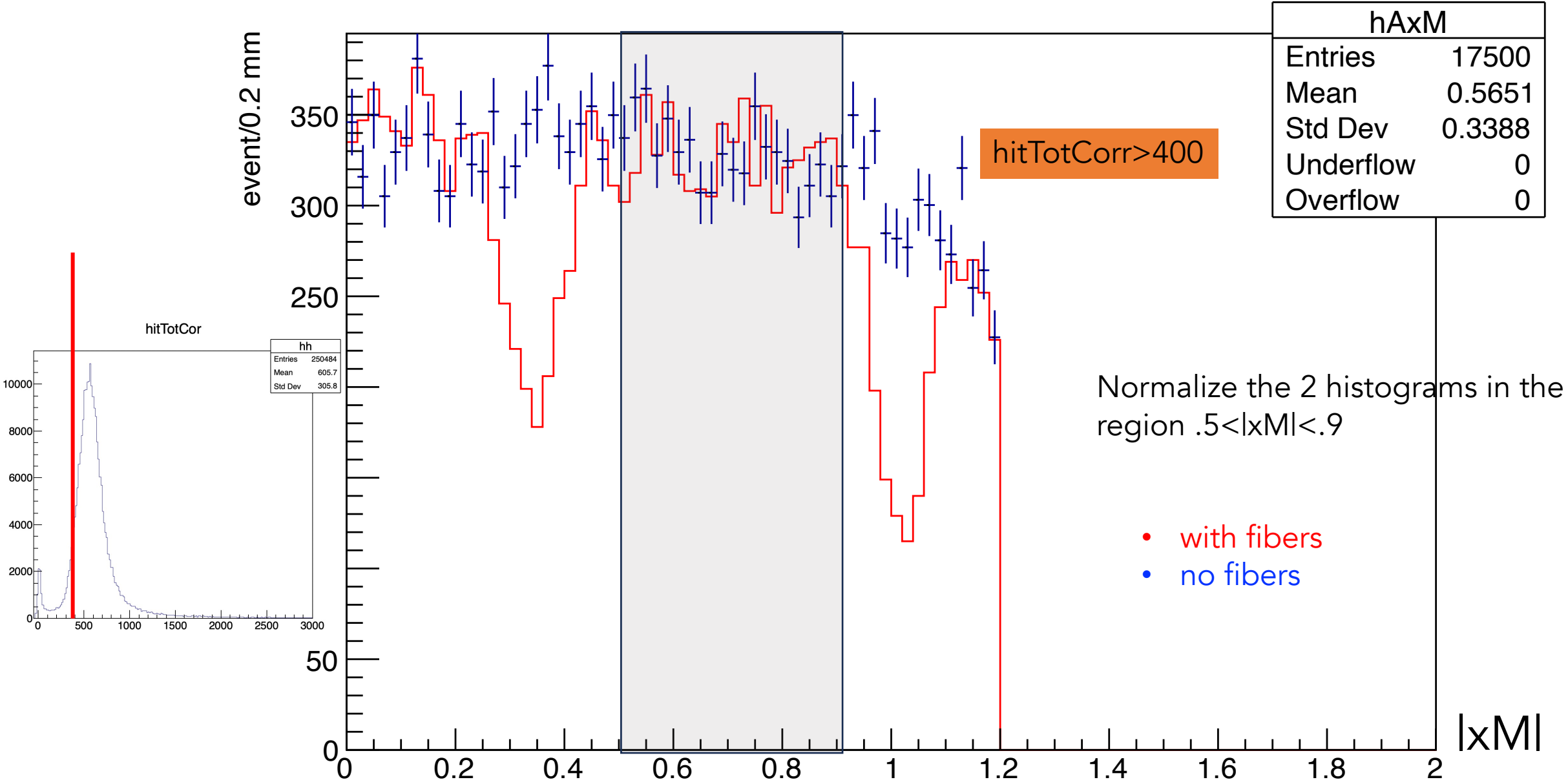
xM vs yM



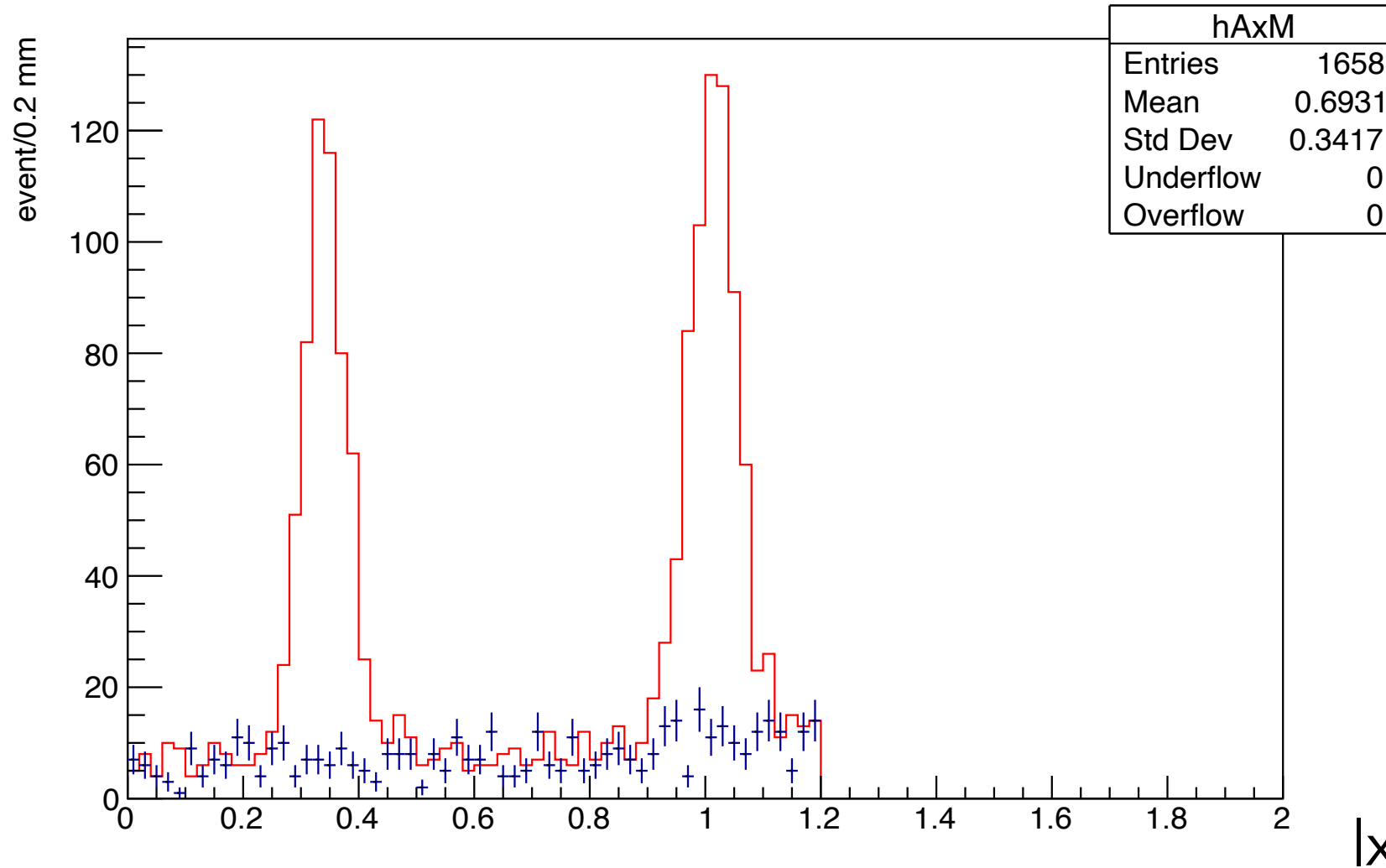
- Use $|x_M|$
- Define 2 zones :
 - with fibers (2 red regions : $-.5 < y_M < -.4$ or $.4 < y_M < .5$)
 - no fibers (2 blue regions : $-.3 < y_M < -.2$ or $.05 < y_M < .15$)
- Bin of 0.2 mm -> fiber over 5 bins in principle



hxM with fibers



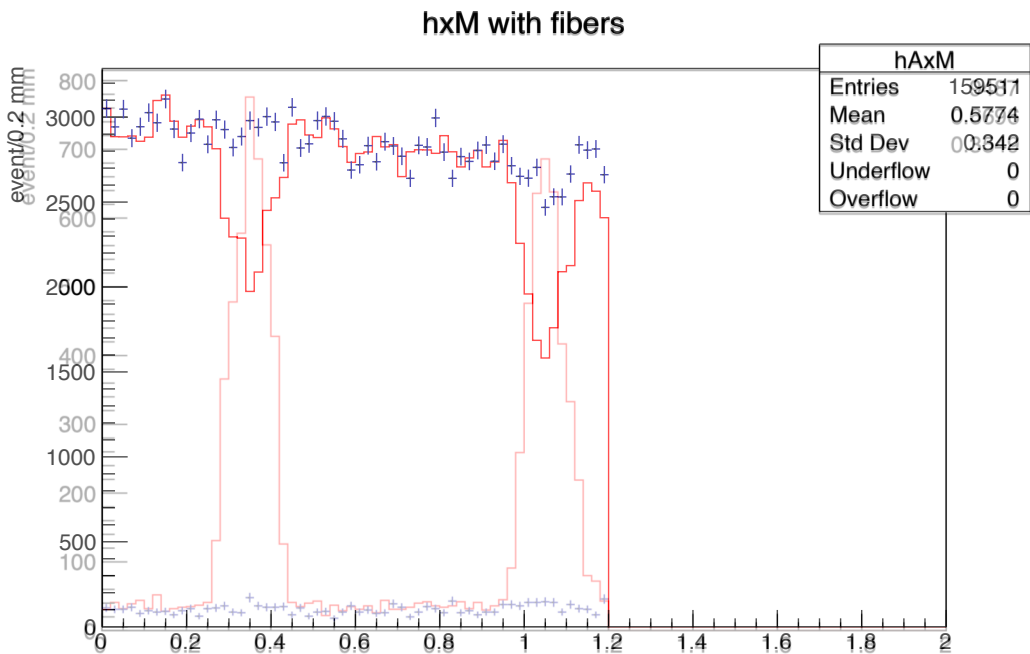
hxM with fibers



hitTotCor<200.
NO normalisation !

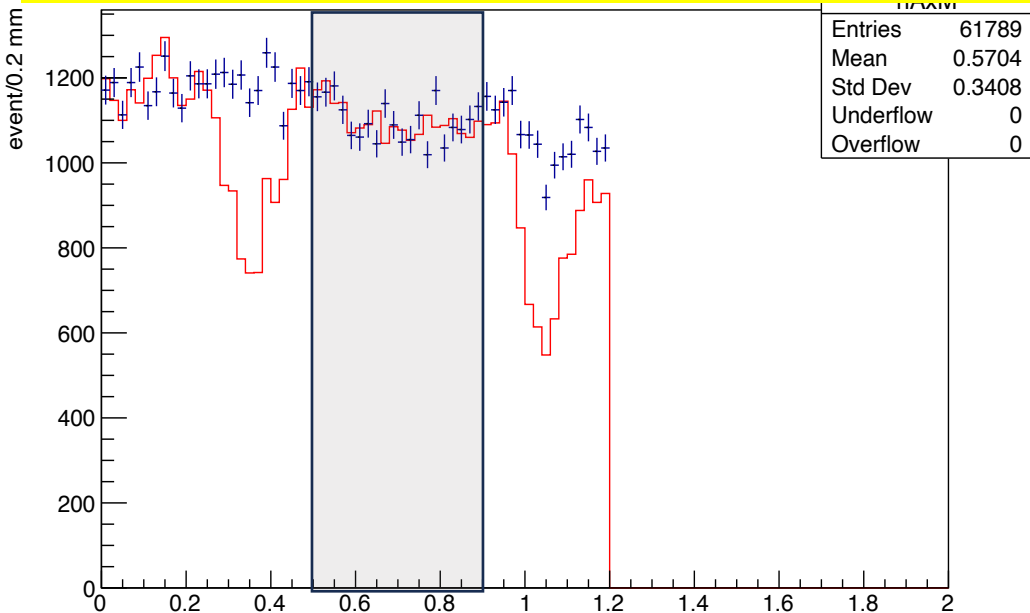
Fibers : ~ 1.8 to 2mm ?

Pion runs 41 42 43 Troll1 Water good SSiB

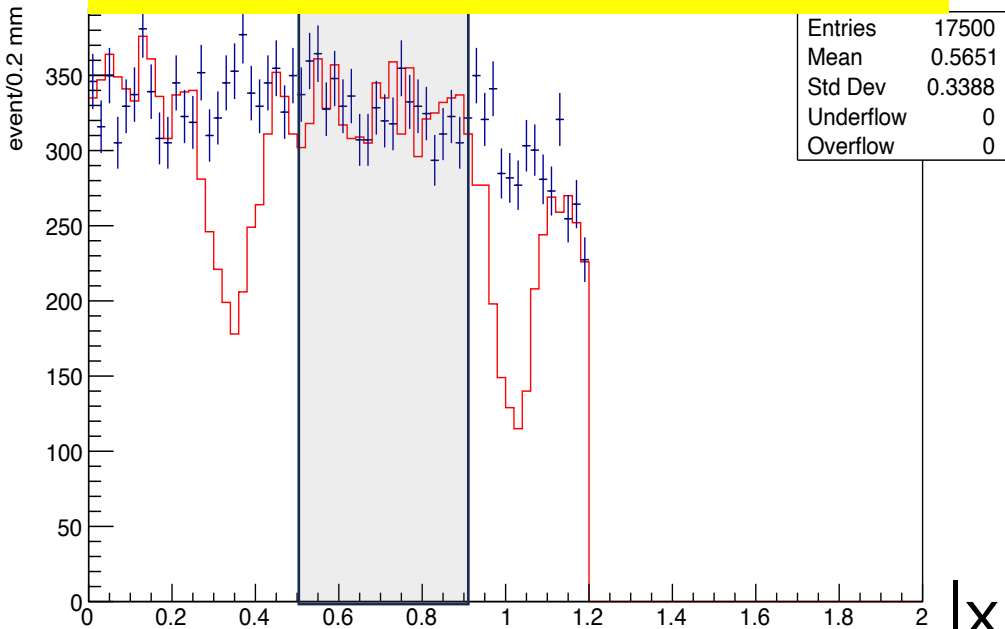


- with fibers
- no fibers

Pion 50 – 51, Troll1 Water – good SSiB

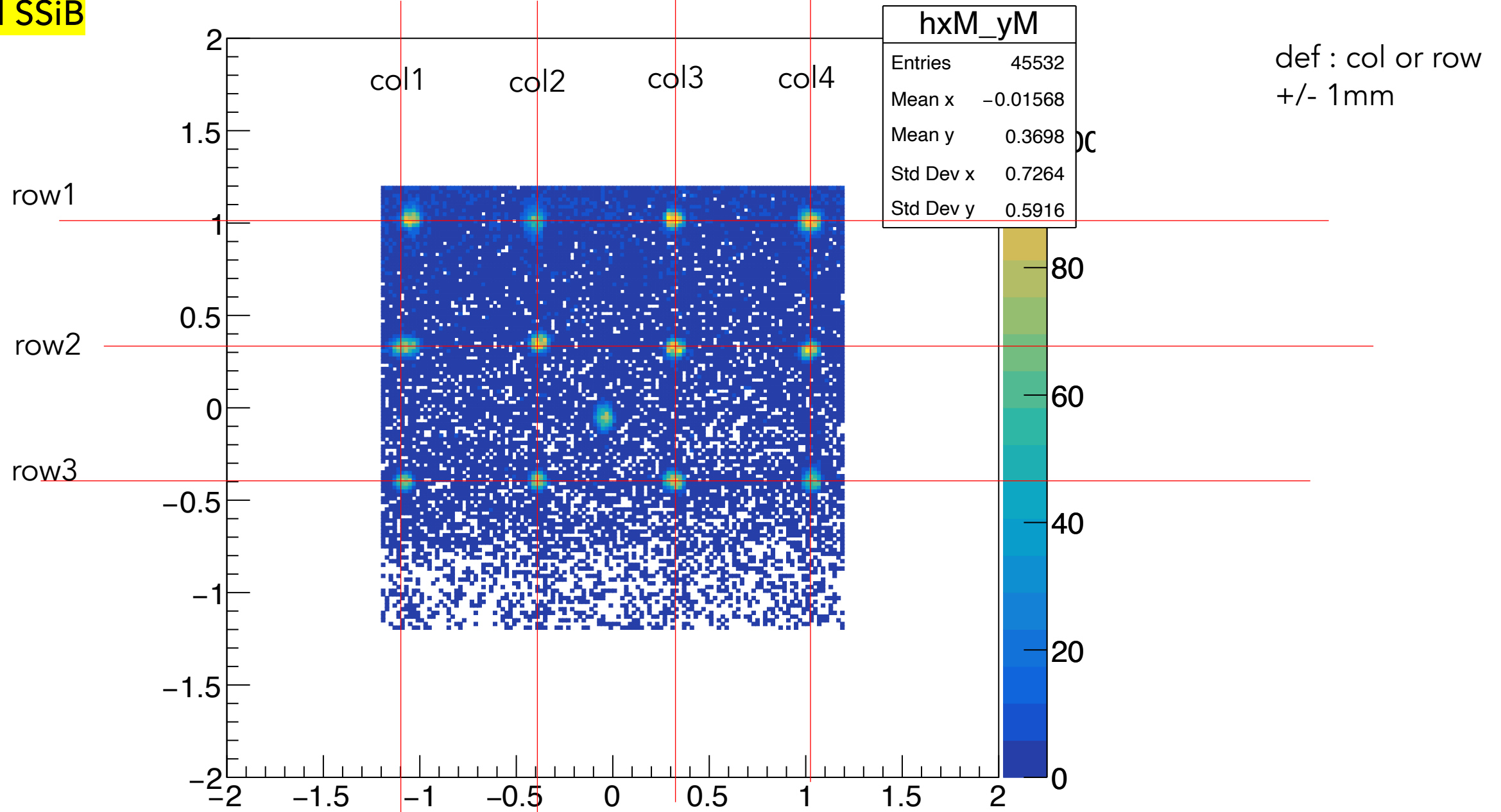


Muon 59 – 60, Troll1 HL bad SSiB

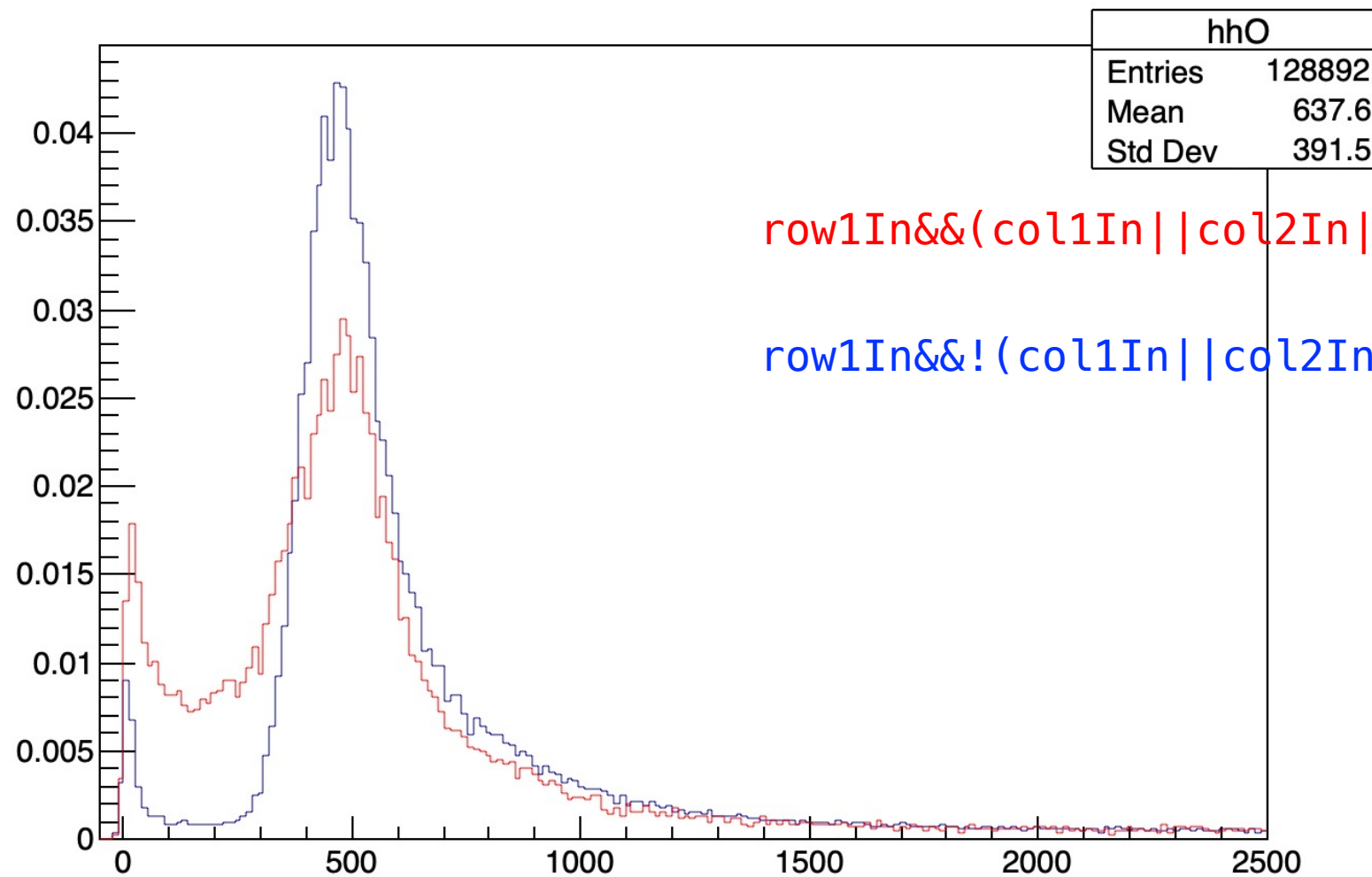


Pion runs 41 42 43 Troll1 Water
good SSiB

xM vs yM



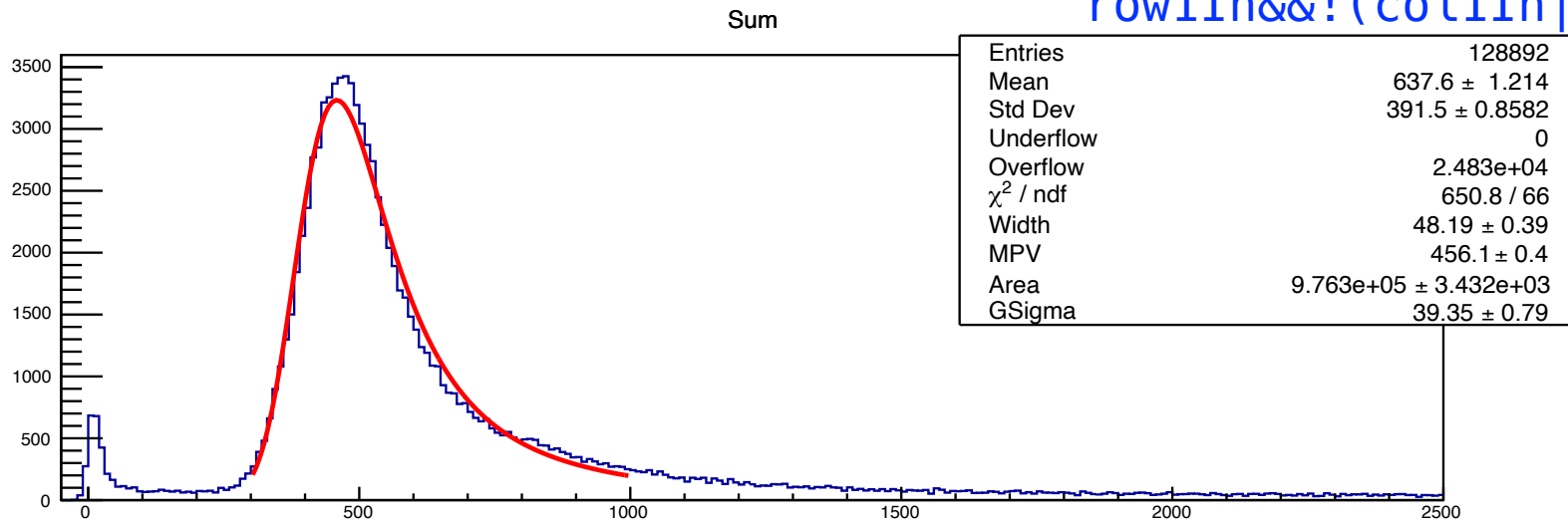
hitTotCor {(((muonType==20&eventType==4))&&(yM>.9 && yM<1.1))&&(!(((xM>-1.15 && xM<-.95)|(xM>-.5 && xM<-.4)|(xM>.25 && xM<.45)|(xM>.95 && xM<1.15))))}



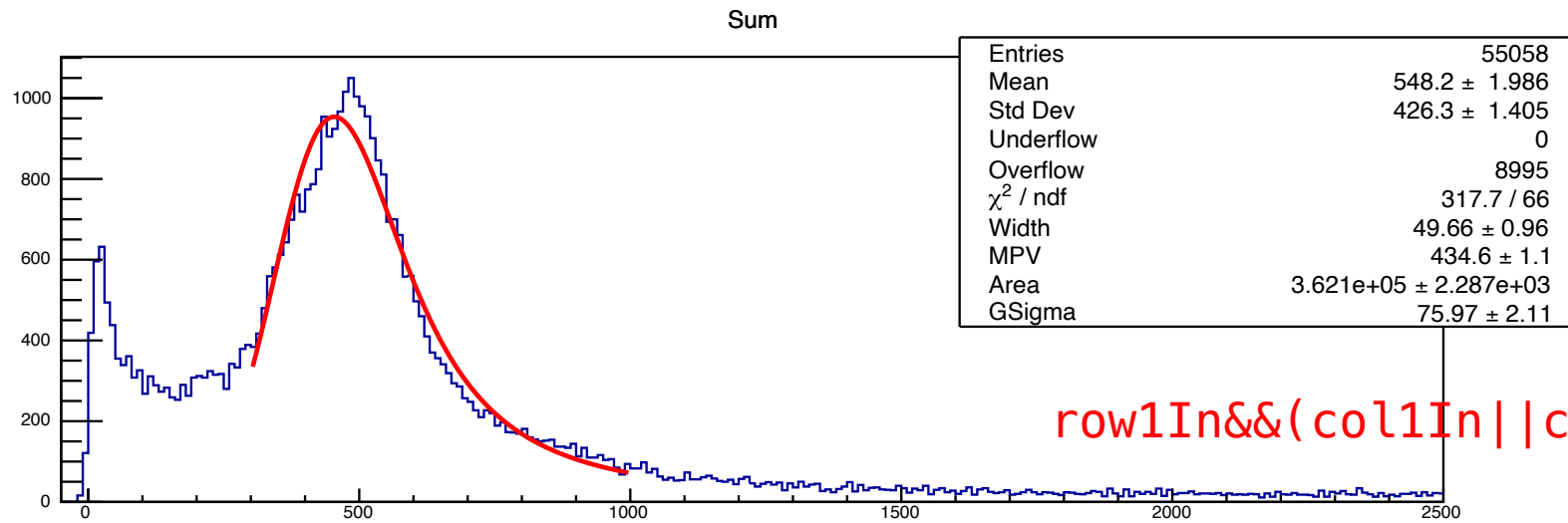
row1In&&(col1In||col2In||col3In||col4In)

row1In&&!(col1In||col2In||col3In||col4In)

row1In&&!(col1In||col2In||col3In||col4In)

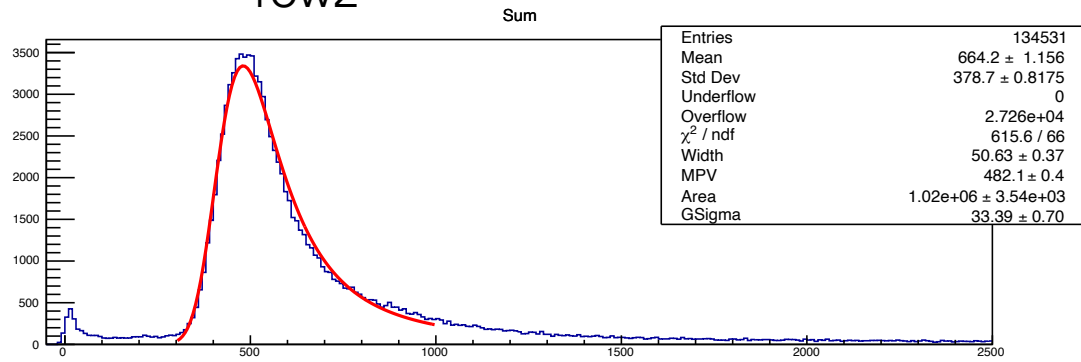


row1

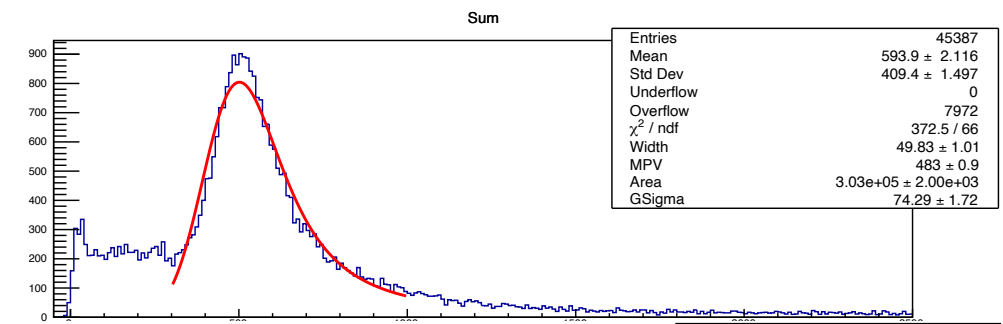
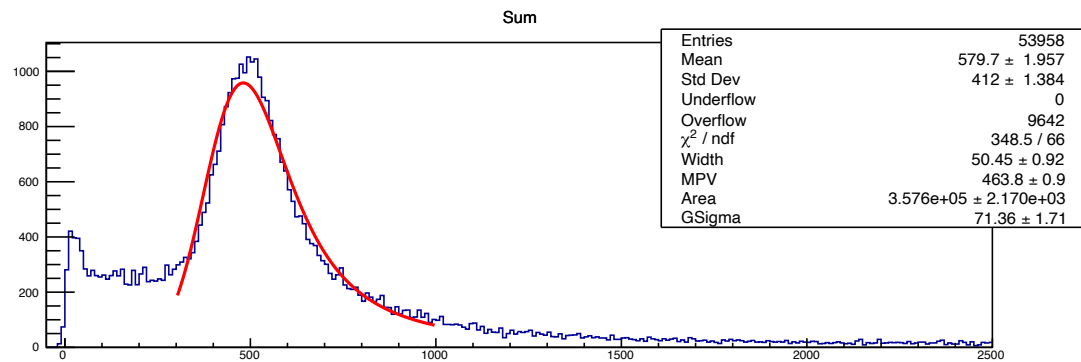
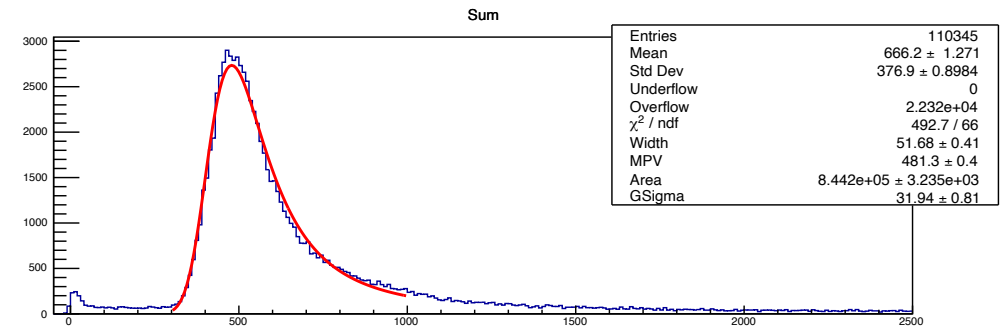


row1In&&(col1In||col2In||col3In||col4In)

row2

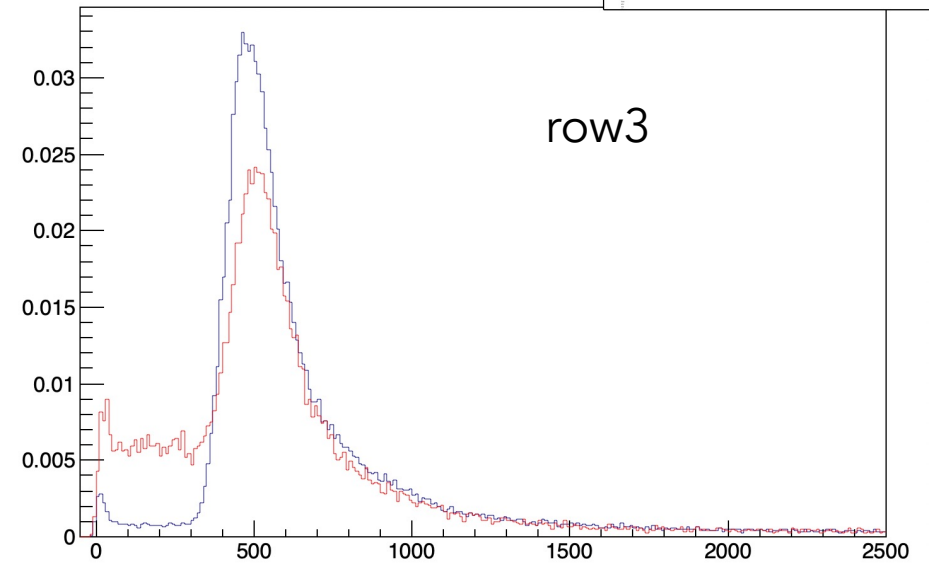


row3

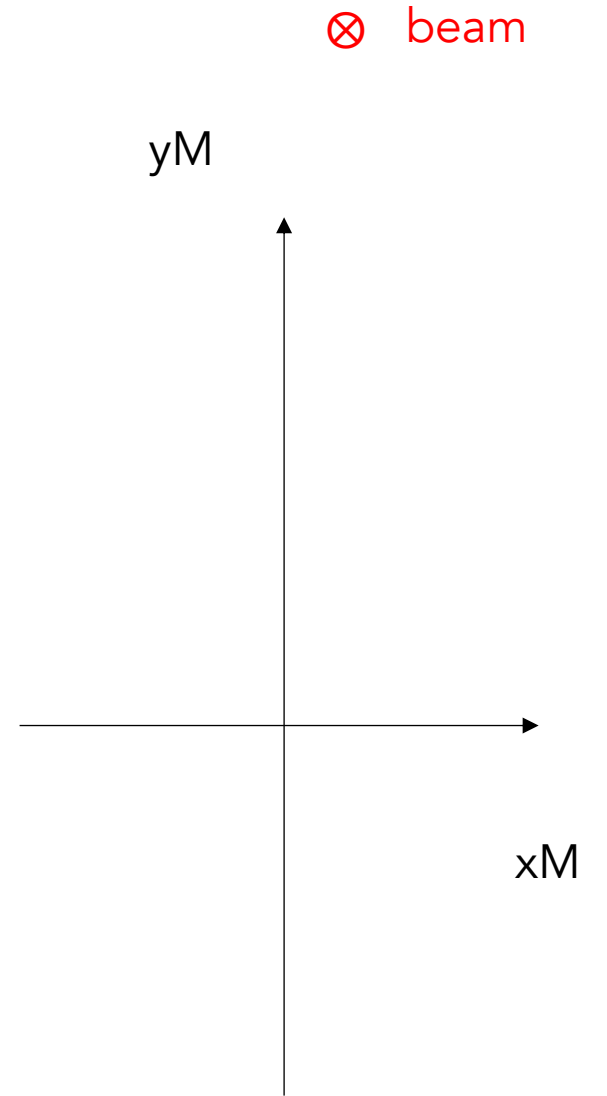


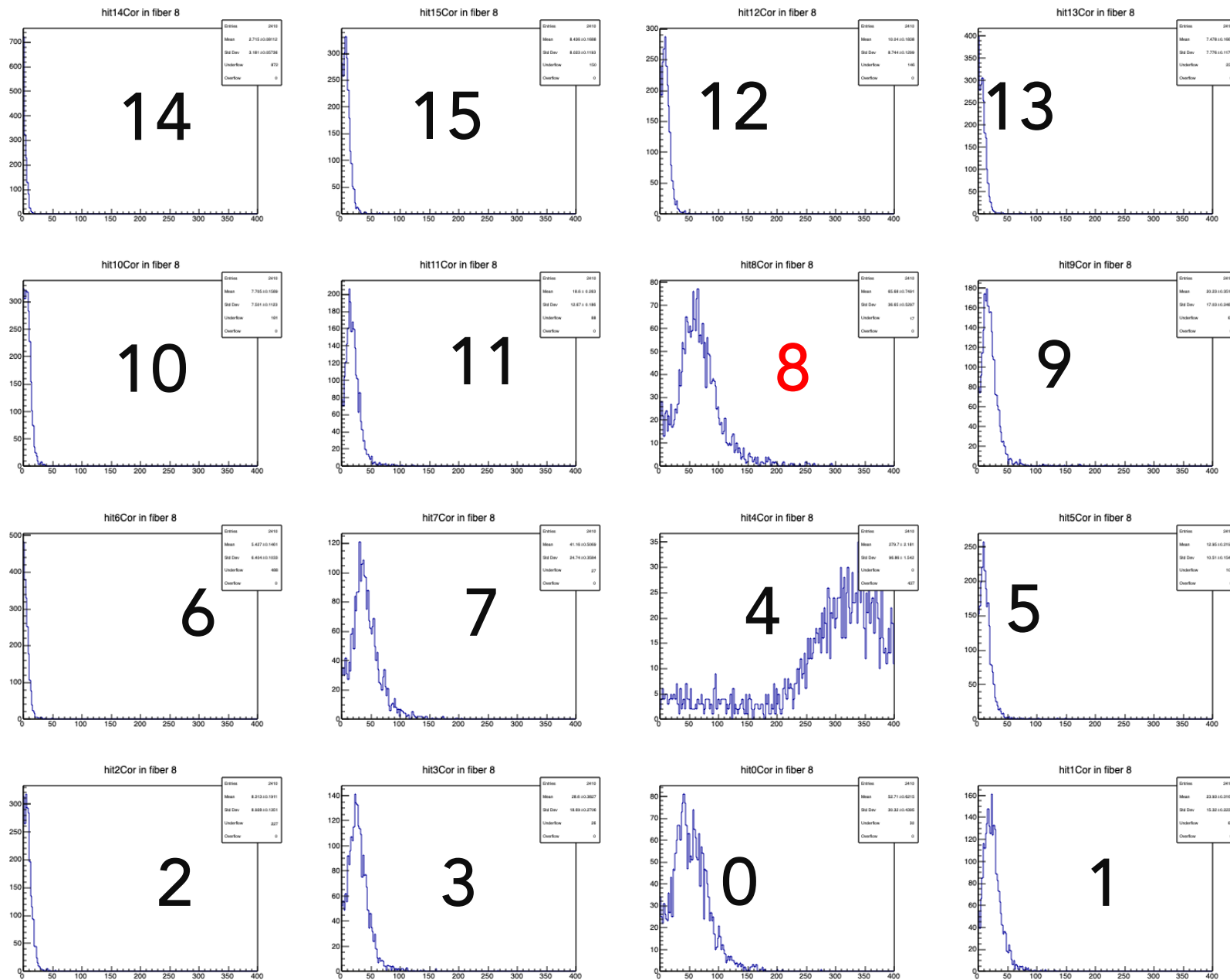
Row	MPV Out of fibers	MPV In fibers
1	456	435
2	482	464
3	481	483

row3



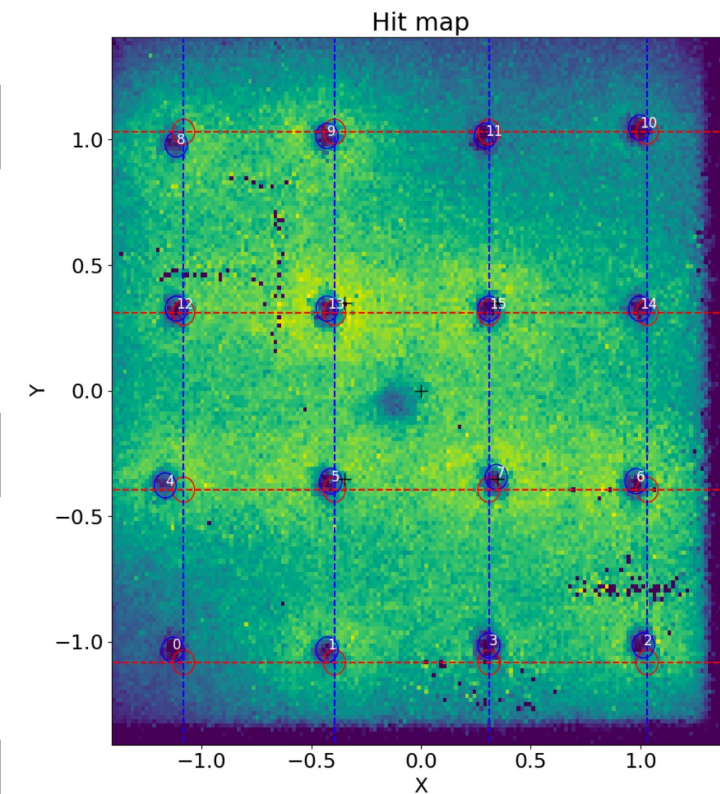
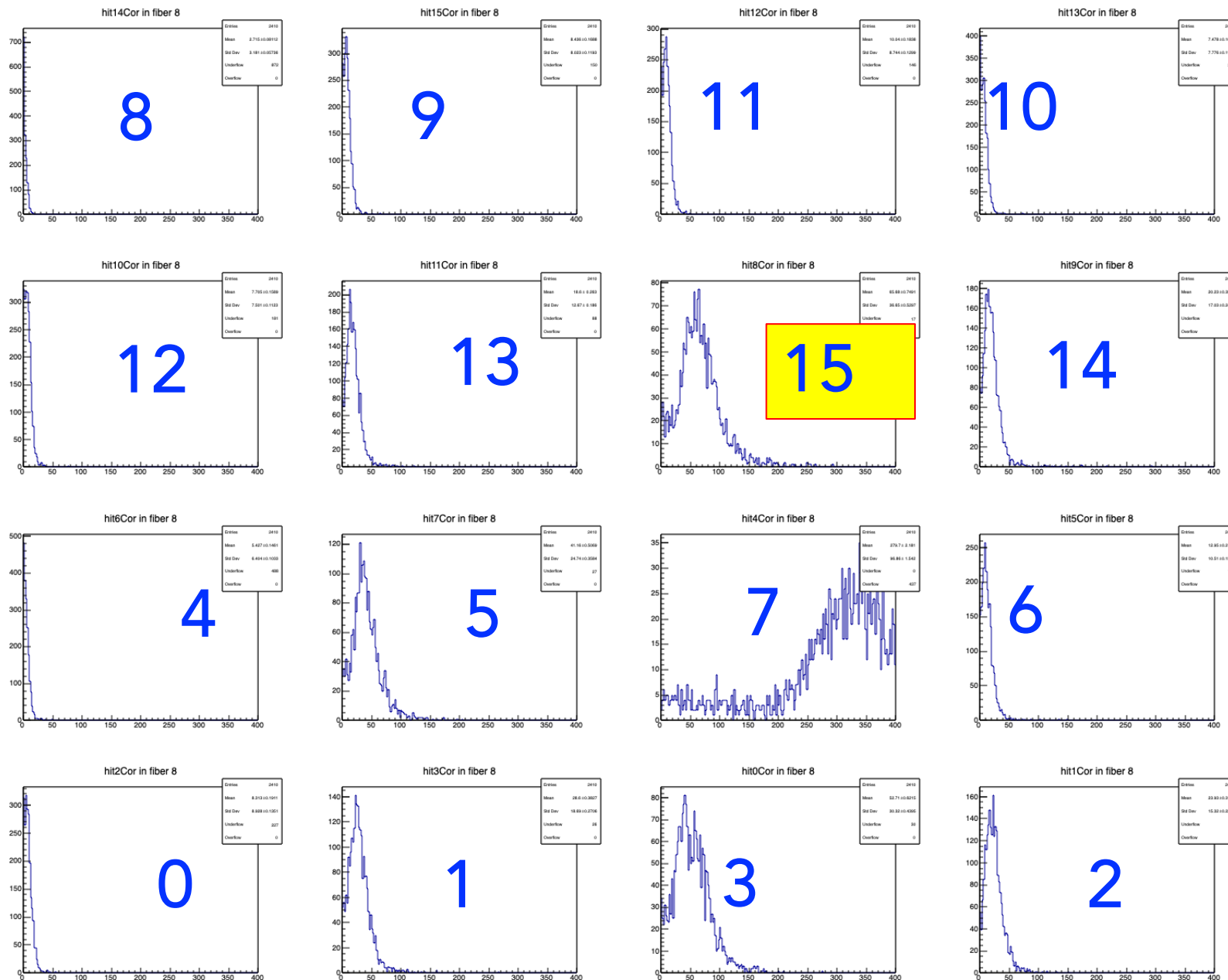
What I think is the numbering



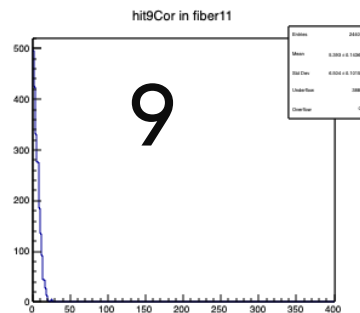
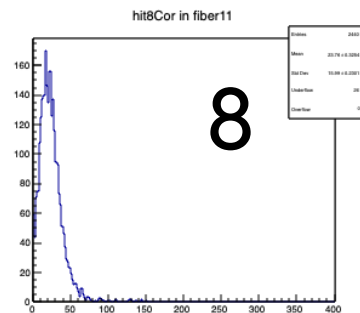
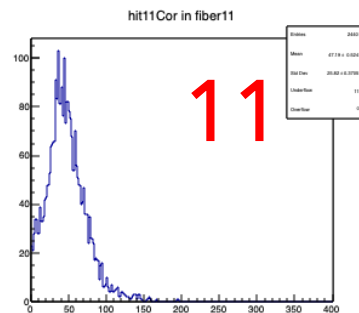
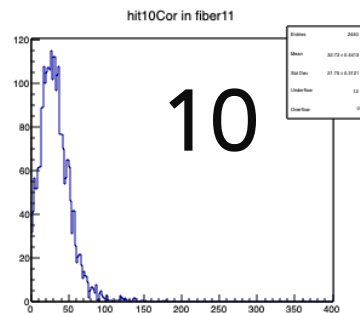
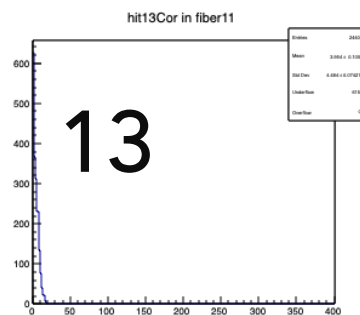
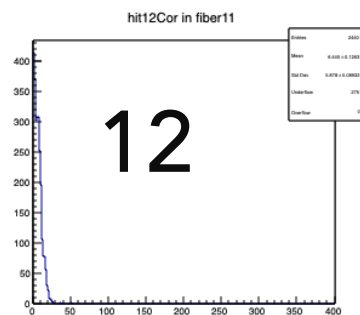
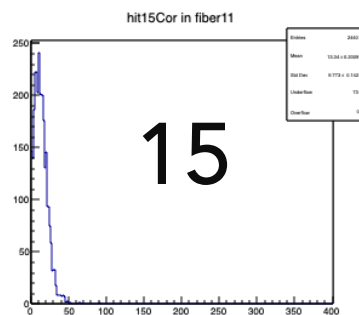
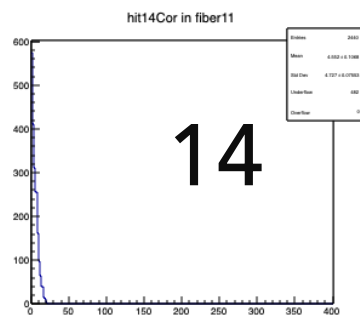


Muon 59 – 60
Troll1 HL bad SSIB

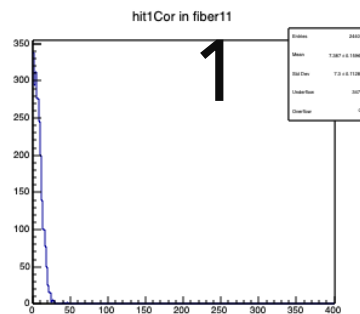
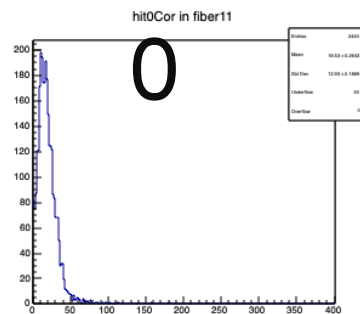
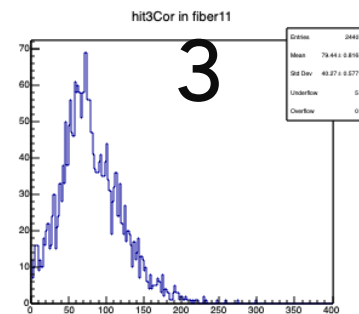
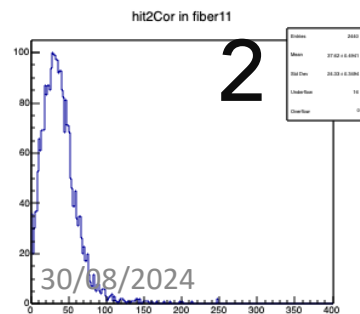
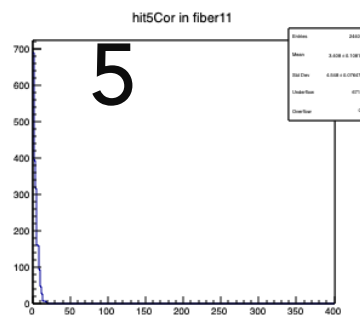
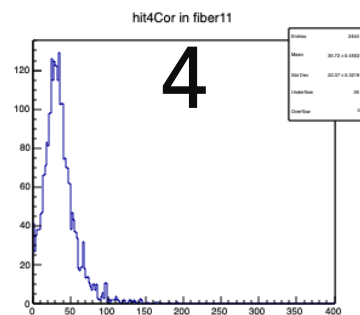
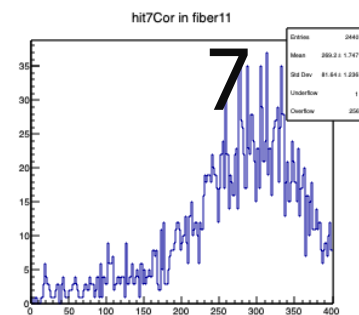
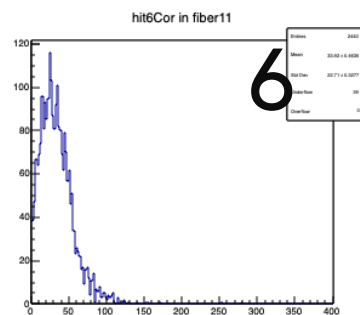
Numeros Herve



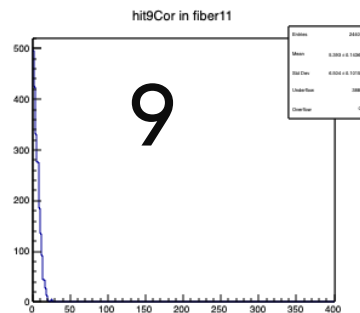
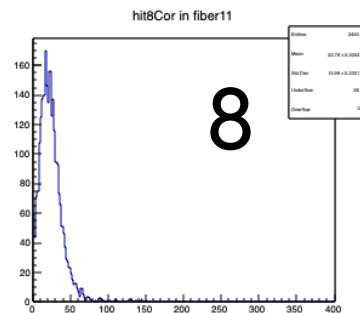
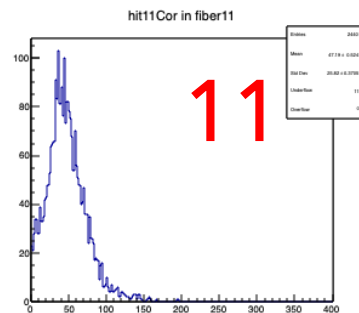
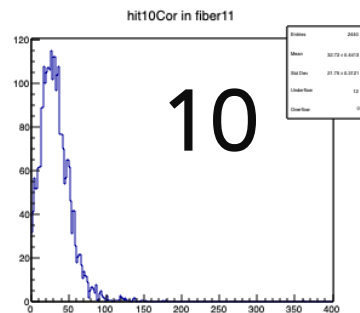
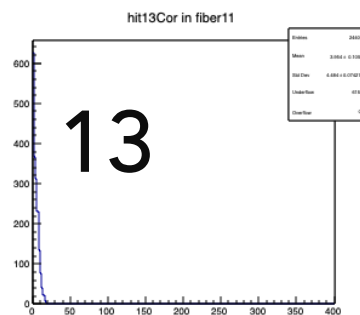
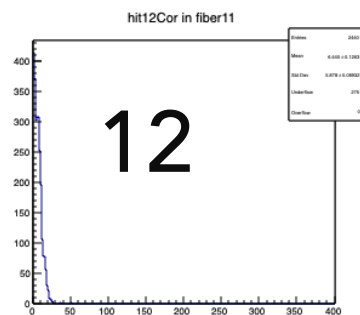
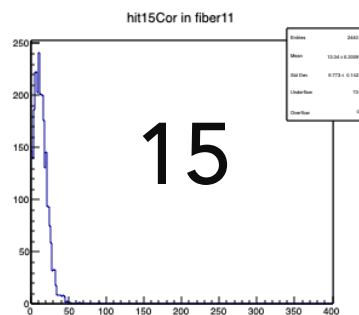
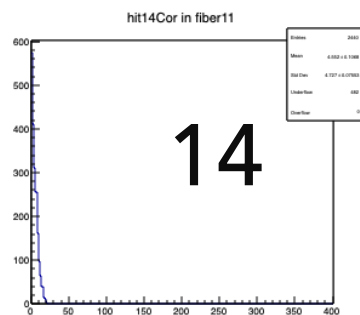
Muon 59 – 60
Troll1 HL bad SSIB



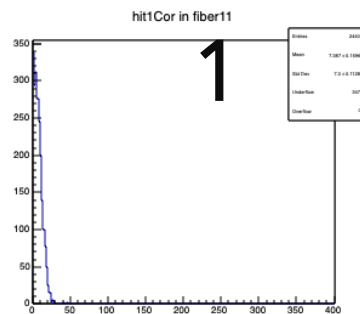
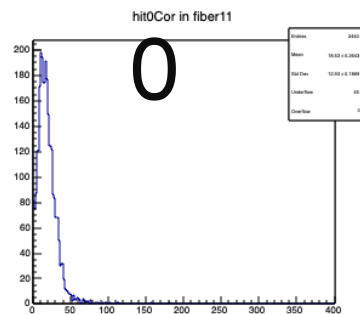
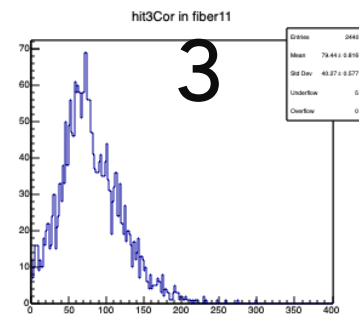
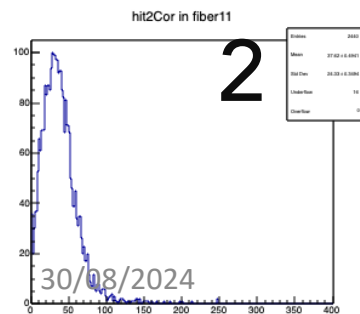
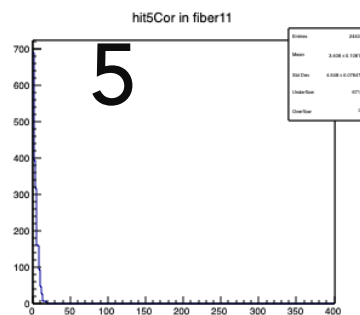
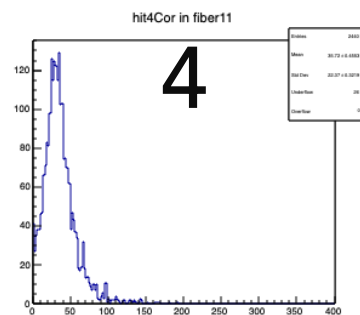
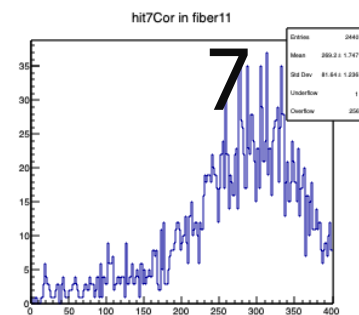
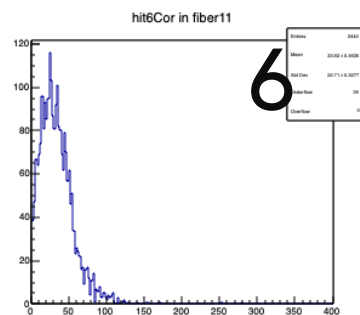
Muon 59 – 60
Troll1 HL bad SSIB



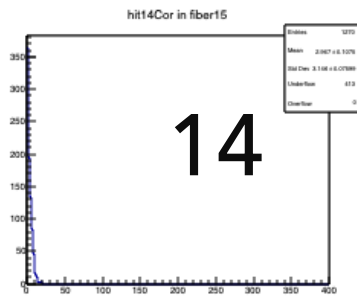
30/08/2024



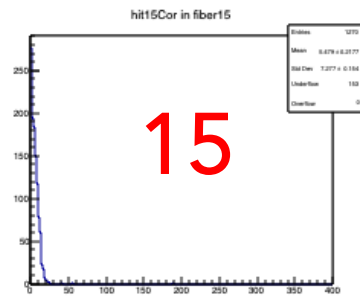
Muon 59 – 60
Troll1 HL bad SSIB



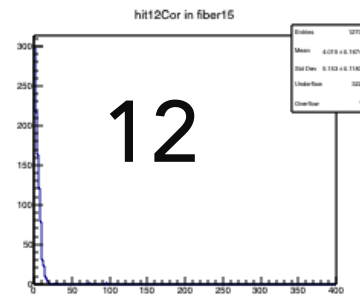
30/08/2024



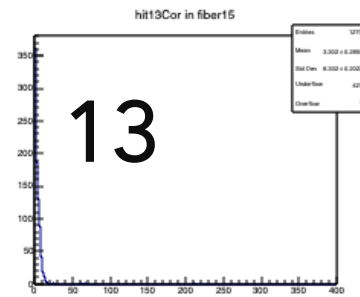
14



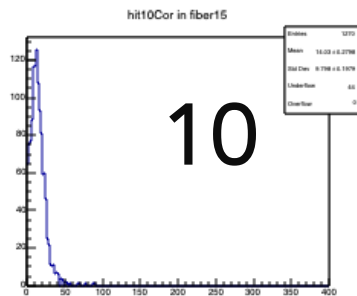
15



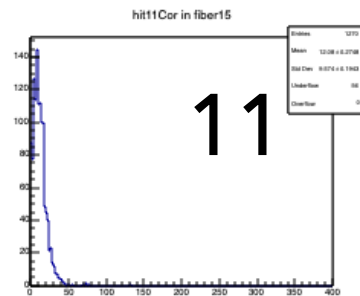
12



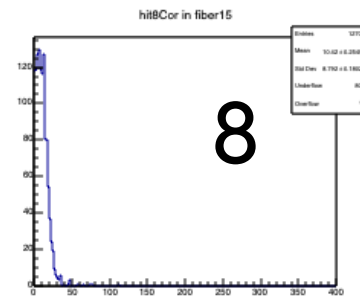
13



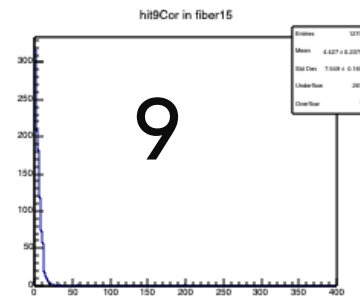
10



11

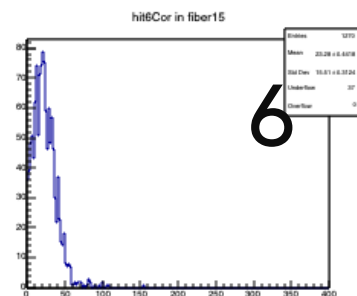


8

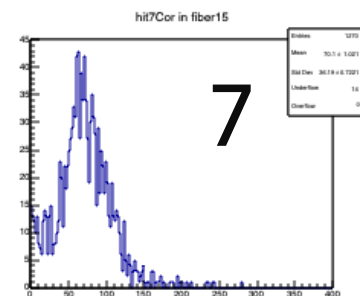


9

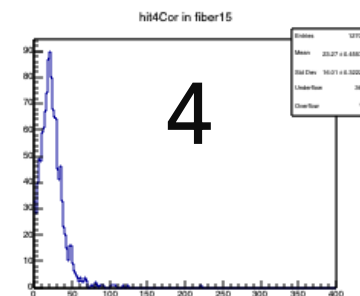
Muon 59 – 60
Troll1 HL bad SSIB



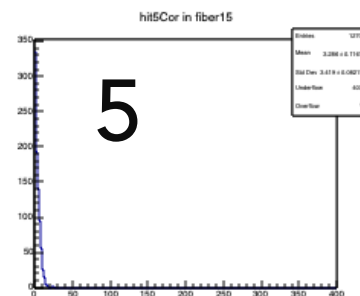
6



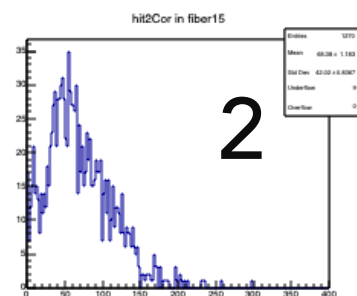
7



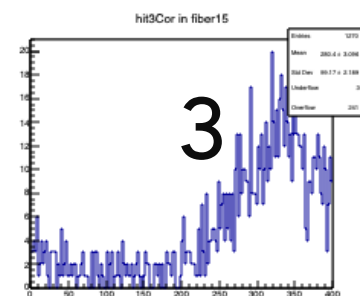
4



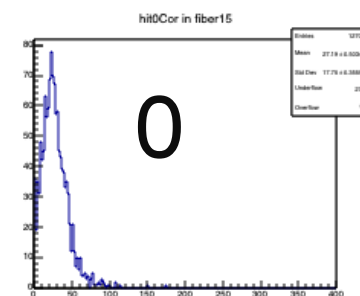
5



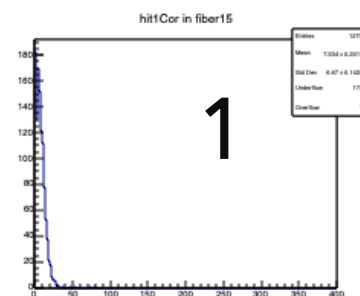
2



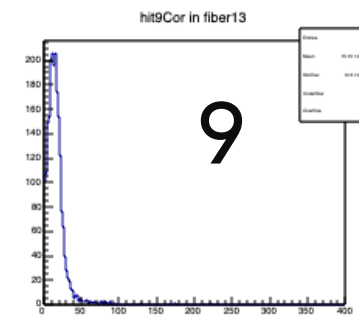
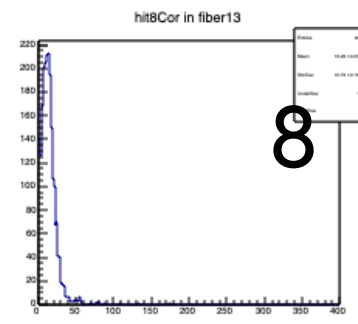
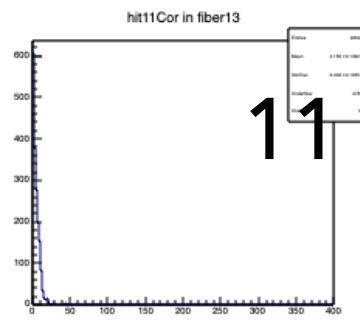
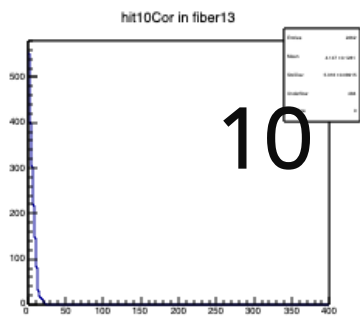
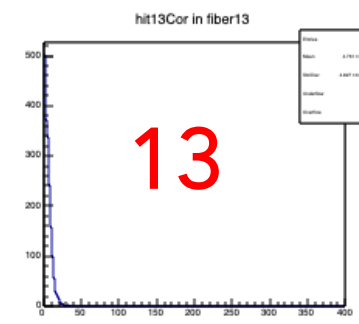
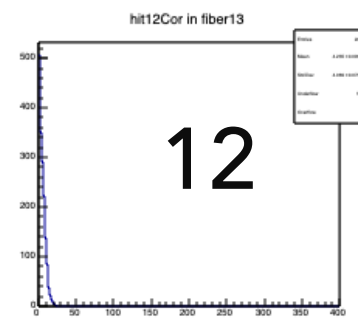
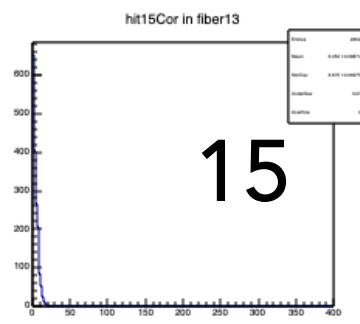
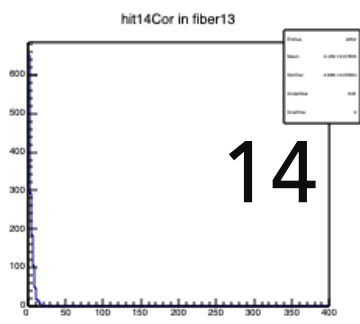
3



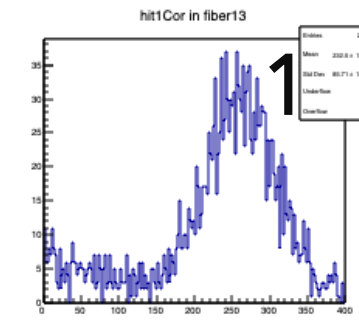
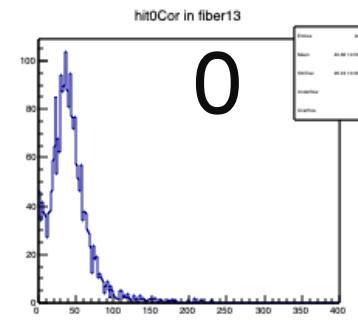
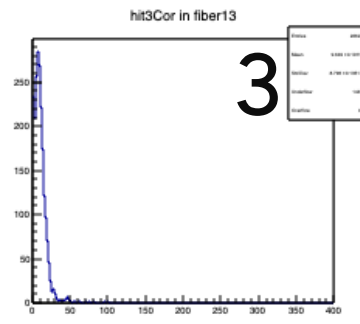
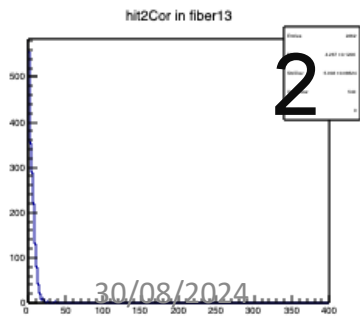
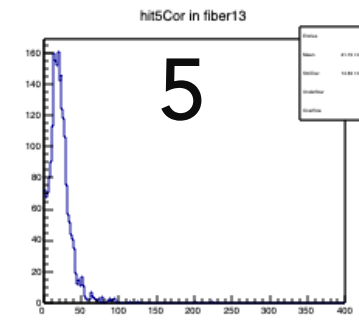
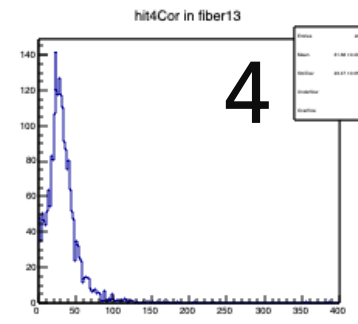
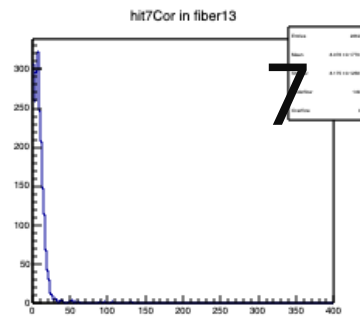
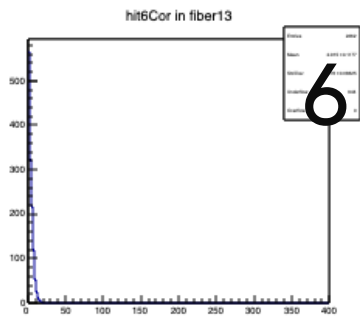
0



1

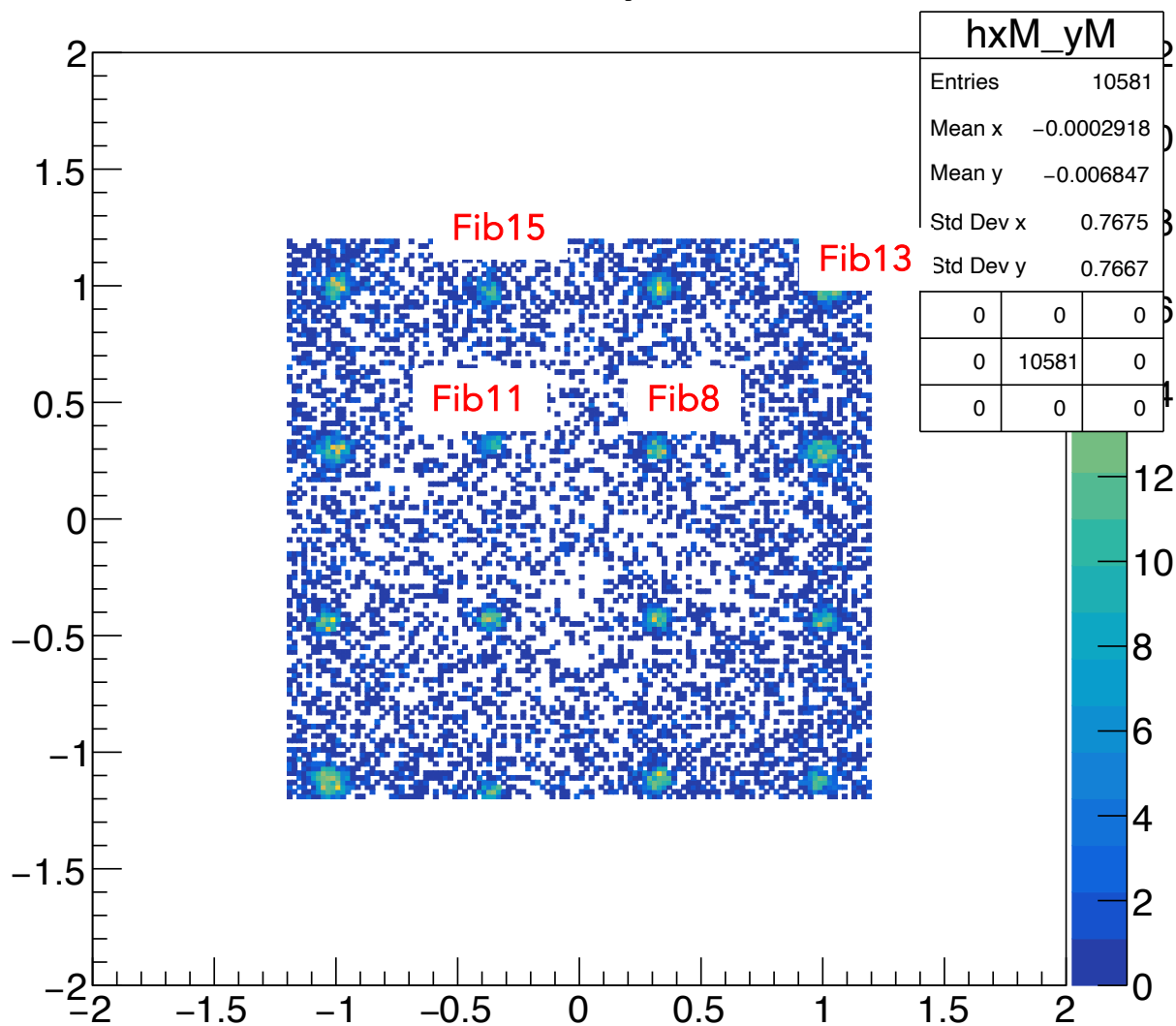


Muon 59 – 60
Troll1 HL bad SSIB



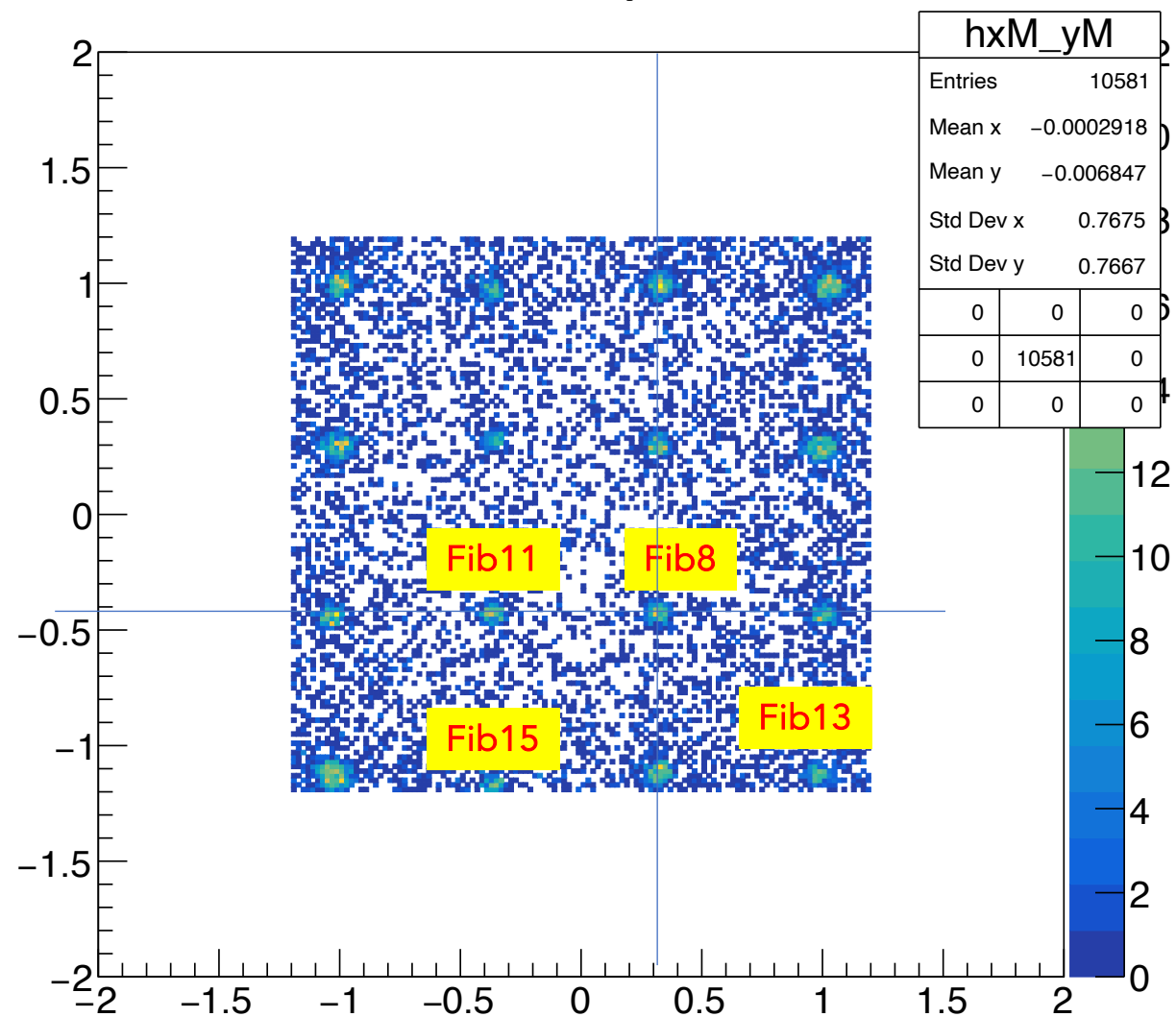
What I was expecting

xM vs yM



What I get from the plots : yM sign issue ?

xM vs yM

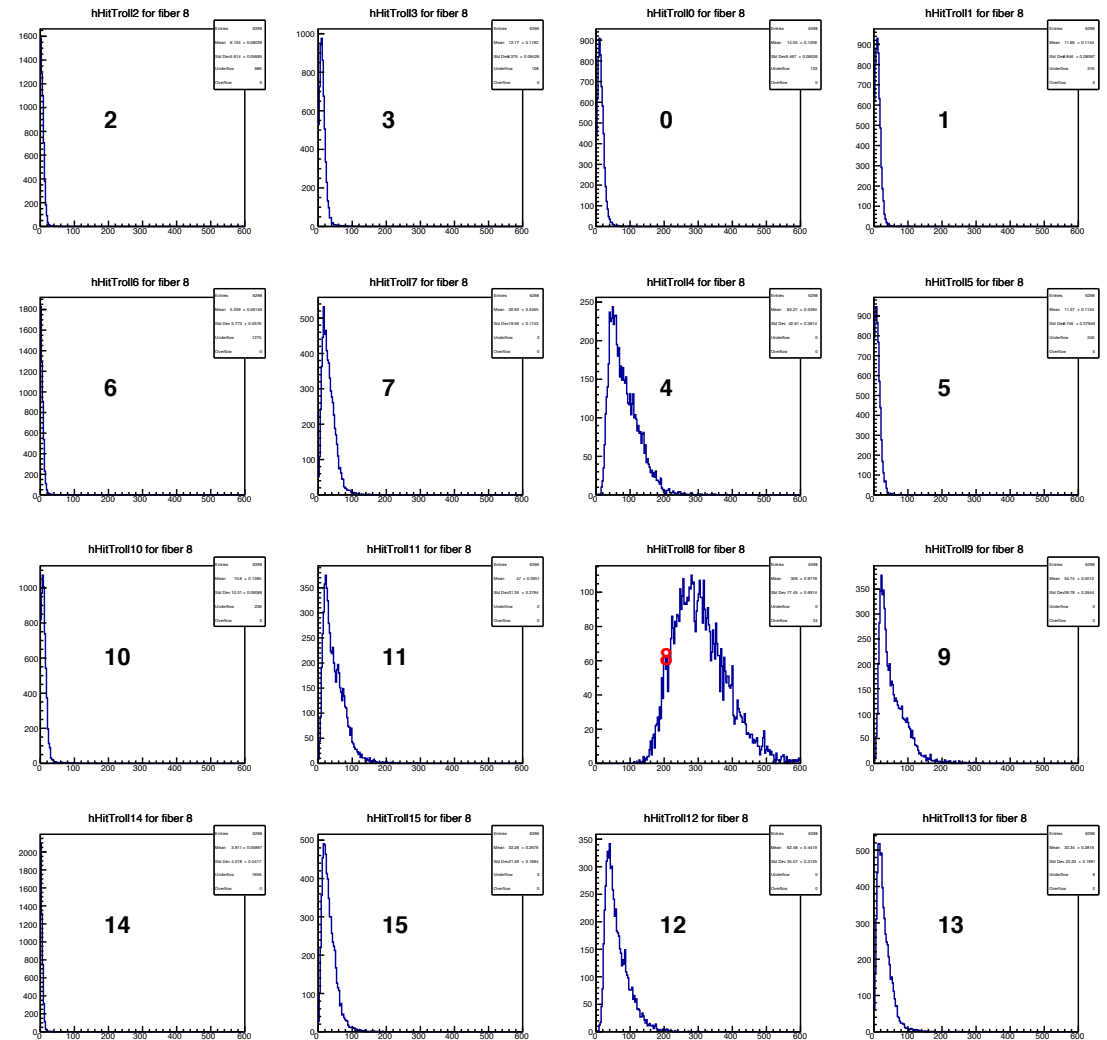
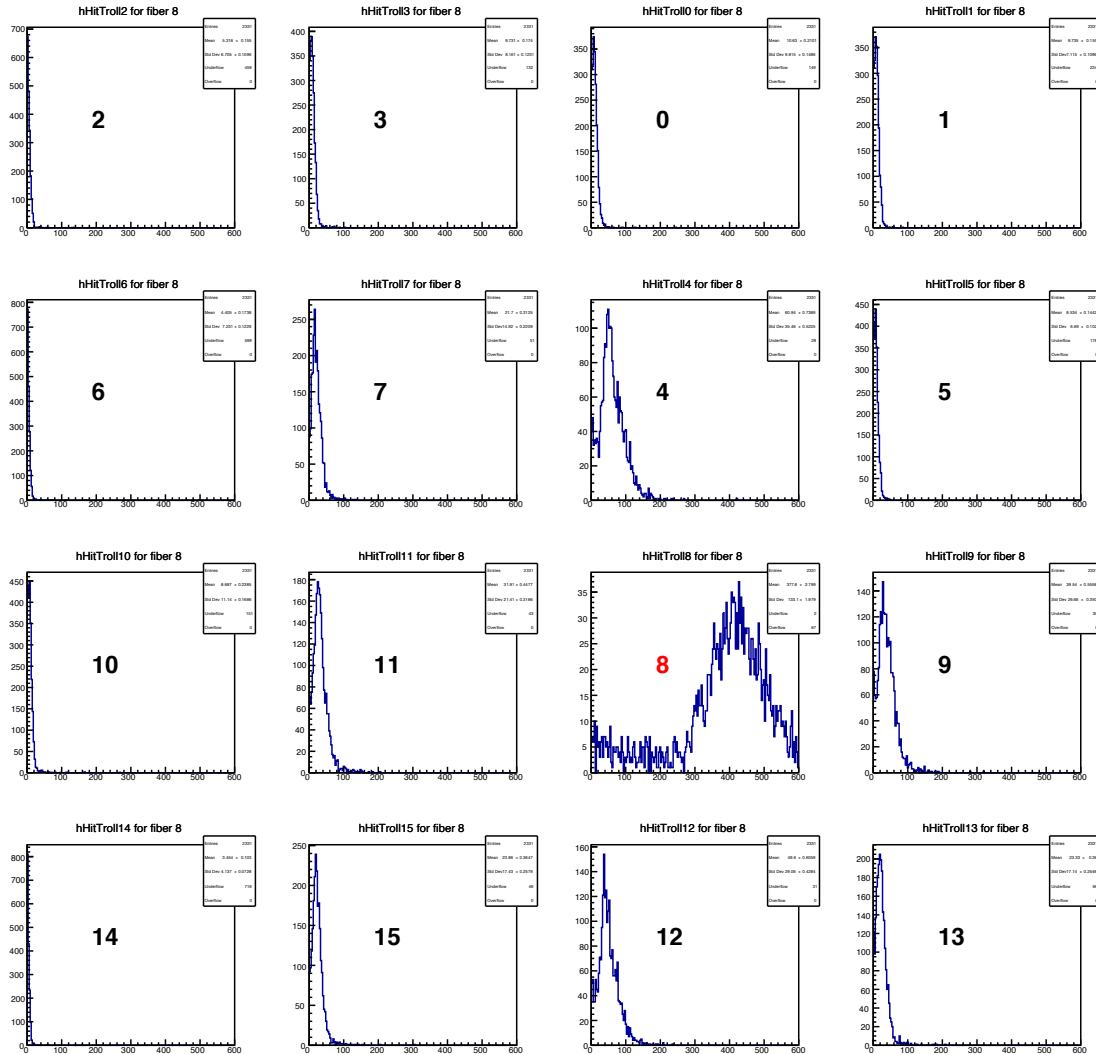


Let's assume it is under control and look at a fiber :

Muon hitting the fiber : (disk of radius 1.5 mm, "centered")

Muon in a corona around the fiber (radius between 1.5 mm and 3 mm "centered")

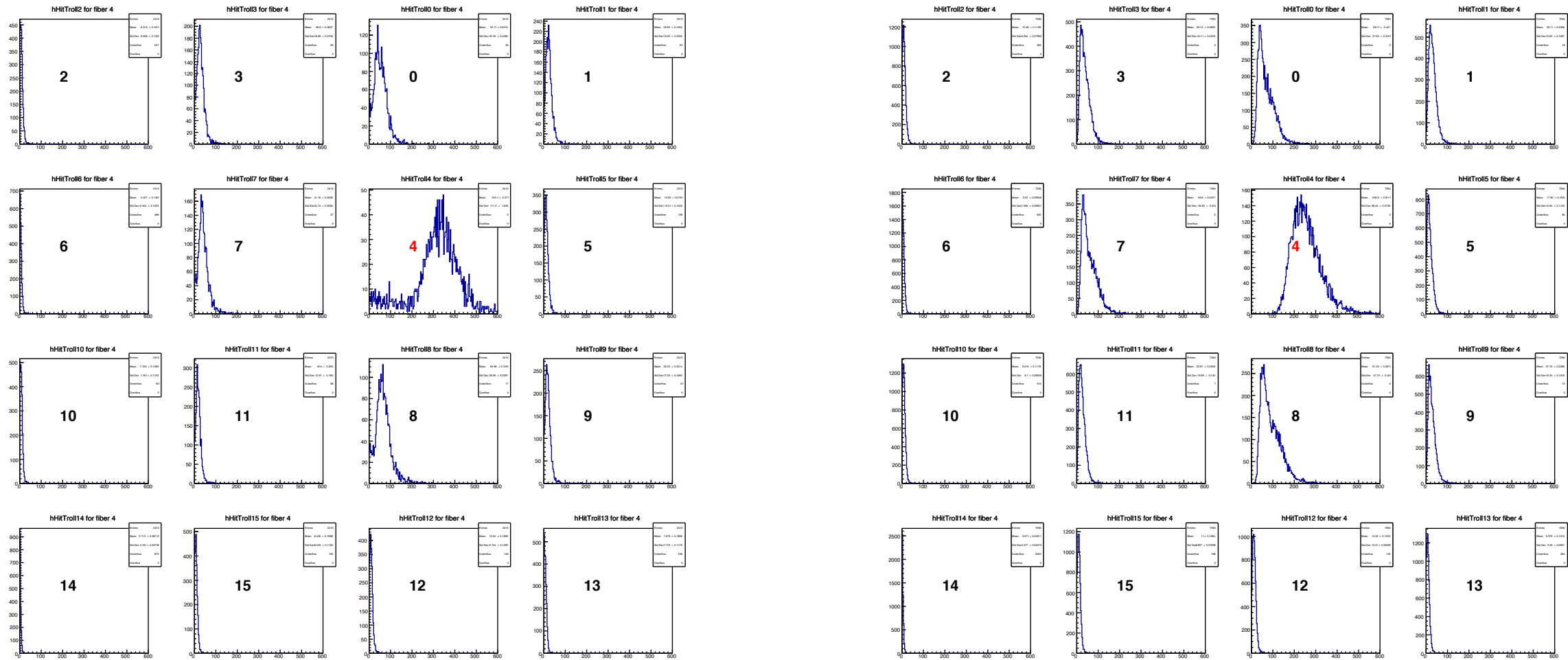
Muon Run (59,60)



Muon hitting the fiber

Muon in a corona around the fiber

Let's assume it is under control and look at a fiber :
Muon hitting the fiber : (disk of radius 1.5 mm, "centered")
Muon in a corona around the fiber (radius between 1.5 mm and 3 mm "centered")

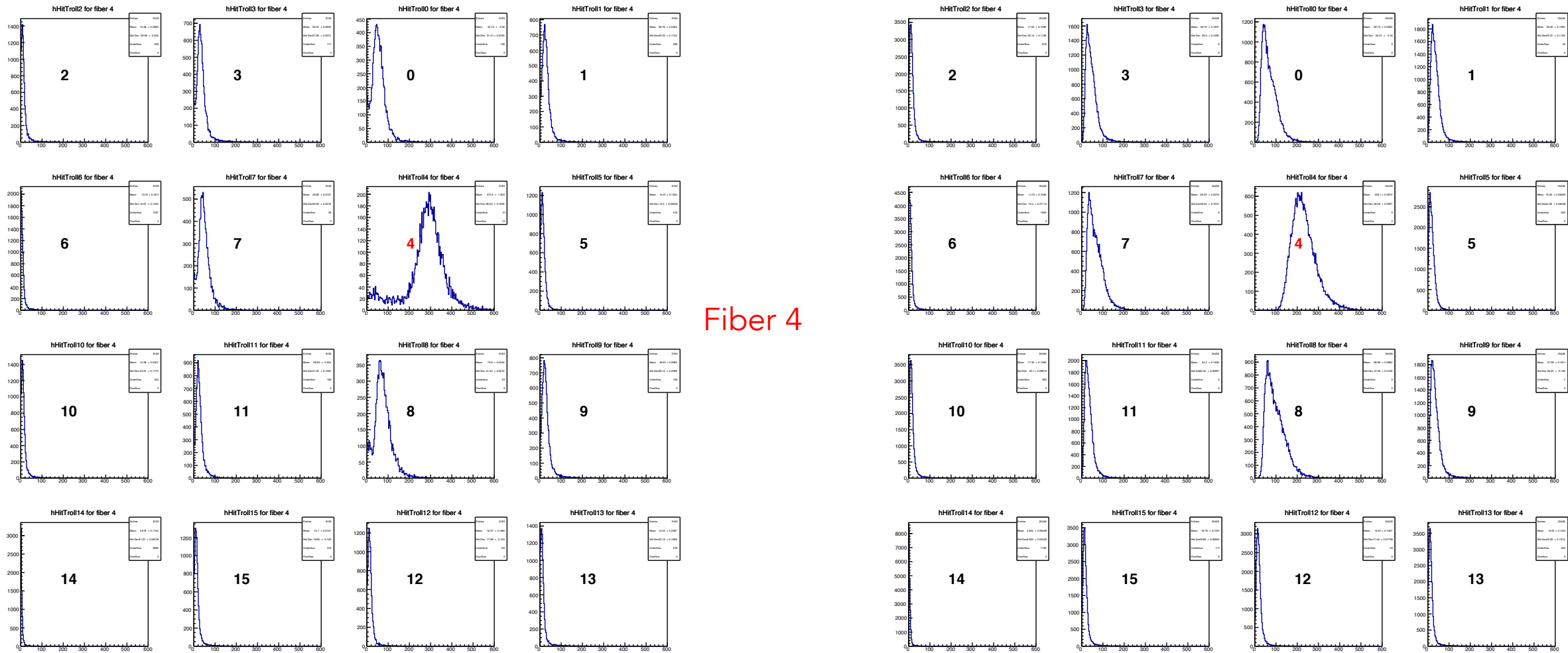


Muon hitting the fiber

Muon in a corona around the fiber

Let's assume it is under control and look at a fiber :
Pion hitting the fiber : (disk of radius 1.5 mm, "centered")
Pion in a corona around the fiber (radius between 1.5 mm and 3 mm "centered")

Pion Run (57,58)

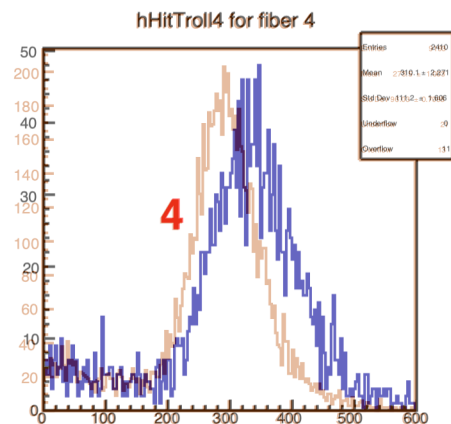
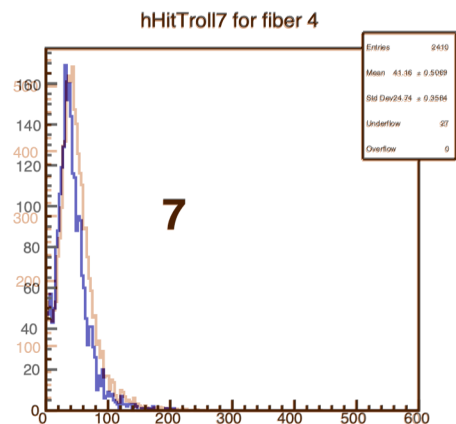


Pion hitting the fiber

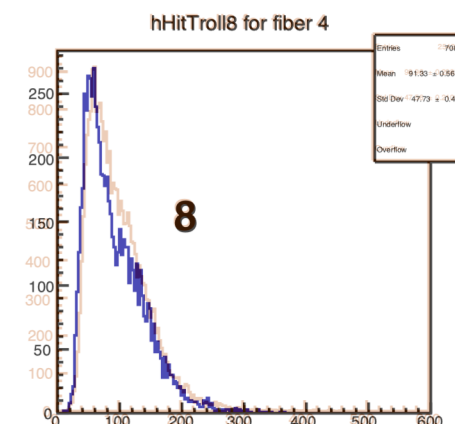
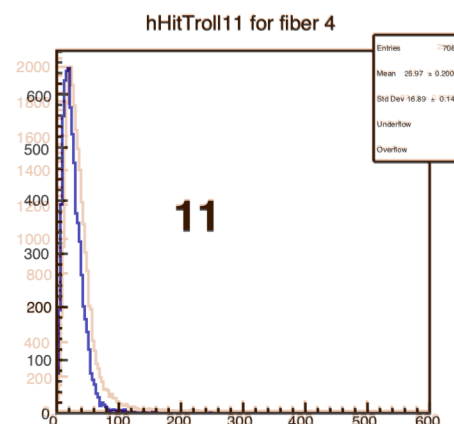
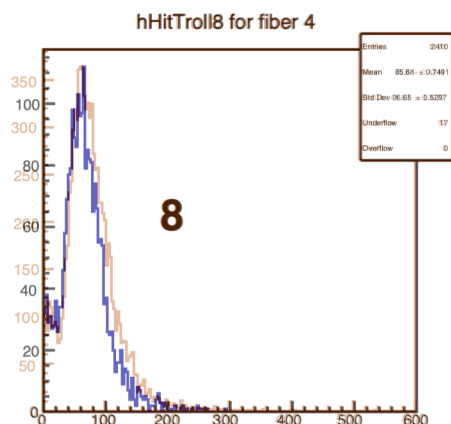
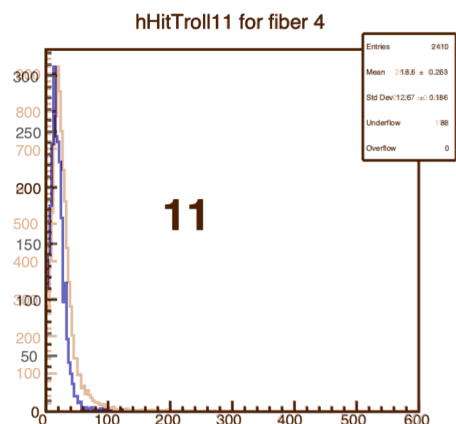
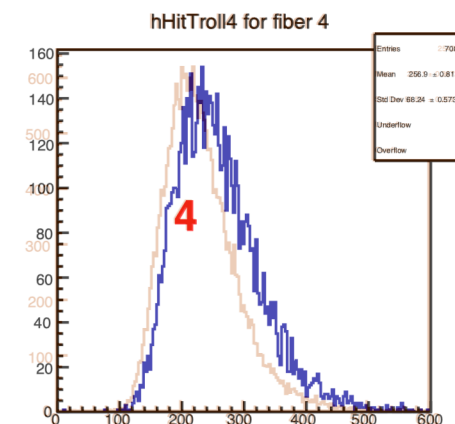
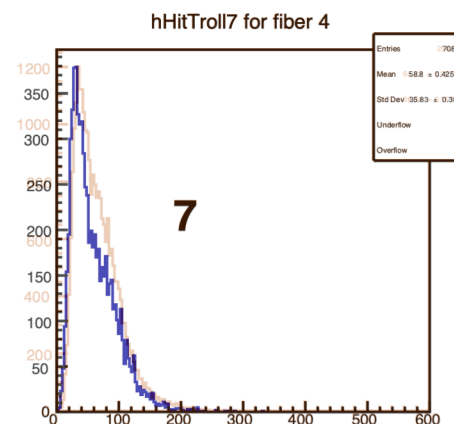
Pion in a corona around the fiber

In fiber

Corona around fiber

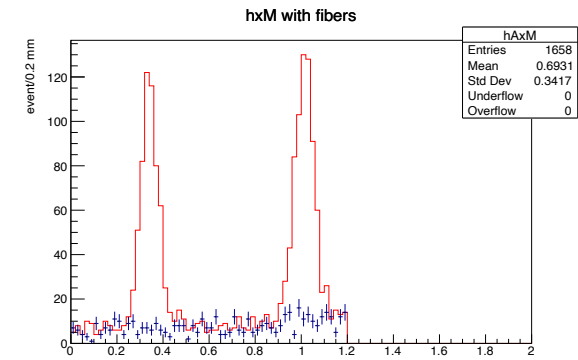
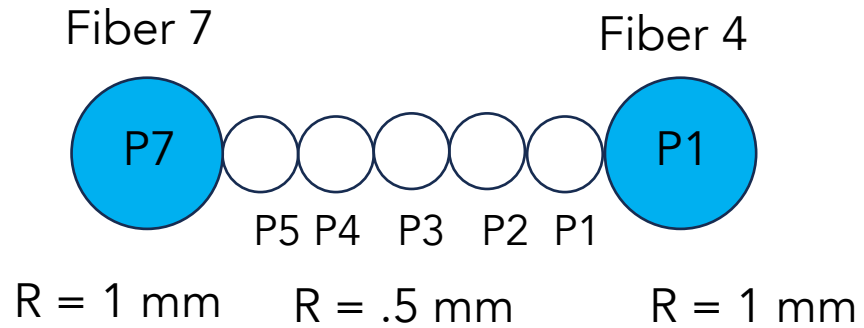


Pion
Muon



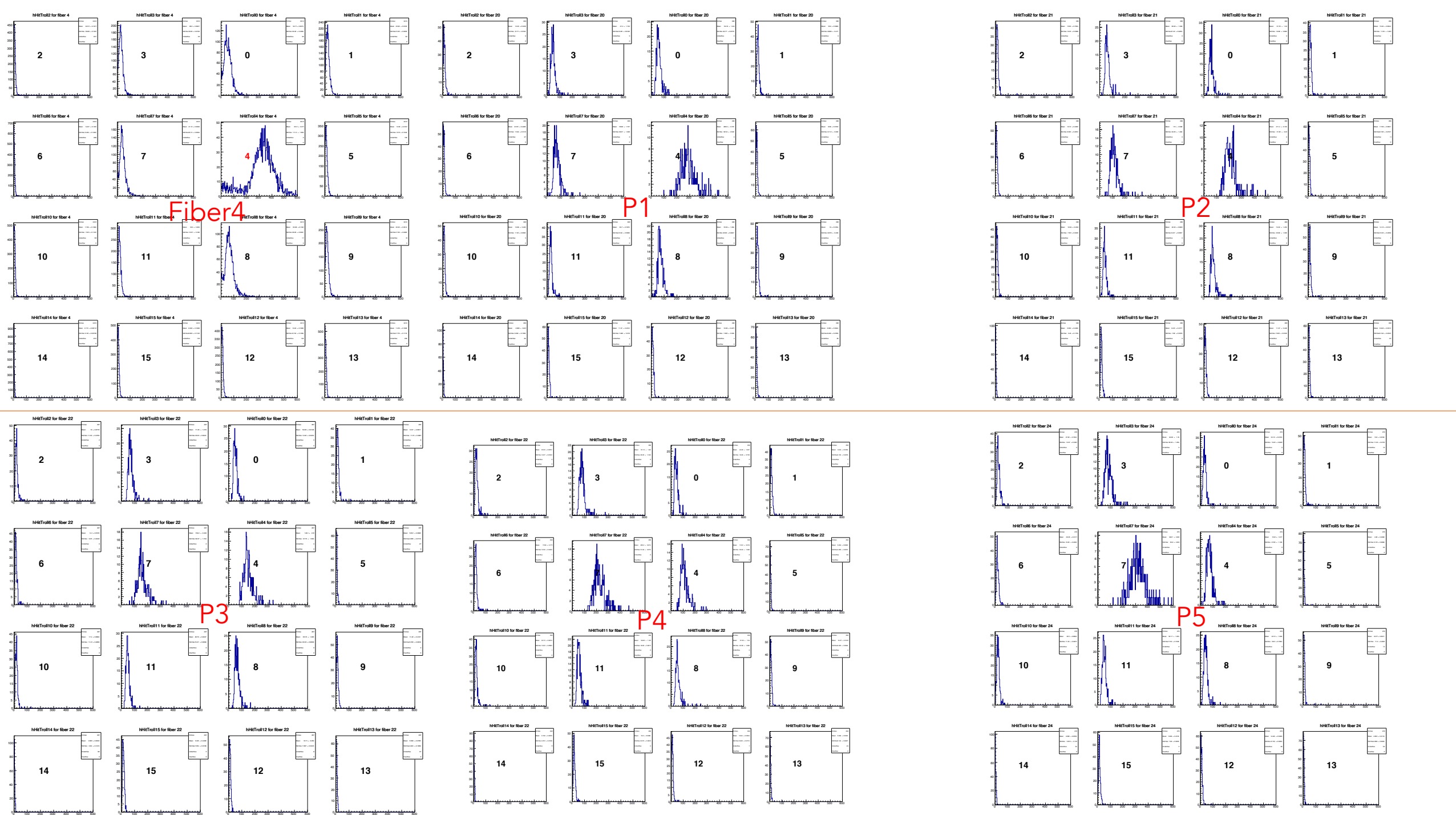
Troll1, HL, and degraded SIBB in both cases

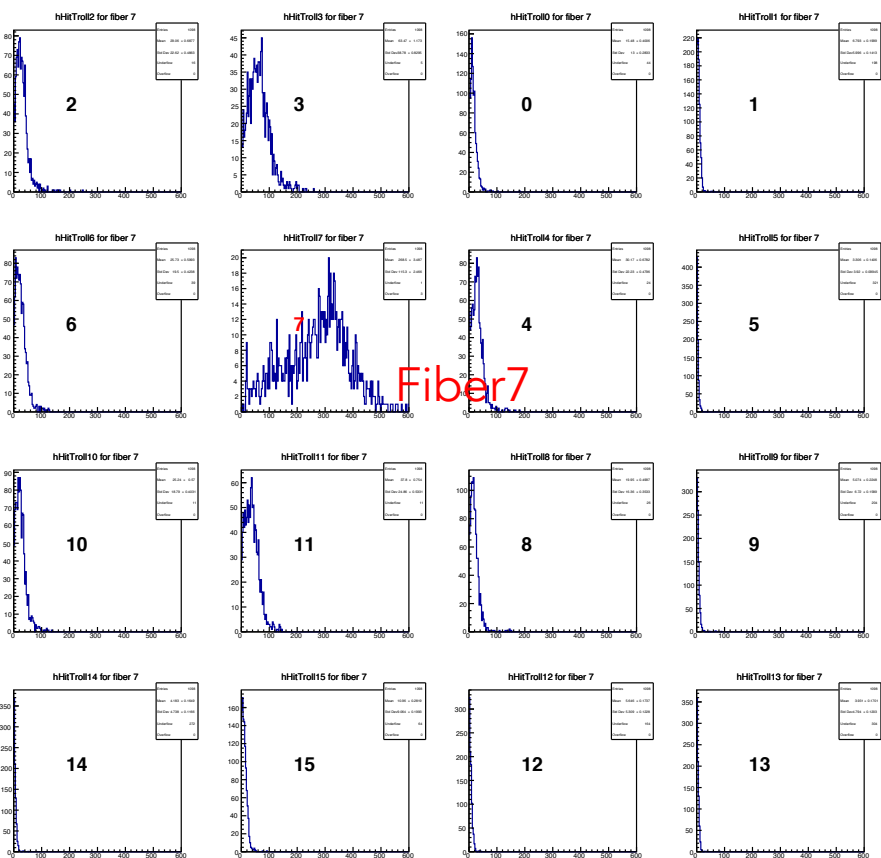
Let's assume the fiber extension has 1 mm radius



Muon Run (59,60)

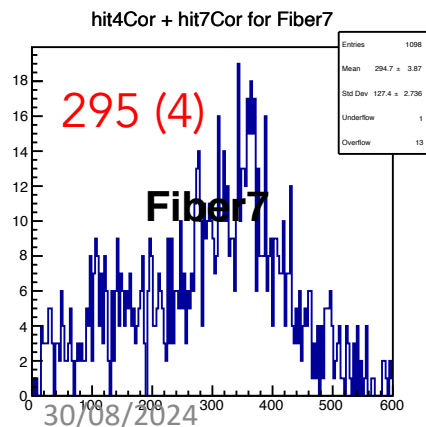
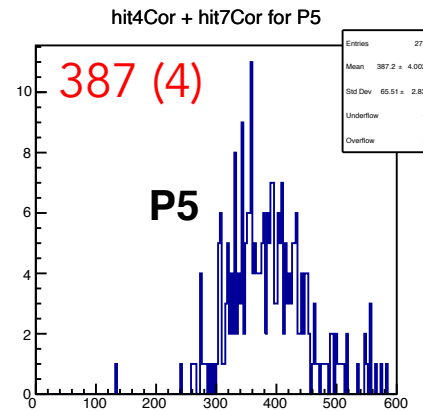
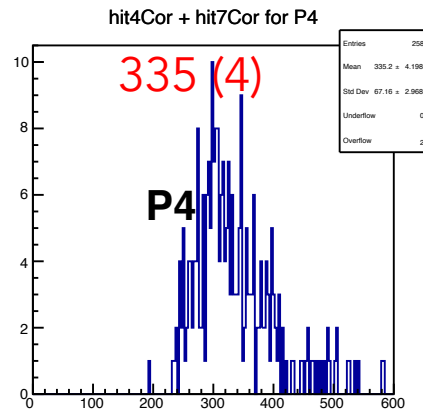
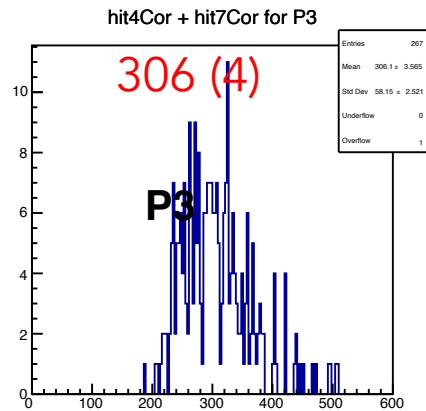
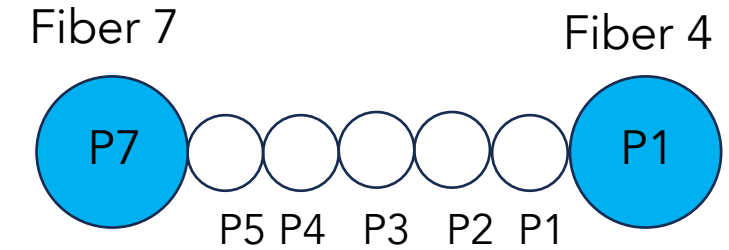
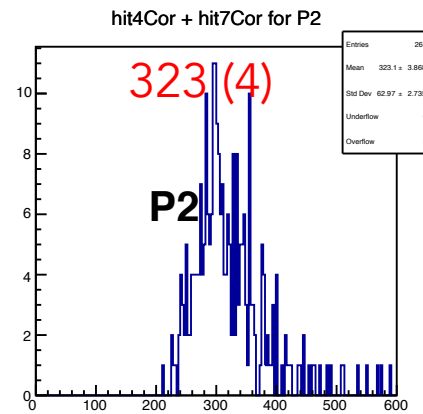
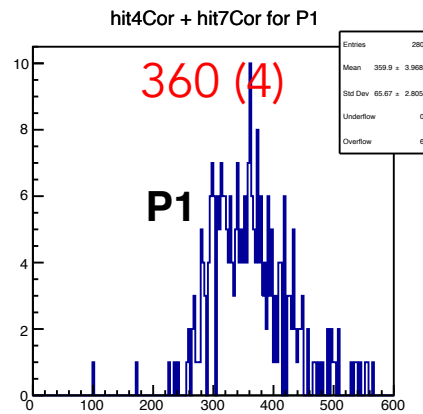
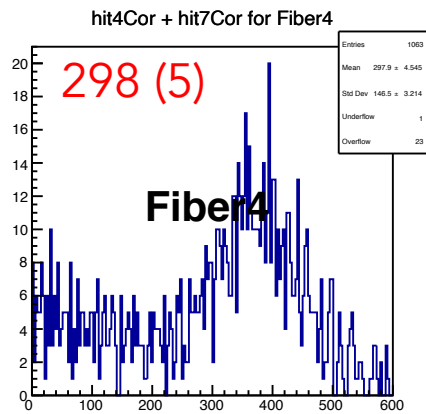




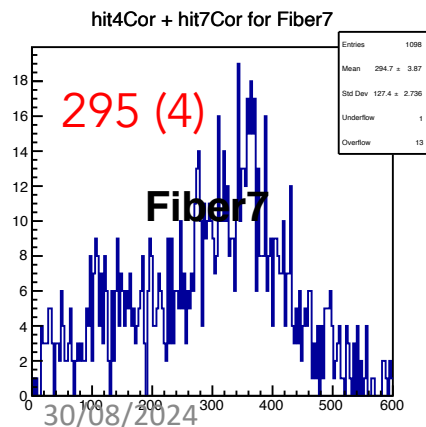
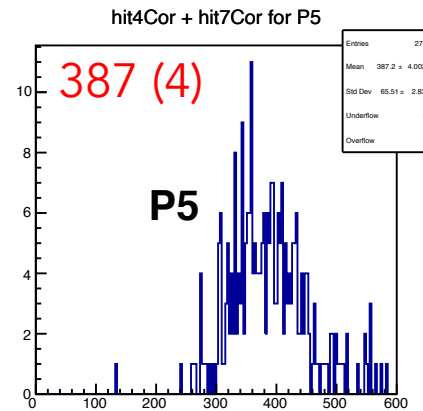
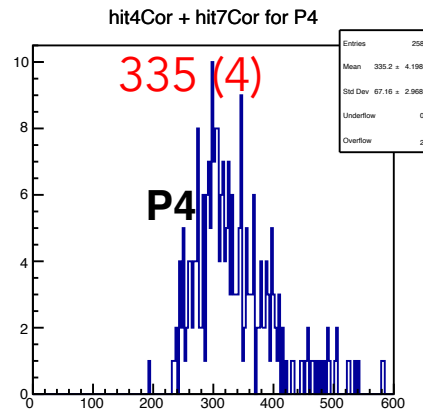
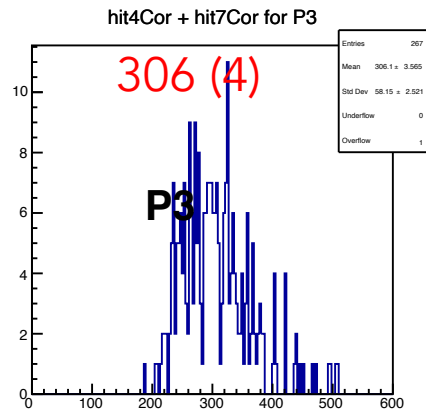
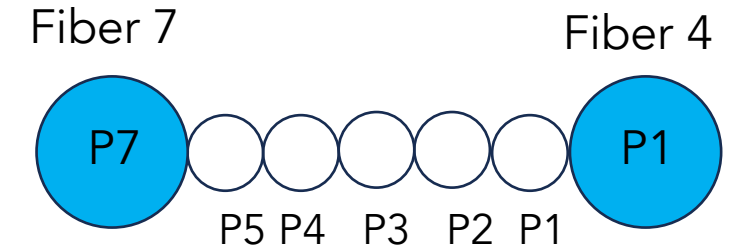
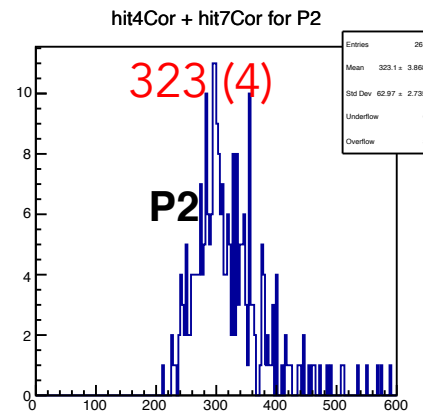
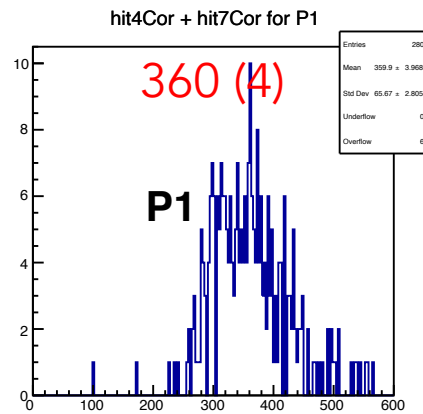
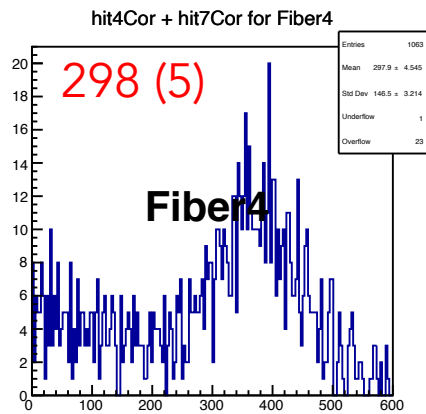


Position	Mean in Fiber4	Mean in Fiber7
Fiber4	310(2)	41(1)
P1	287(4)	79(2)
P2	211(3)	115(2)
P3	148(2)	159(2)
P4	112(2)	223(3)
P5	74(2)	321(4)
Fiber7	30(1)	269 (4)

Let's look at the variation of hit4Cor + hit7Cor when the muon is in Fiber4, Fiber7 and P1 to P5

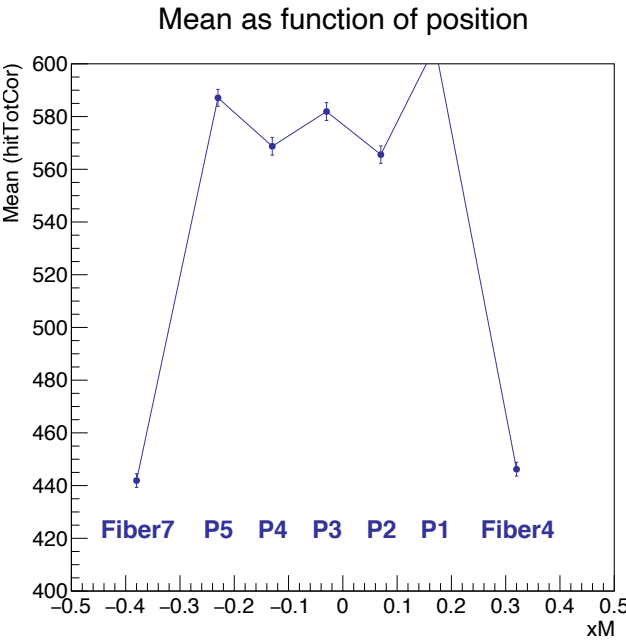
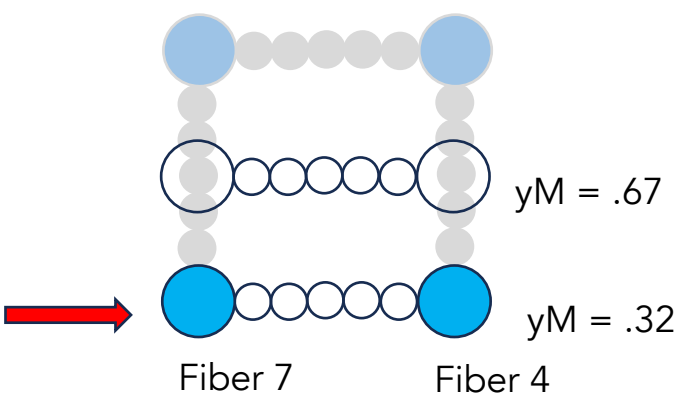
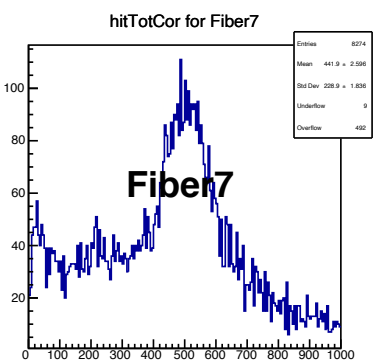
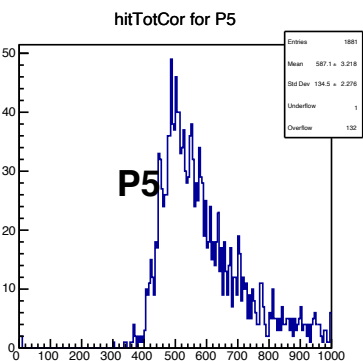
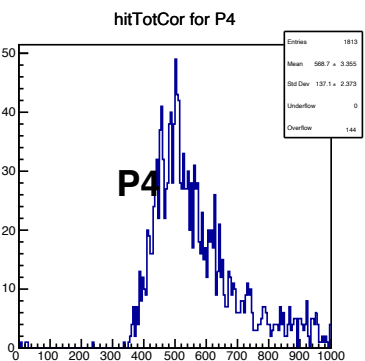
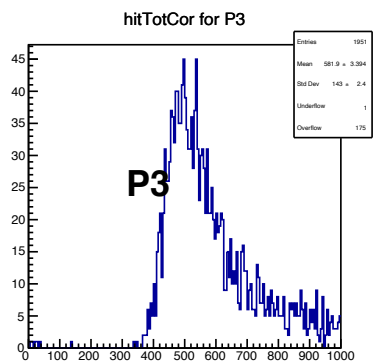
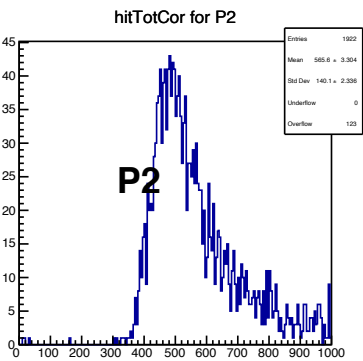
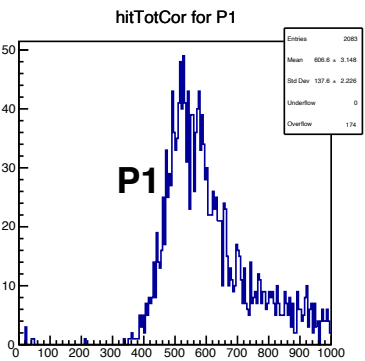
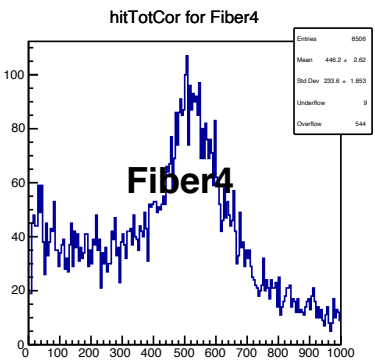


- When we are IN a fiber we have less light
- When we are out but nearby (P1, P5) we have the max of light
- When we are the further away (P3) we loose light (due to absorption ?)



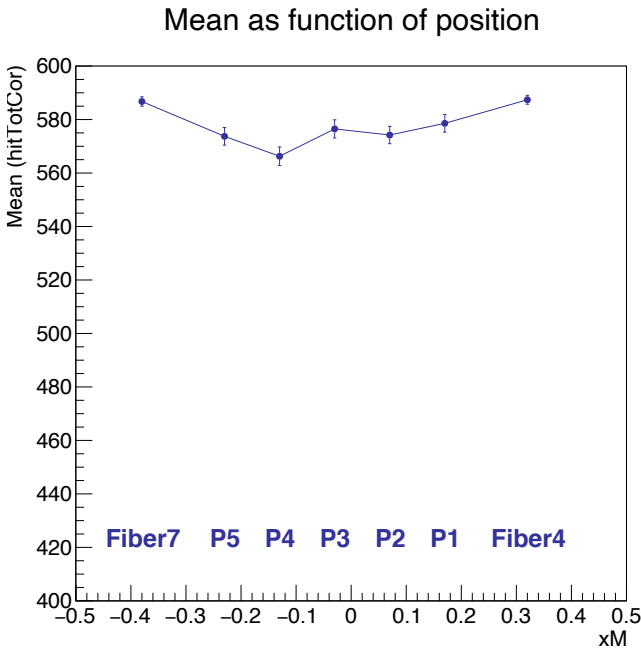
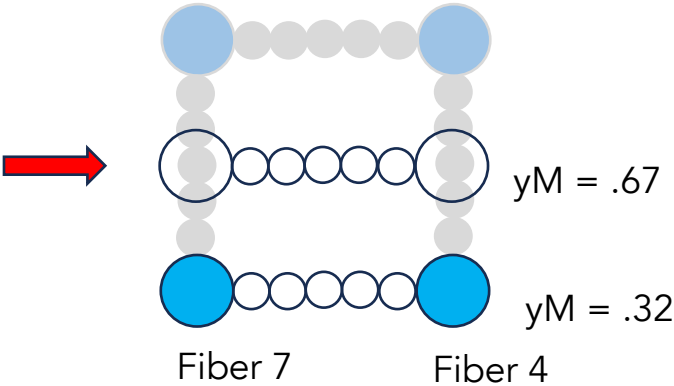
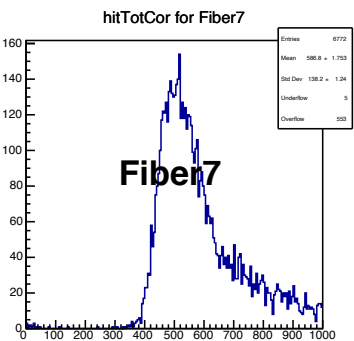
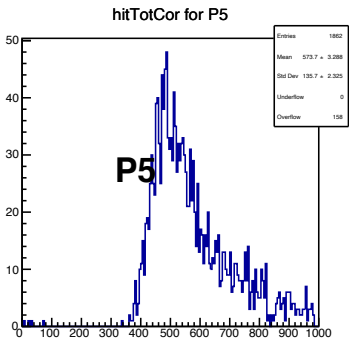
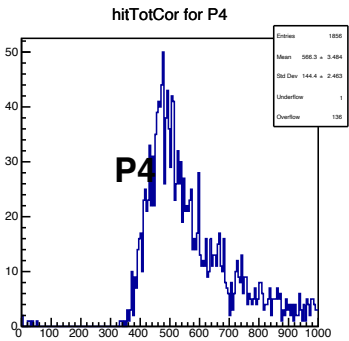
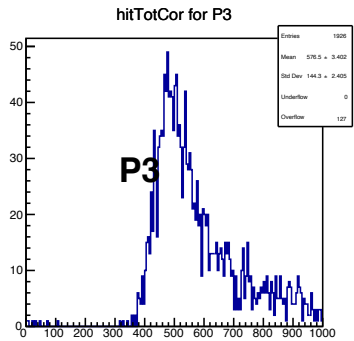
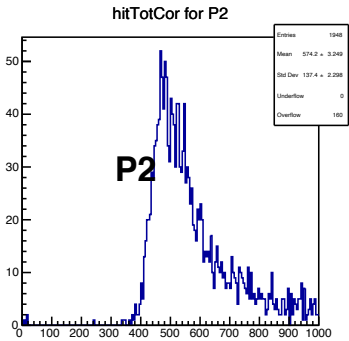
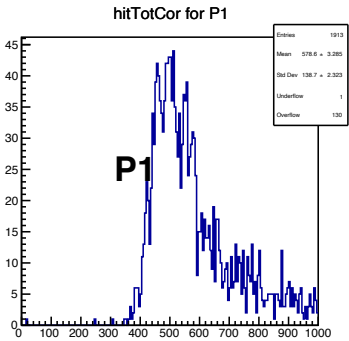
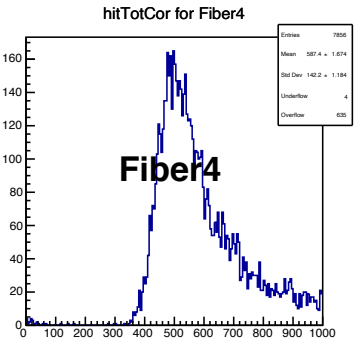
- When we are IN a fiber we have less light
- When we are out but nearby (P1, P5) we have the max of light
- When we are the further away (P3) we loose light (due to absorption ?)

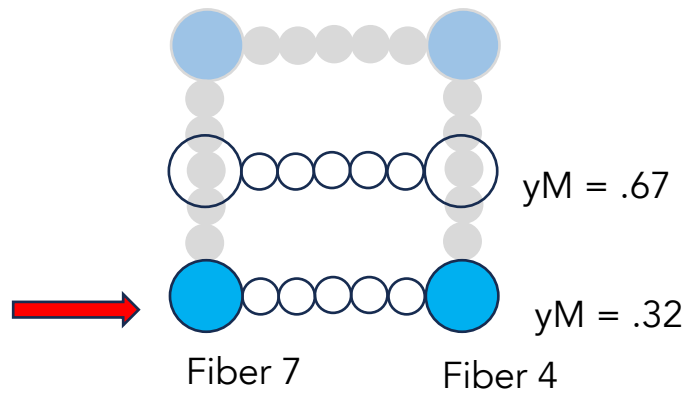
Global answer (hitTotCor)



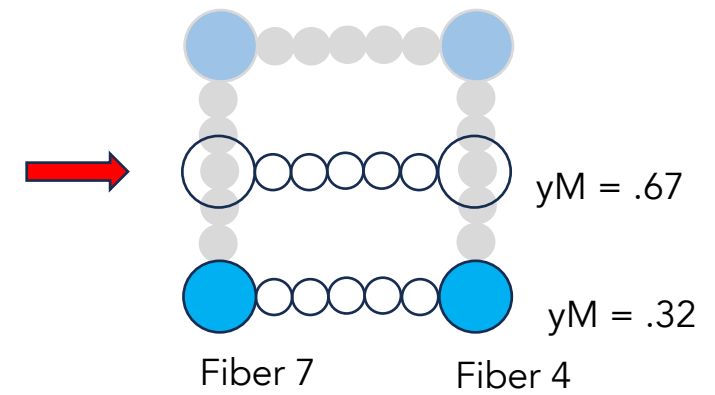
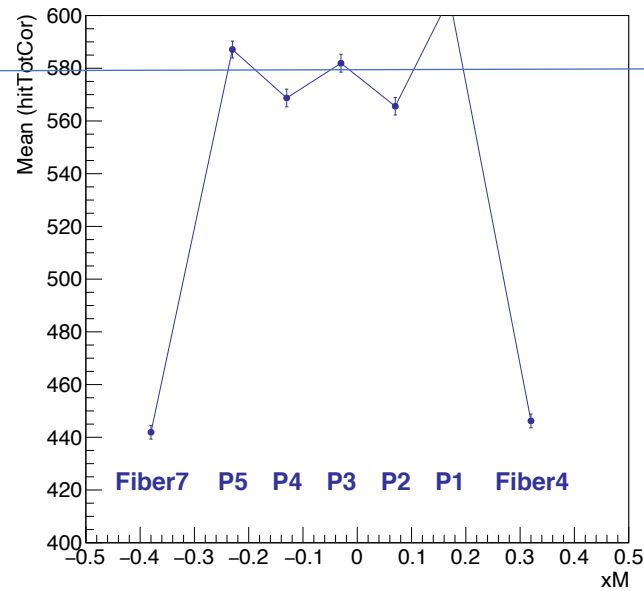
Pion Run (41,42,43) , Trol1 water
More stat but water and different SiBB settings

Global answer (hitTotCor)

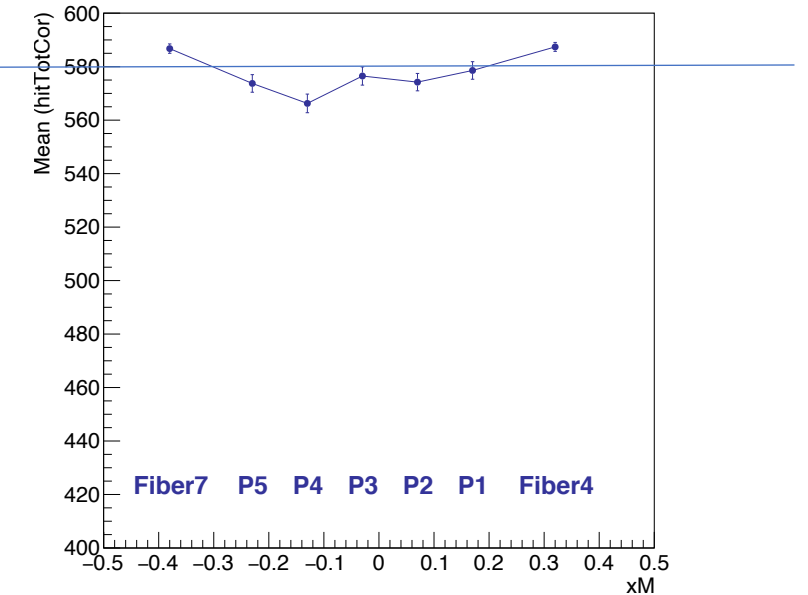




Mean as function of position



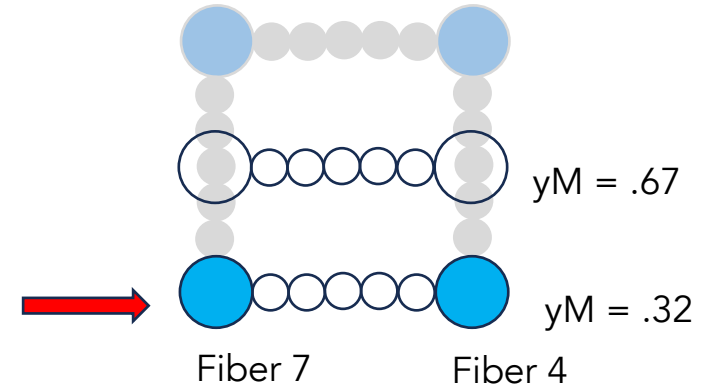
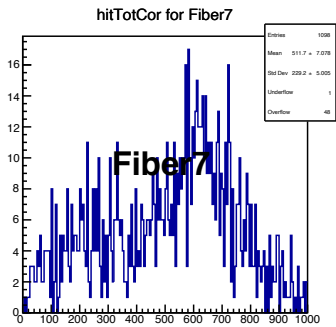
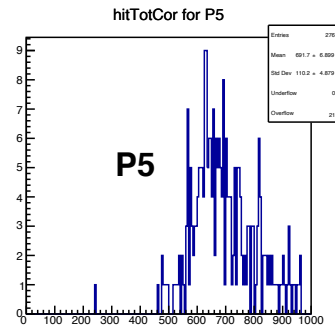
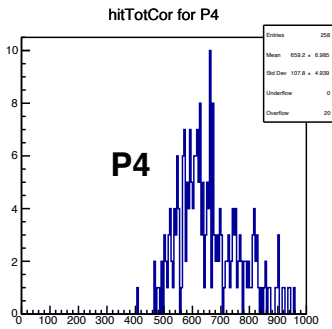
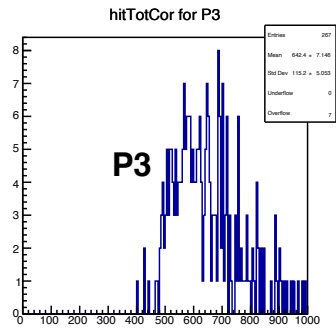
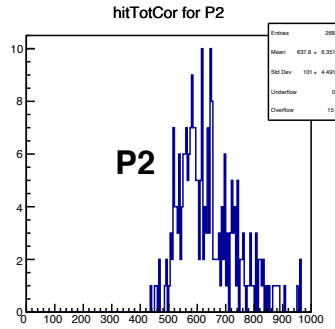
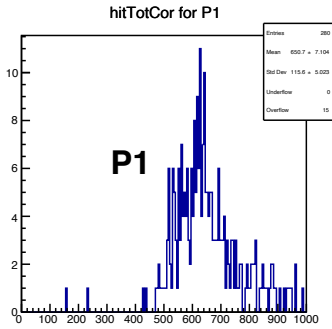
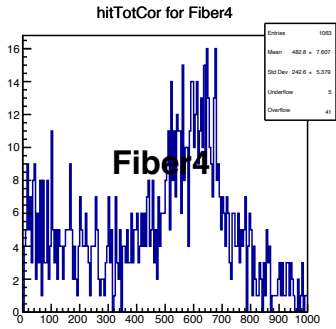
Mean as function of position



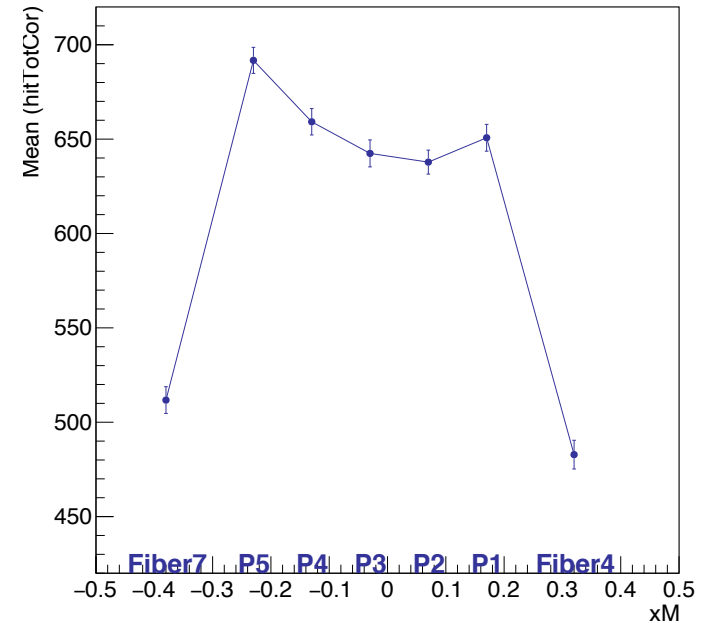
but the shape ... not very much Landau-like ...

hitTotCor

Muon Run (59,60)
troll1 HL
degraded SiBB

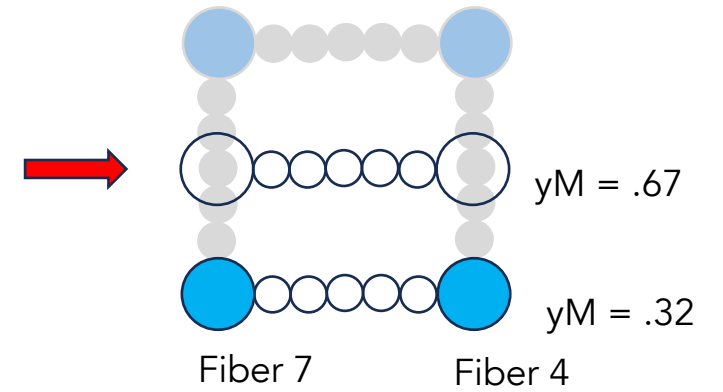
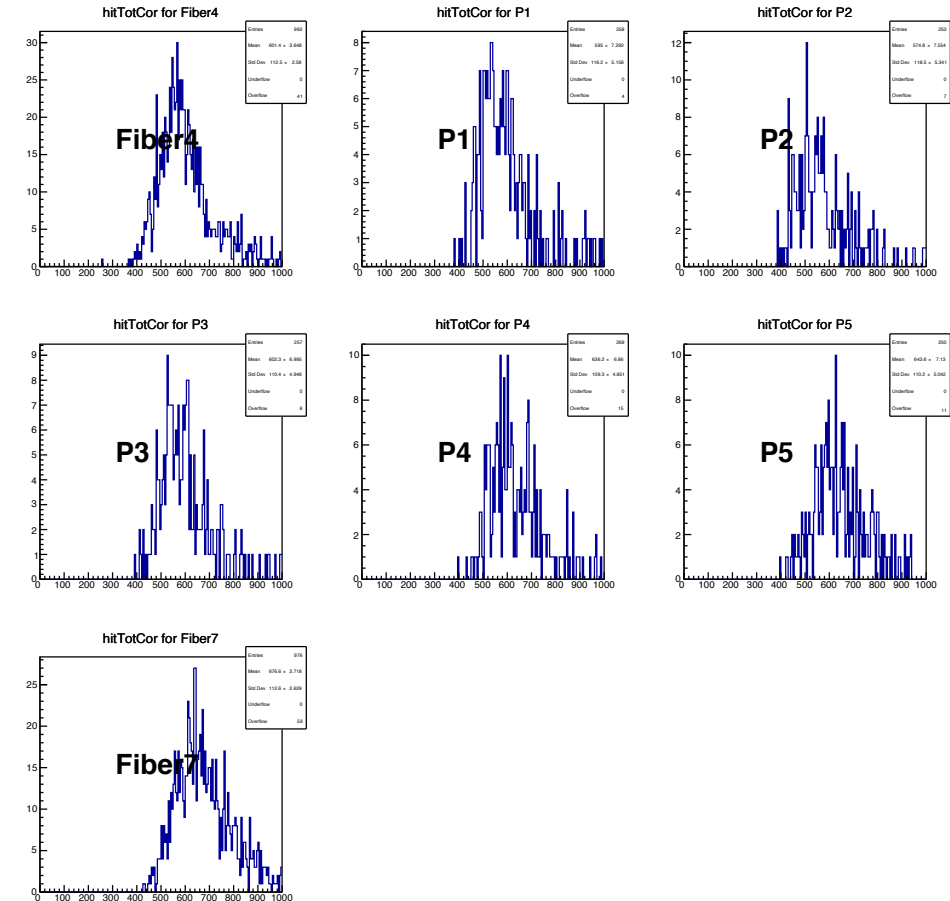


Mean as function of position

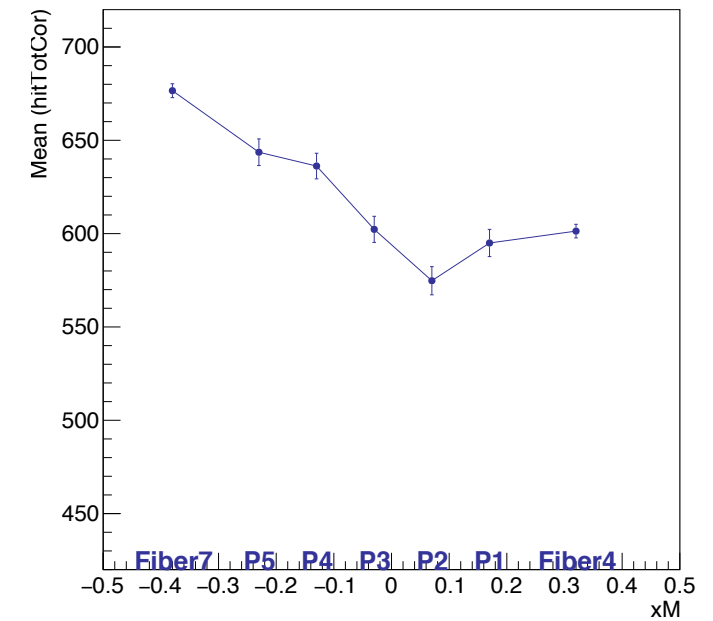


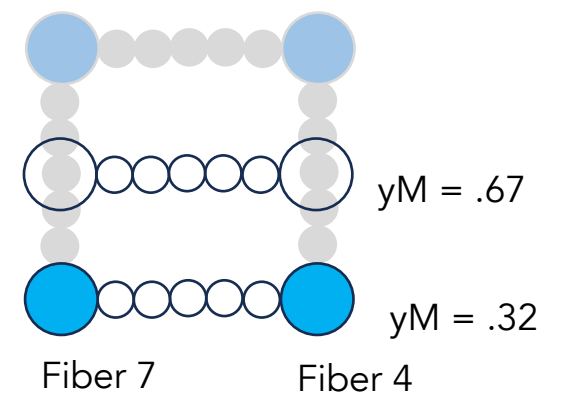
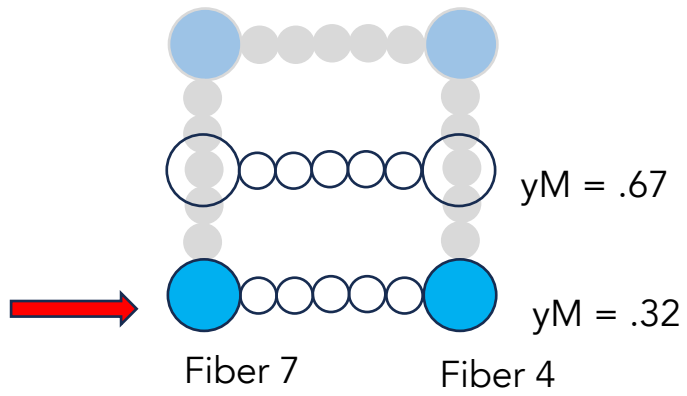
hitTotCor

Muon Run (59,60)
troll1 HL
degraded SiBB

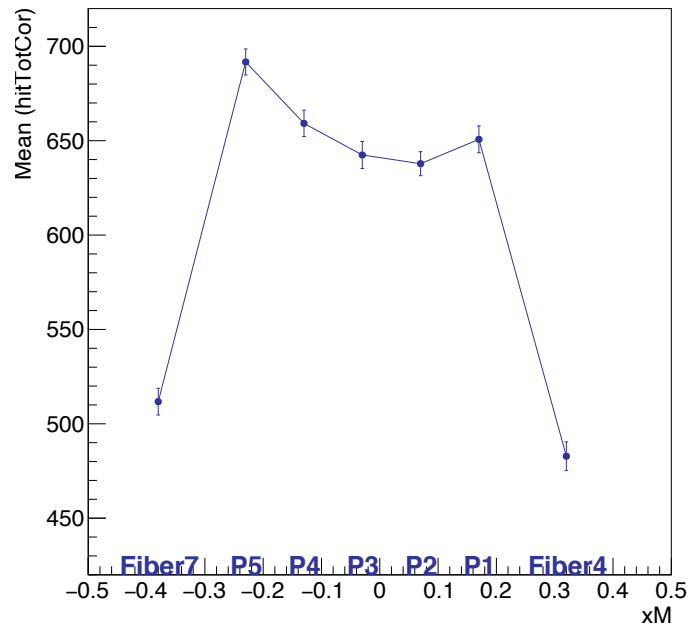


Mean as function of position

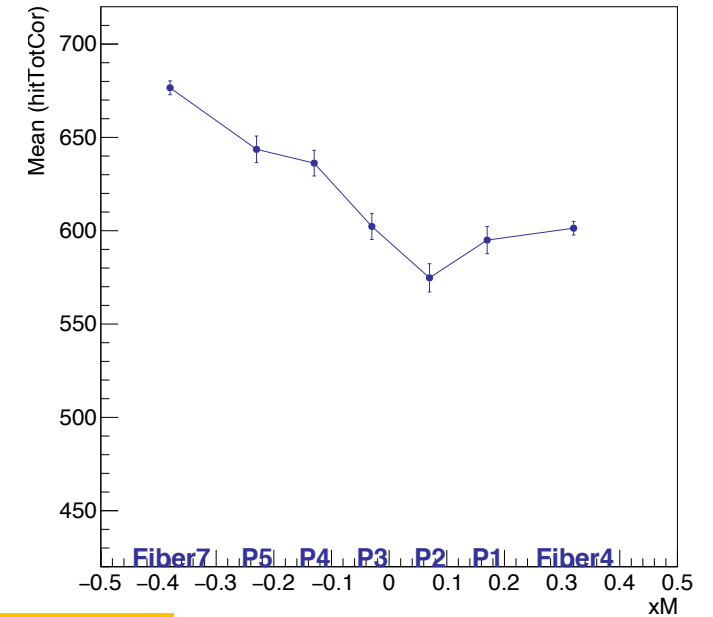




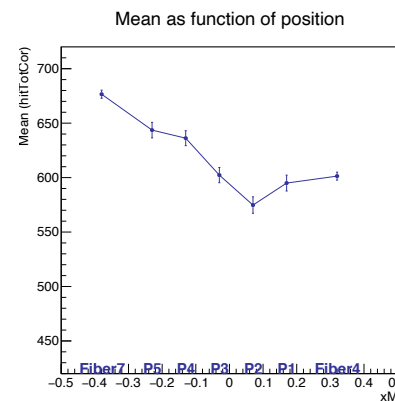
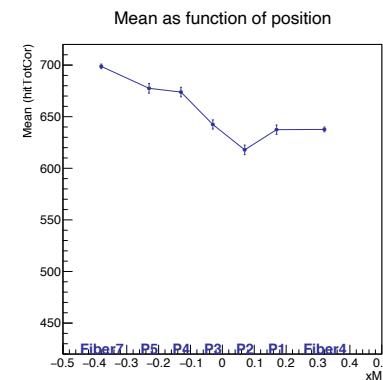
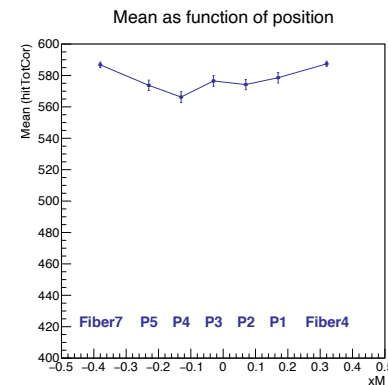
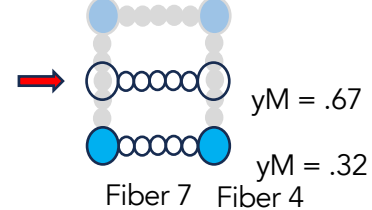
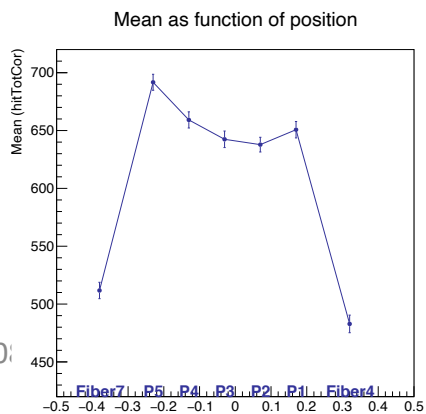
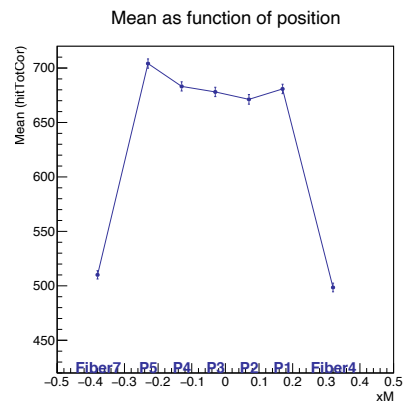
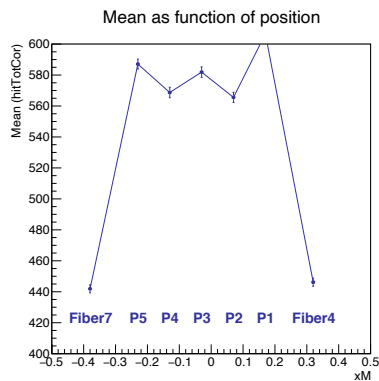
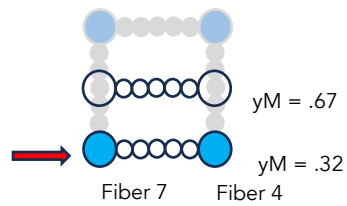
Mean as function of position



Mean as function of position



why is this worse than for the pion case ?

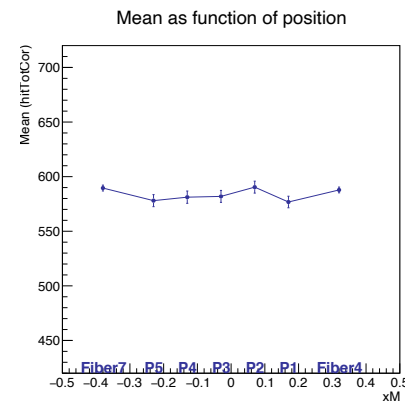
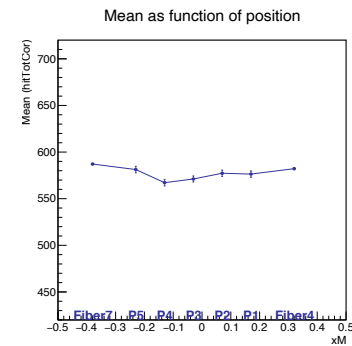
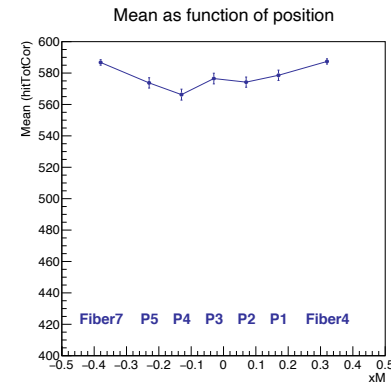
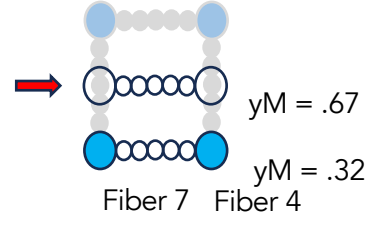
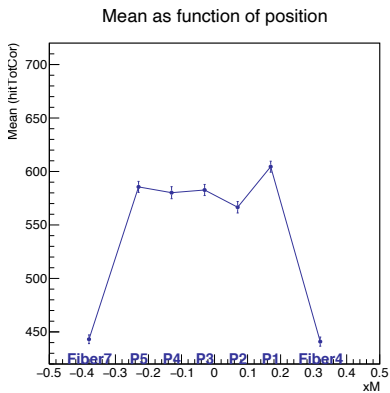
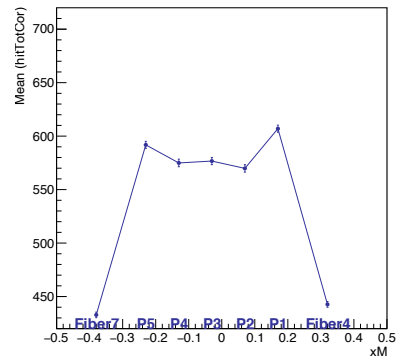
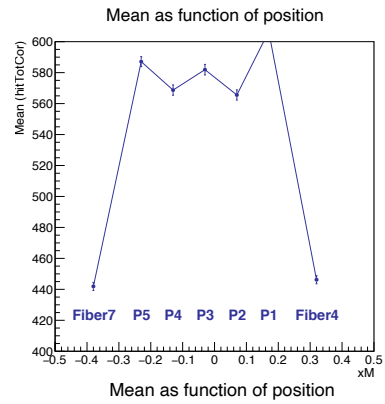
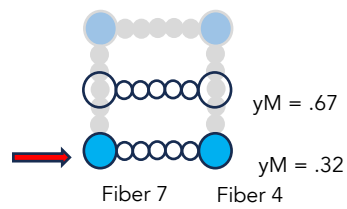


Mind the y scale !

Pion (41,42,43) Troll1 water
good SSiB

Pion (57,58) Troll1 HL bad SSiB

Muon (59,60) Troll1 HL bad SSiB

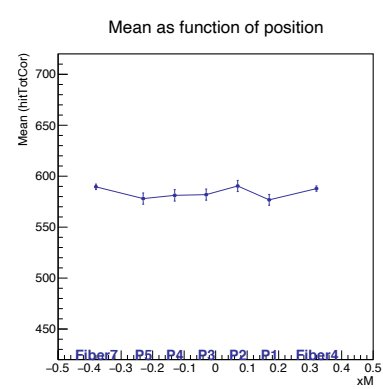
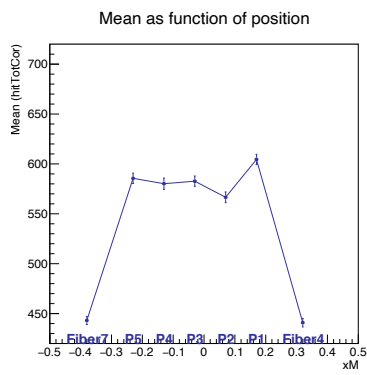


Mind the y scale !

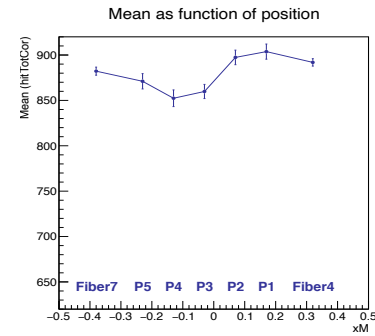
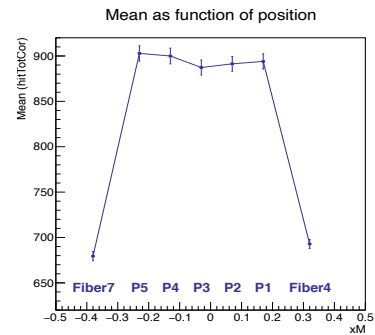
Pion (41,42,43) Troll1 water
good SSiB

Pion (44,45) Troll1 water
good SSiB

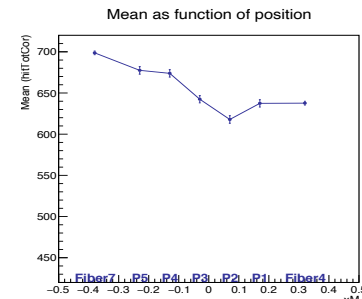
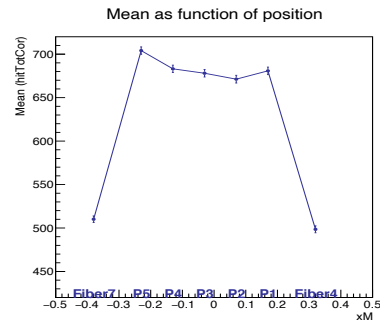
Pion (50,51) Troll1 water
good SSiB



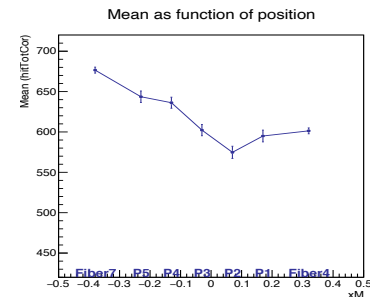
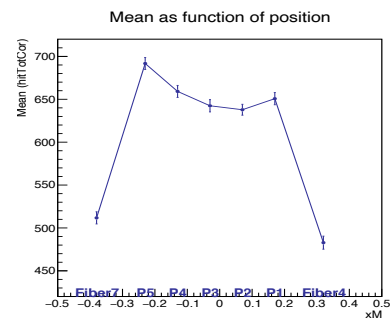
Pion (50,51) Troll1 water
good SSiB



pion 53 54 55
Troll 2 HL
Degraded SiBB



Pion (57,58) Troll1 HL bad SSiB



Muon (59,60) Troll1 HL bad SSiB

What we know we should do and questions

Clearing out once for all the numbering scheme and the (x_M, y_M) of the fibers ($y_M \rightarrow -y_M$??)

Decide on a general set of cuts for the events to be used

Localisation of the fibers to be better done (by eye in this presentation (!))

Uniformisation of the fibers answers

How are we going to handle the degraded SiBB data ?

What about the alignment ?

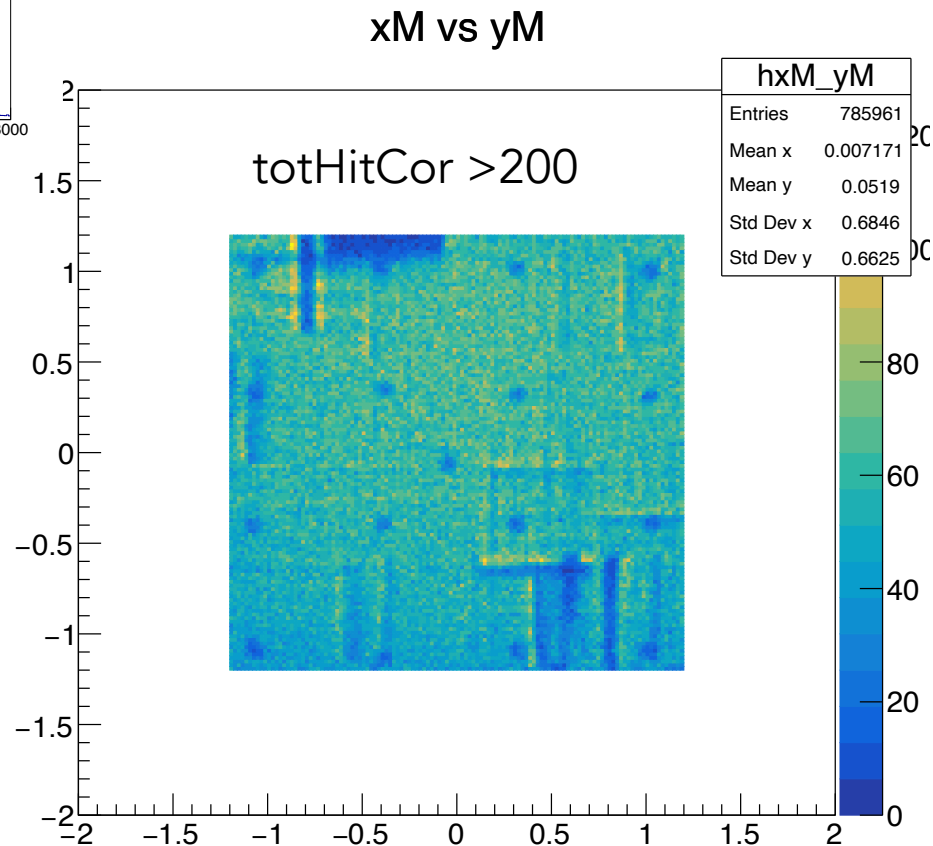
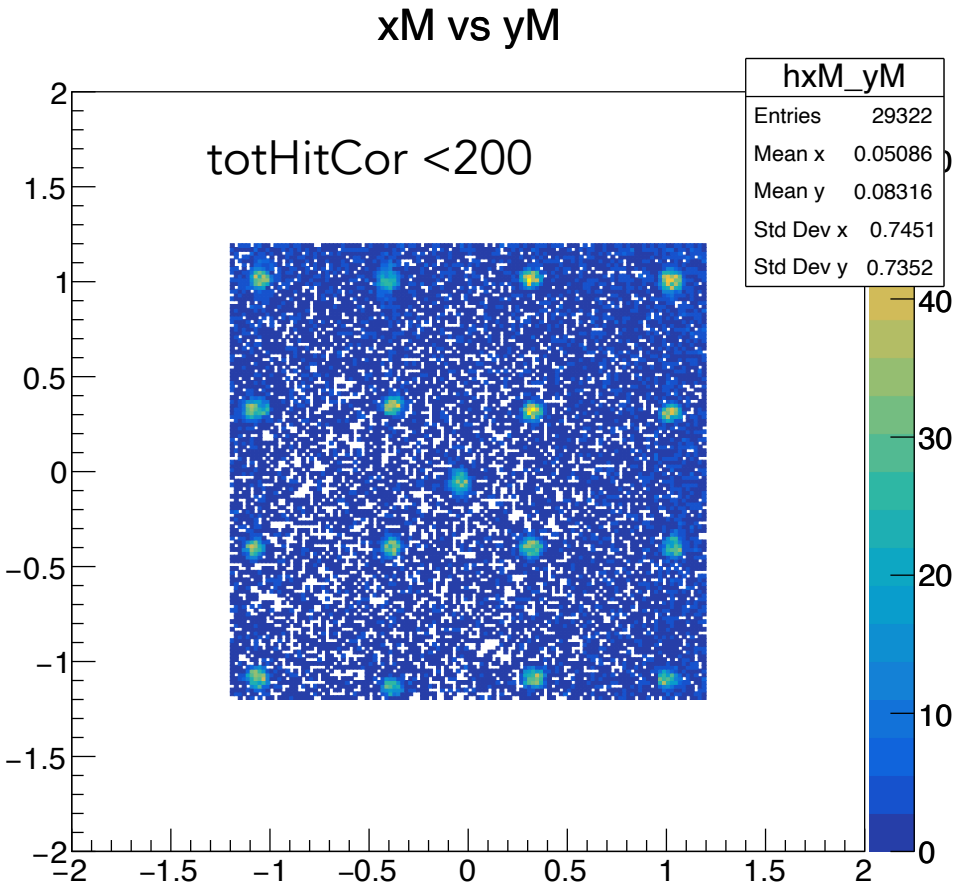
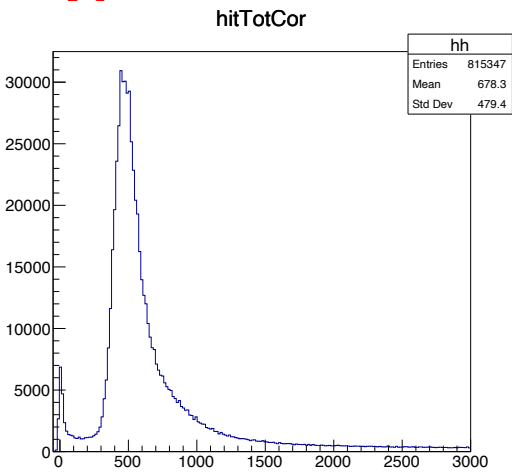
How to deal with the nPhe Pion distributions ?

Back-up slides

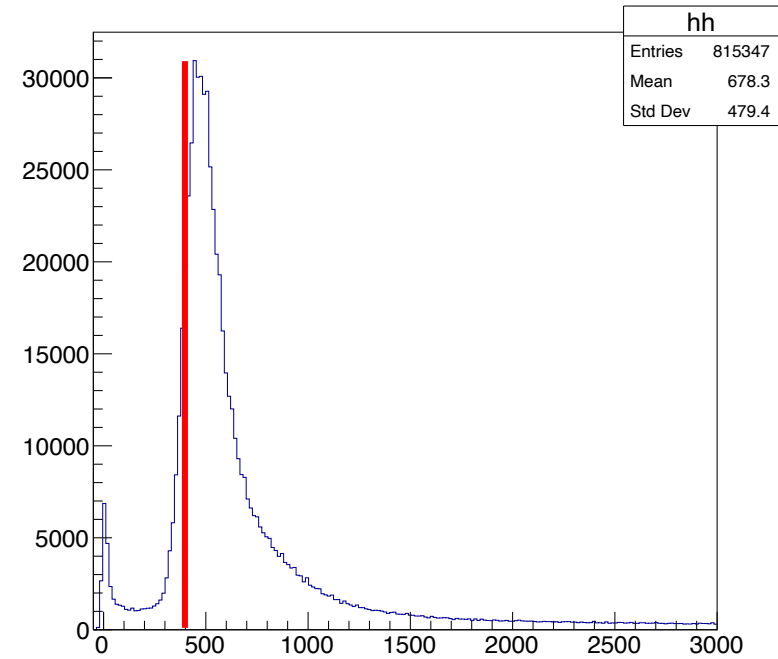
Run#	Troll Type	Data type	Comment	Dark
11	Troll1 Water	LED + pedestal ?		118 – Event Type = 4 LED reste pedestal ?
24	Troll1 Water	LED-only		Event Type = 4 LED
25,30,31,32	Troll1 Water	Electron		~120 – 130
33,34	Troll1 Water	Muon		~130
35,36,37,38,39,40	Troll1 Water	Pion.	changes in position of GRAiNITA ... Beam changes	~130
41,42,43	Troll1 Water	Pion	With 3x3 in the trigger (Samedi soir S, MH)	~140
44,45	Troll1 Water	Pion	No 3x3 in trigger. Dimanche matin... (Giulia & co)	~130
47	Troll1 Water	Pedestal		~ 119
48	Troll1 Water	LED		118 .
50,51	Troll1 Water	Pion	Trigger 5x5	~130
52	Troll2 Heavy L	LED	Degraded SiBB	203. SiBB pb from here
53,54,55	Troll2 Heavy L	Pion	Trigger 5x5 Degraded SiBB	210
56	Troll1 Heavy L	LED+pedestal	Degraded SiBB	Bizarre du beam ???
57,58	Troll1 Heavy L	Pion	Trigger 5x5 Degraded SiBB	180 ?
59,60	Troll1 Heavy L	Muon	Degraded SiBB	211
61	Troll1 Heavy L	LED	Degraded SiBB	204 eventType = 4 = LED
62 30/08/2024	Troll1 Heavy L	LED	Normal SiBB	125 eventType = 4 = LED 41

Fibers extension , different runs in next slides

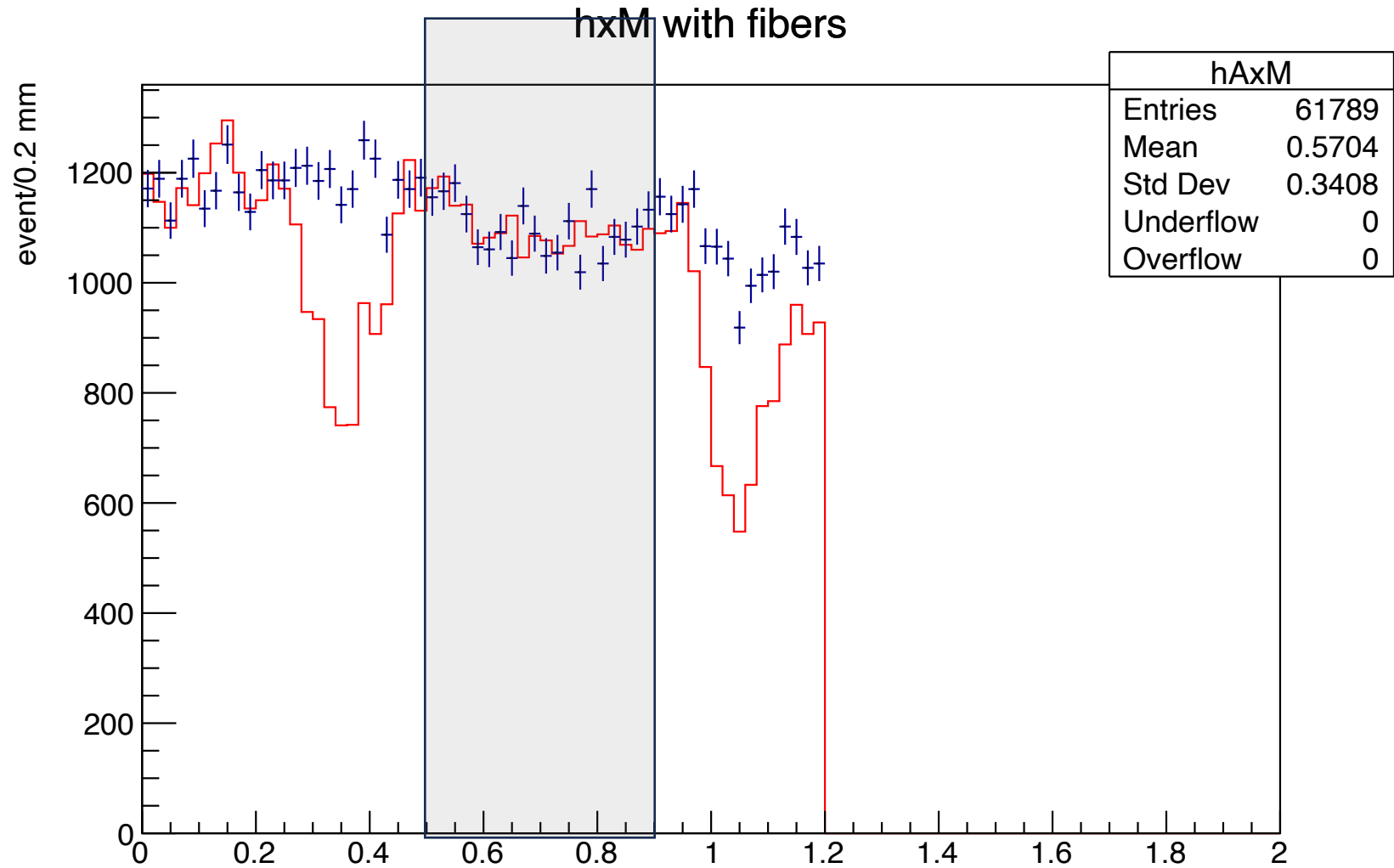
Pion 50 – 51, Troll1 Water – good SSIB



hitTotCor

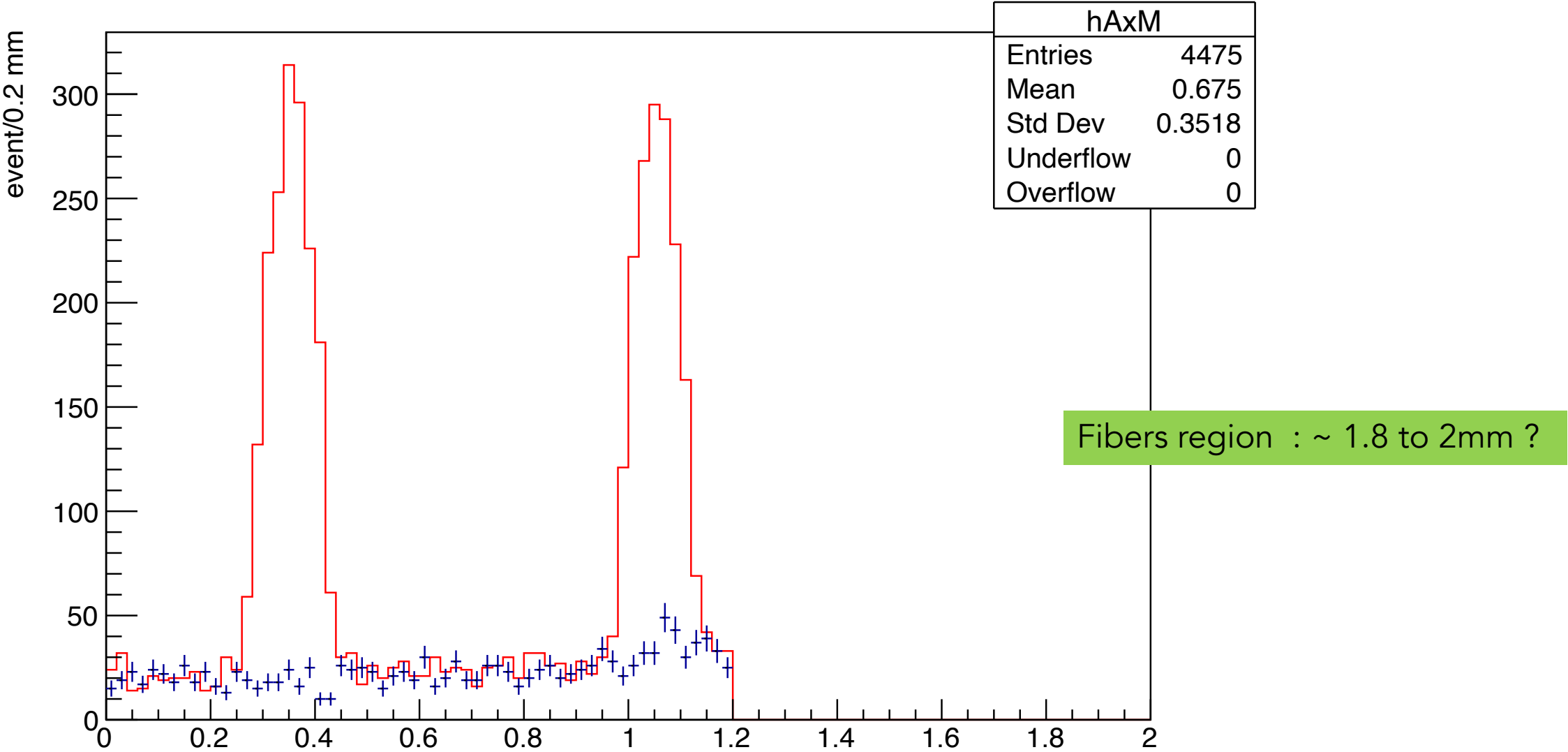


Normalize the 2 histograms in the region $.5 < |x_M| < .9$

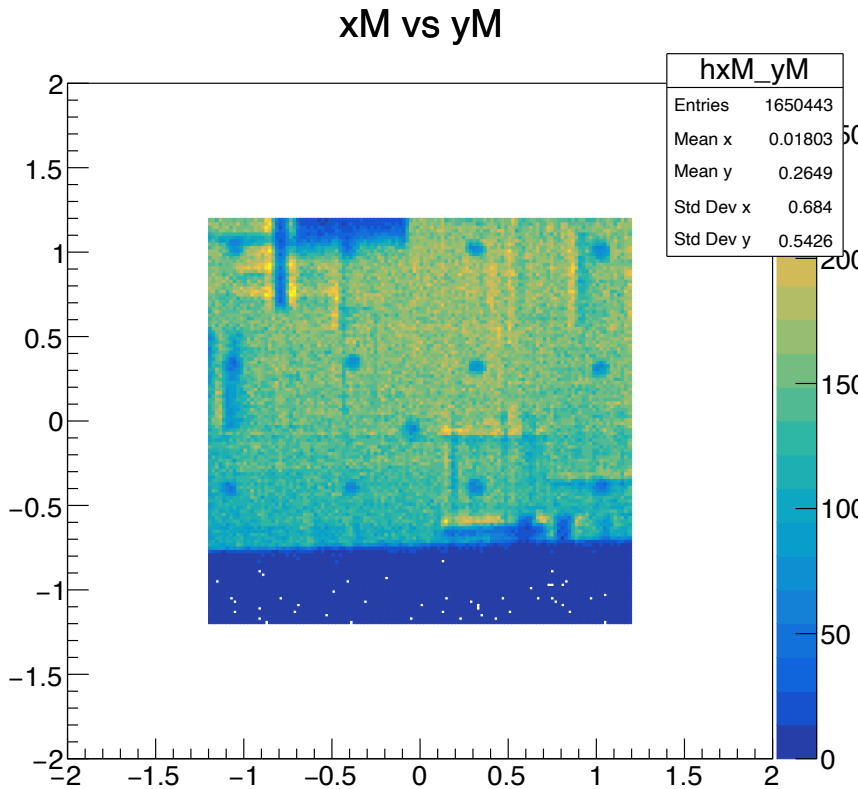
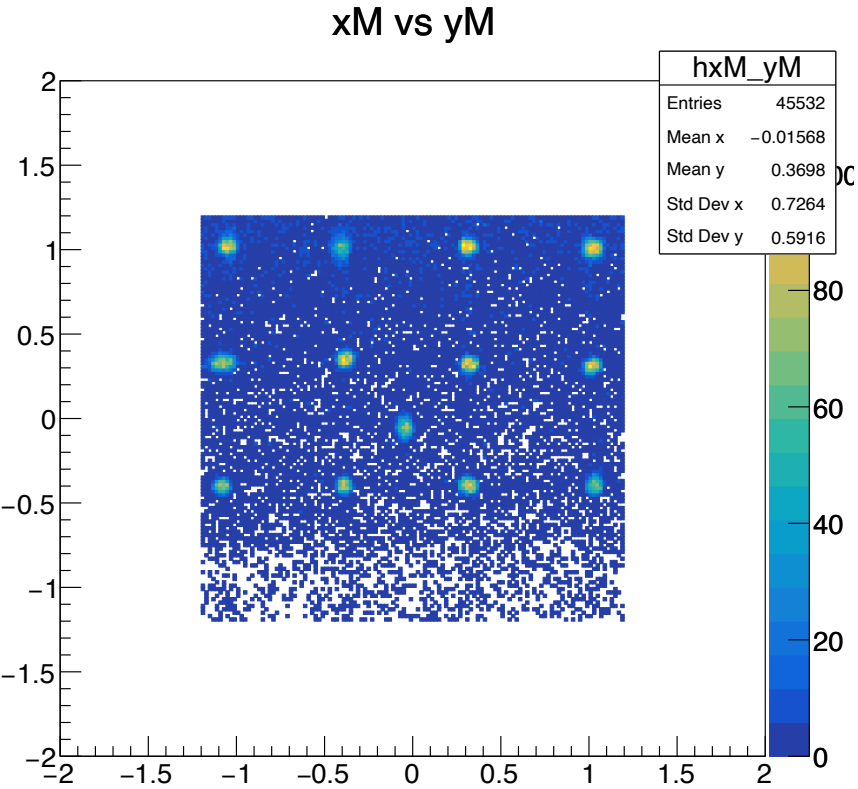
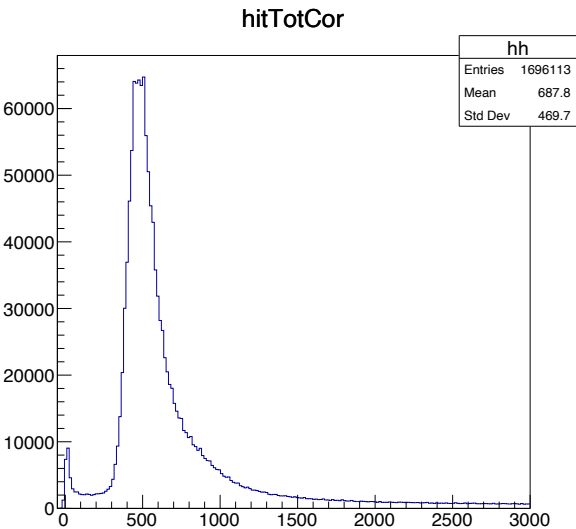


Pion 50 – 51, Troll1 Water – good SSIB

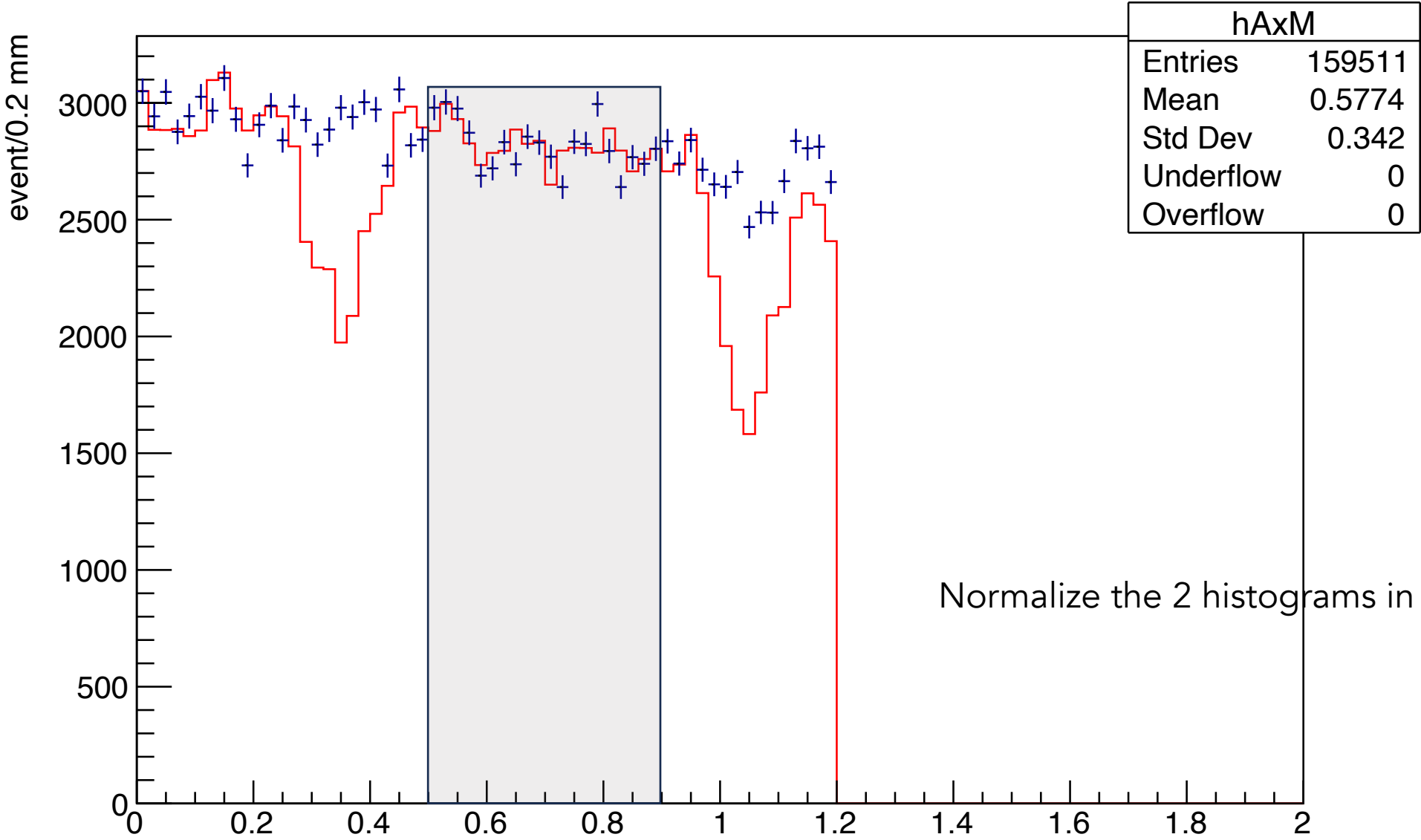
hxM with fibers



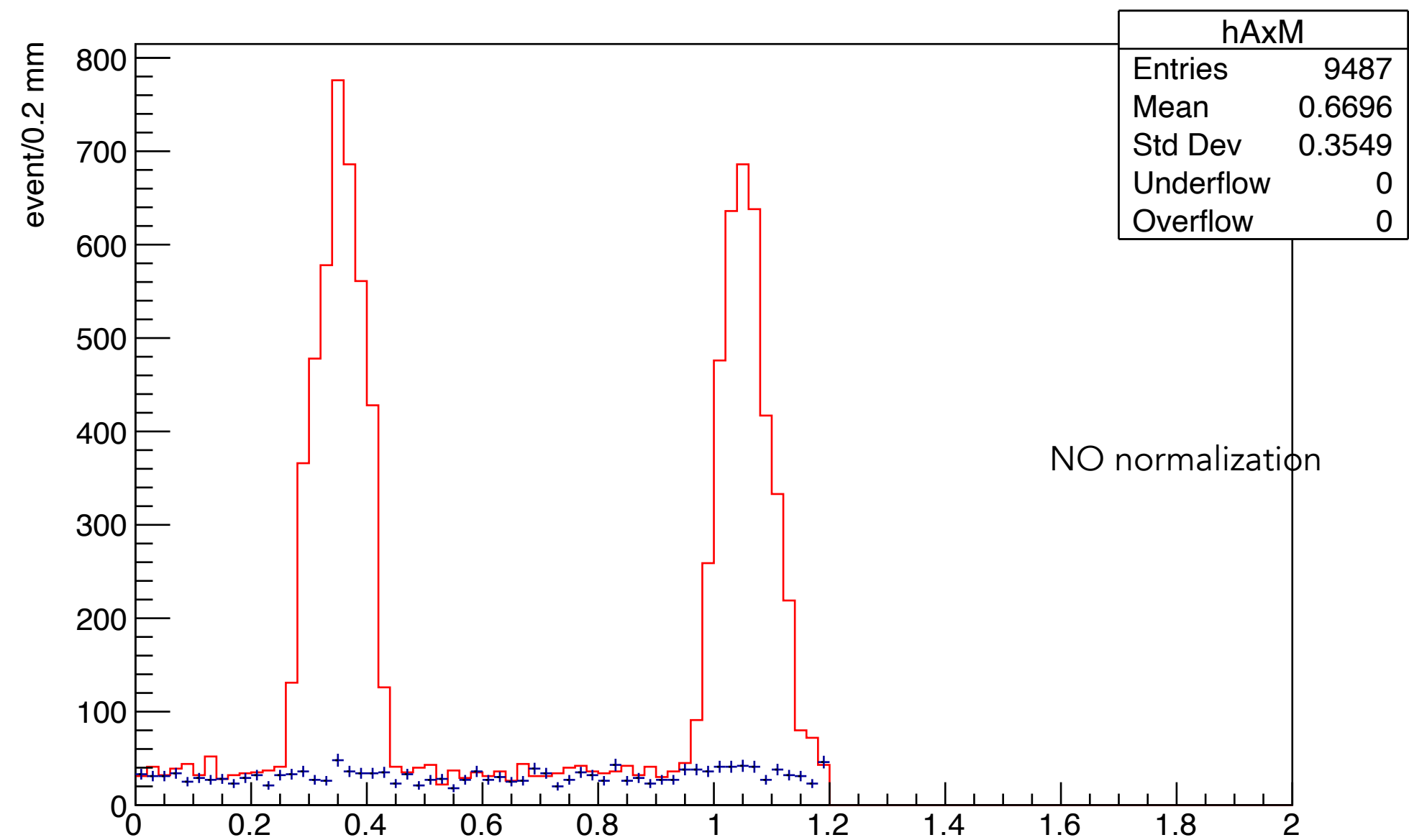
Pion runs 41 42 43 Troll1 Water good SSiB



Pion runs 41 42 43 Troll1 Water good SSiB
hxM with fibers

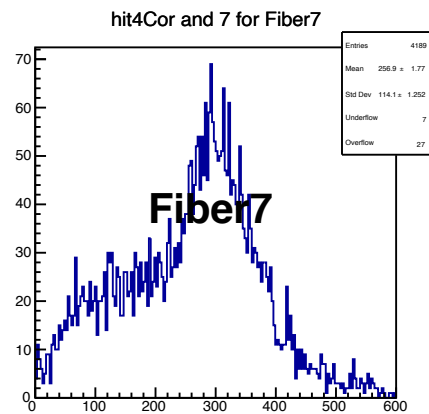
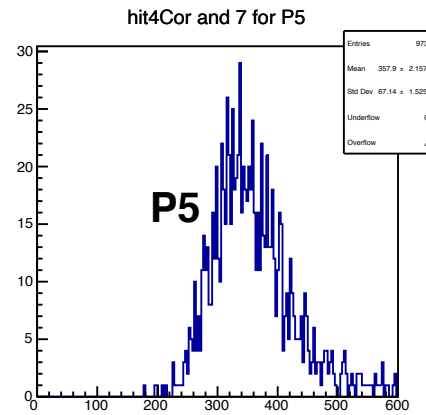
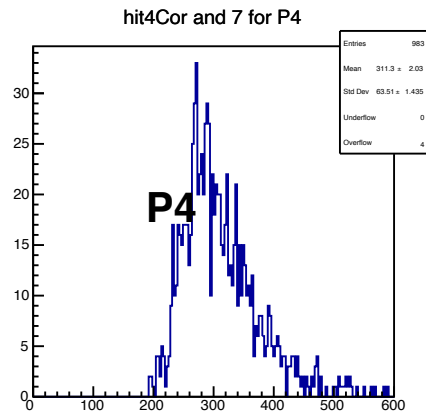
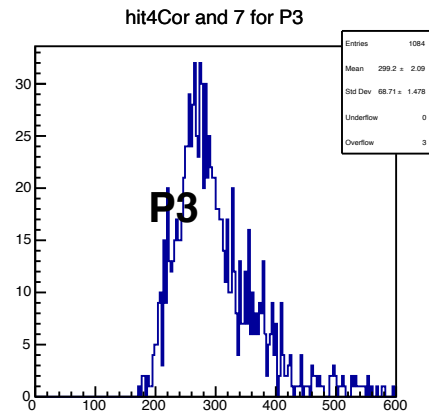
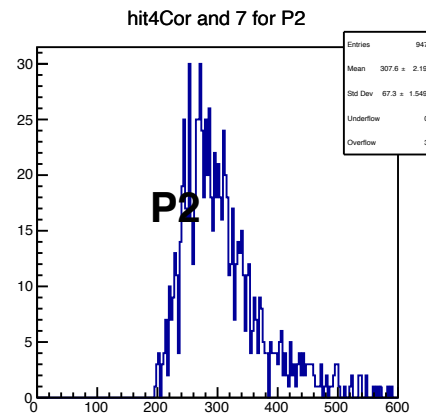
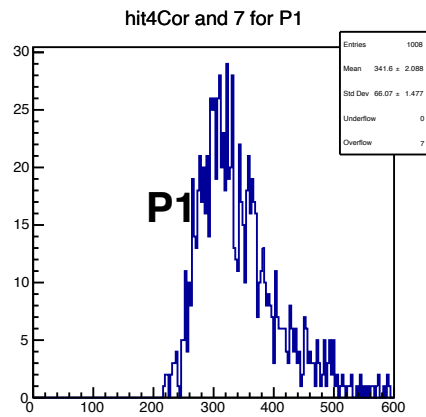
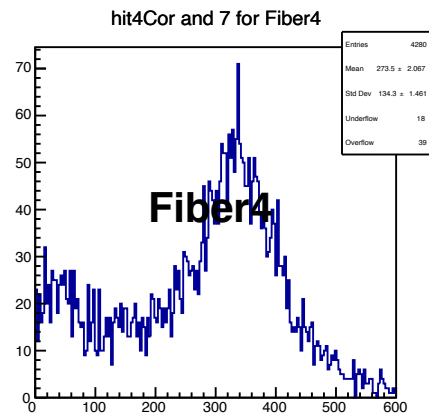


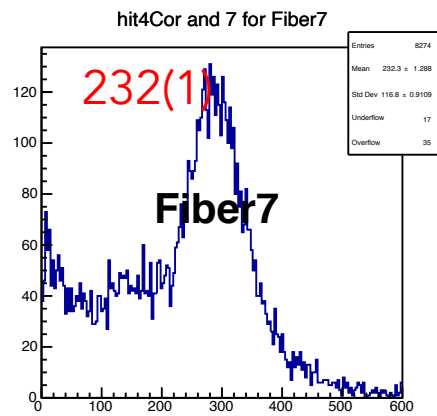
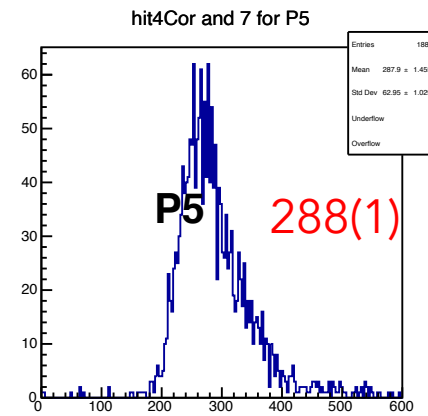
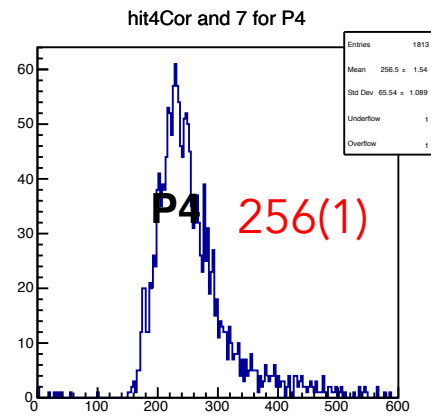
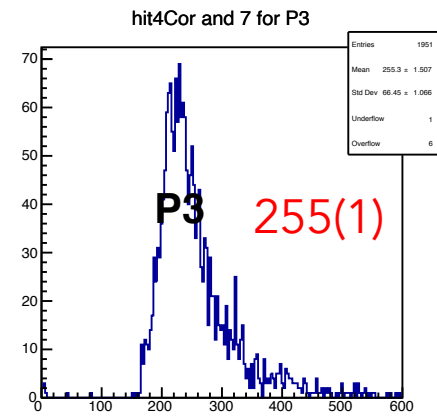
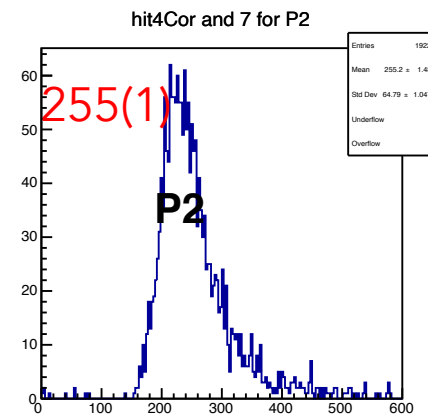
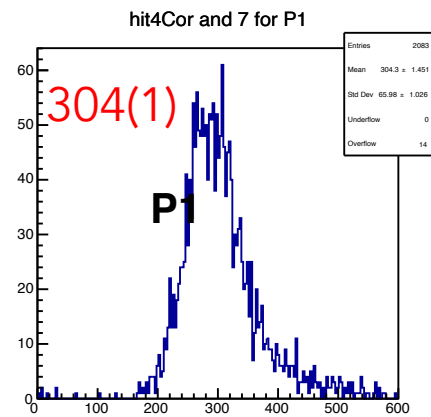
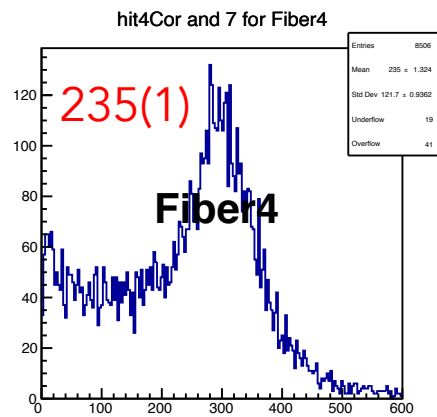
Normalize the 2 histograms in the region $.5 < |xM| < .9$



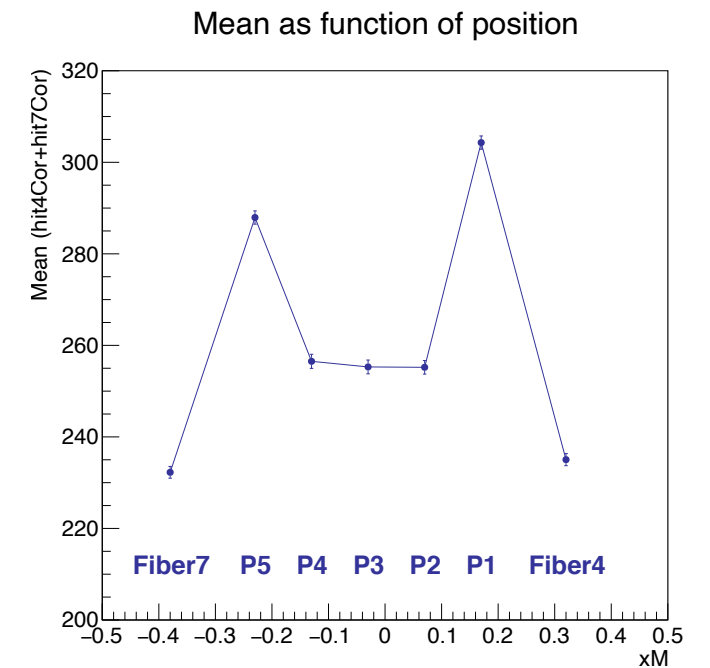
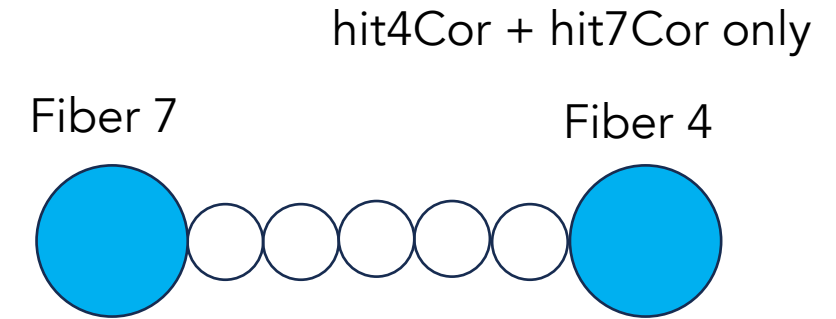
hit4Cor + hit7Cor only in the following slides

hit4Cor + hit7Cor only



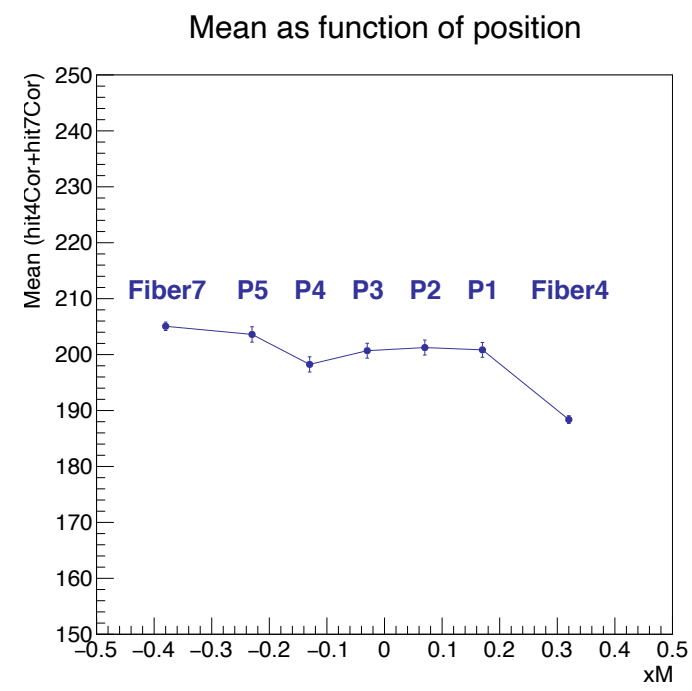
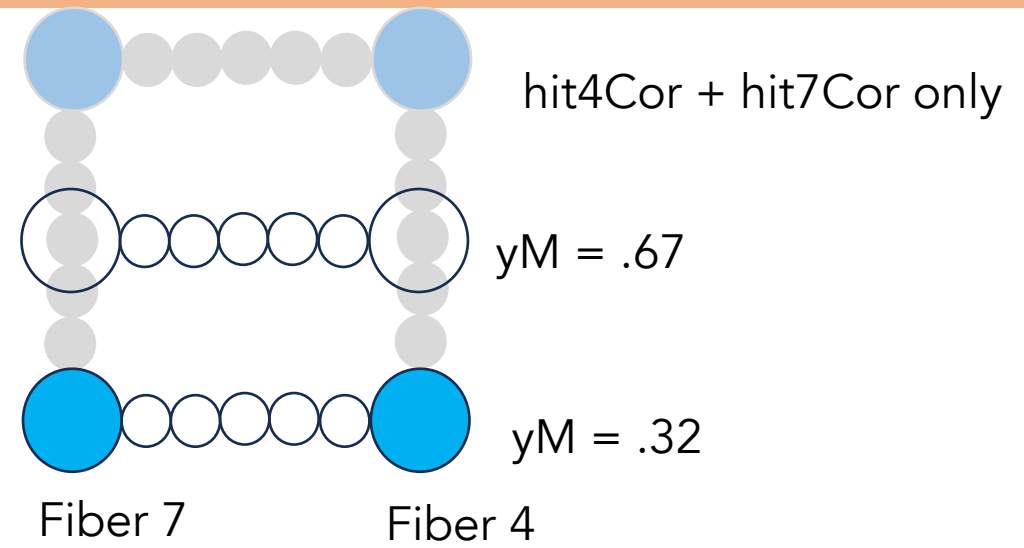
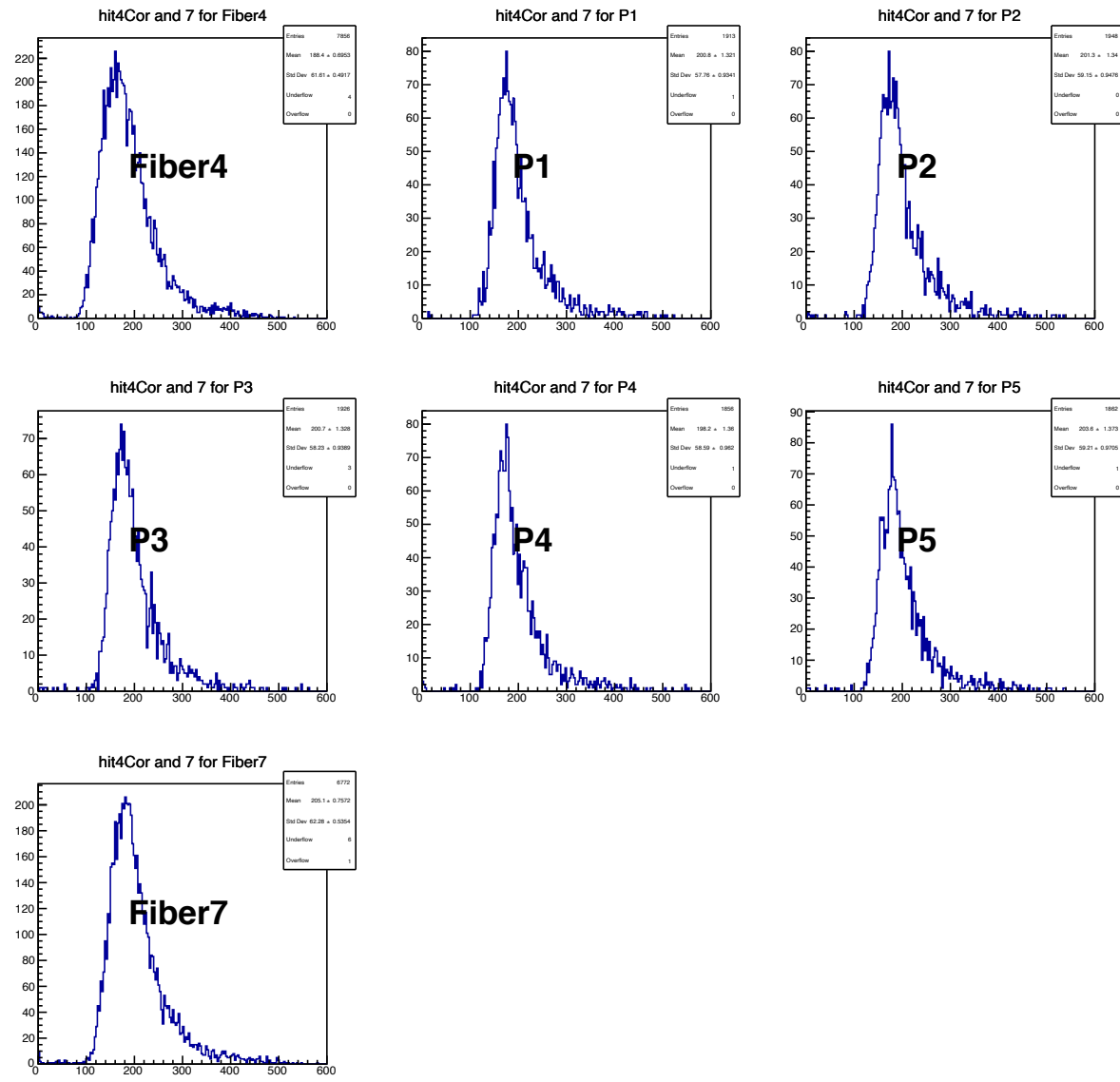


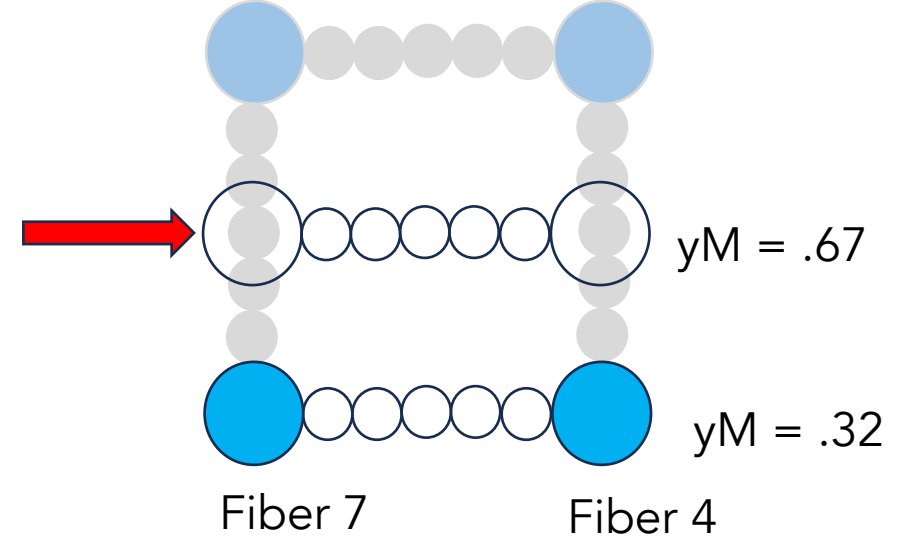
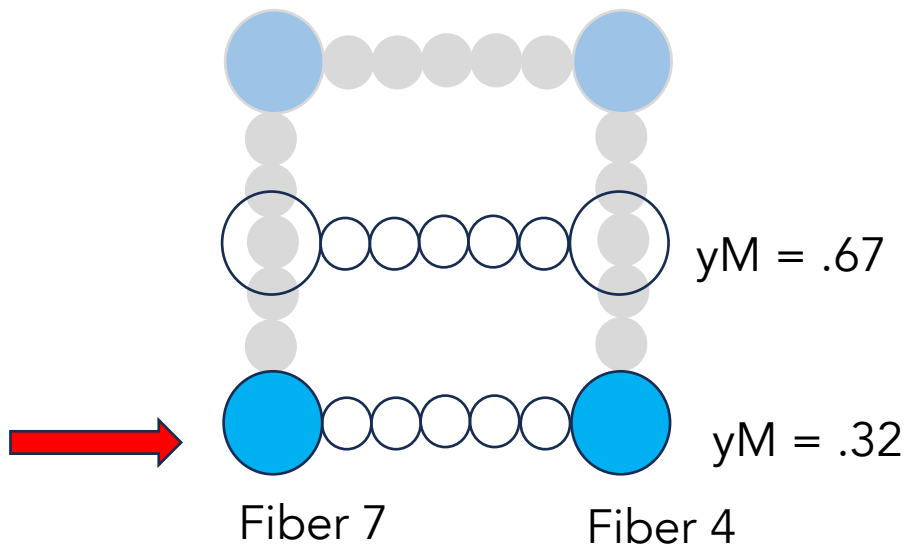
- When we are IN a fiber we have less light
- When we are out but nearby (P1, P5) we have the max of light
- When we are the further away (P3) we loose light (due to absorption ?)



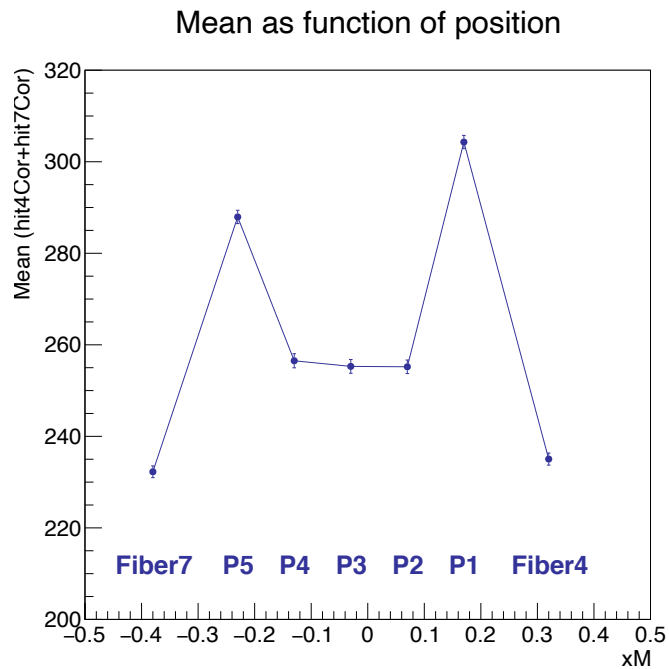
Variation of the order of 25 %

Pion Run (41,42,43)
More stat but water and different SiBB settings

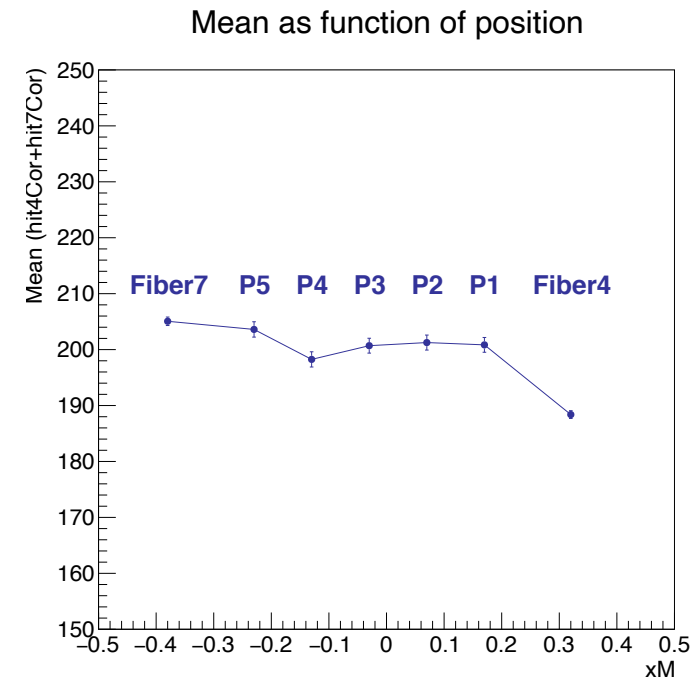




Pion Run (41,42,43)
More stat but water and different SiBB settings



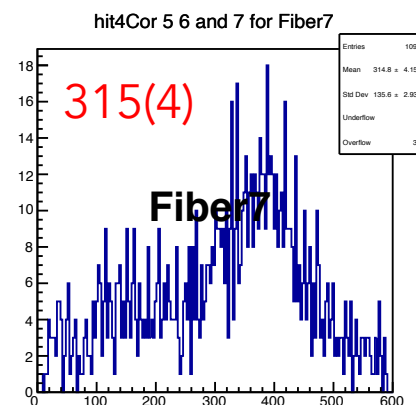
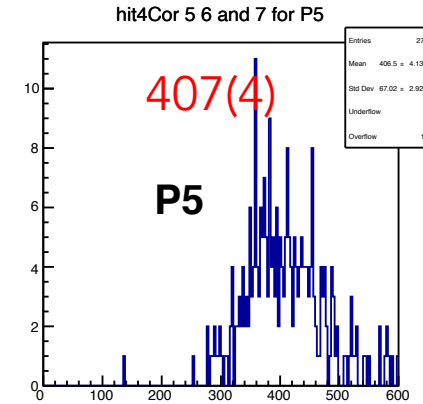
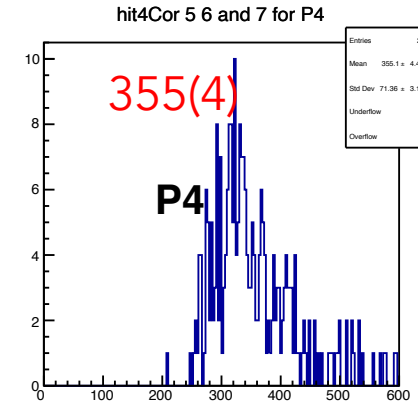
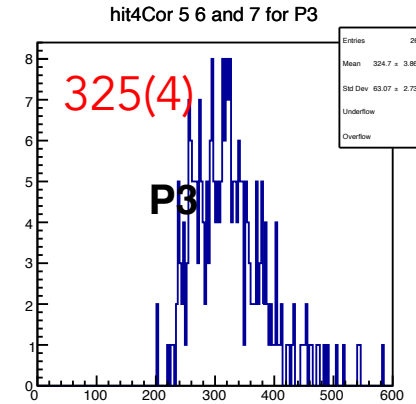
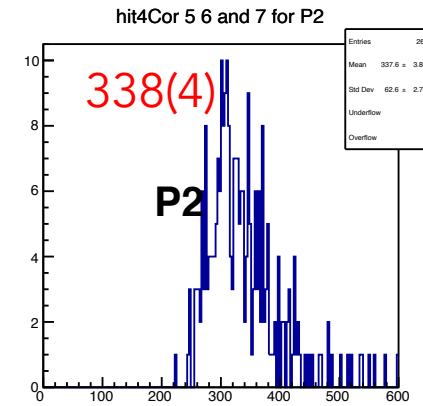
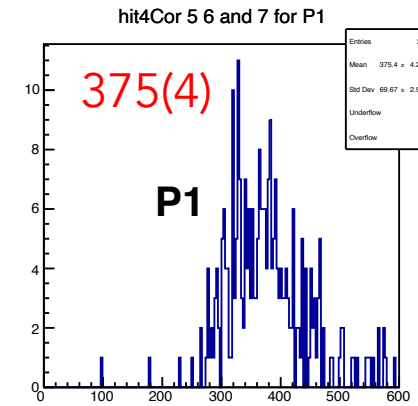
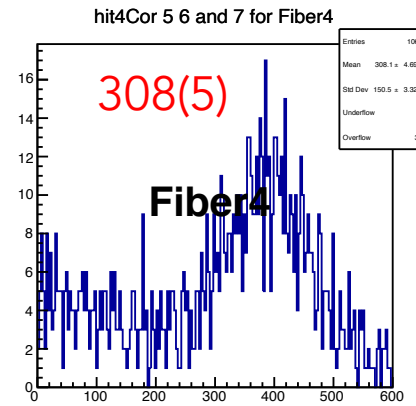
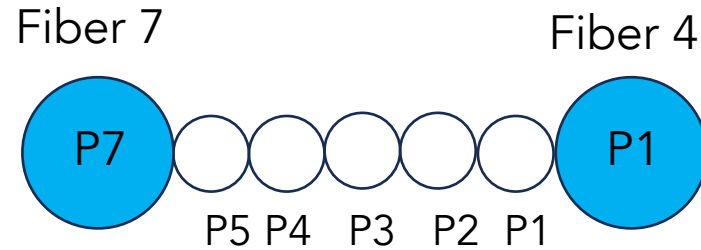
Large variations ????



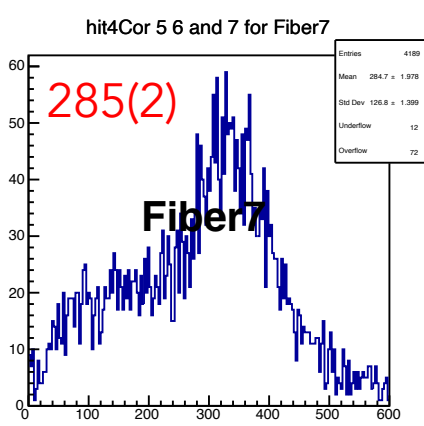
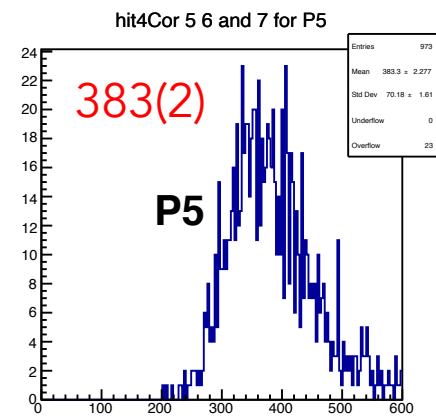
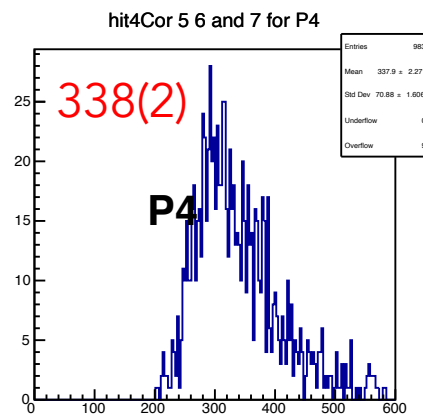
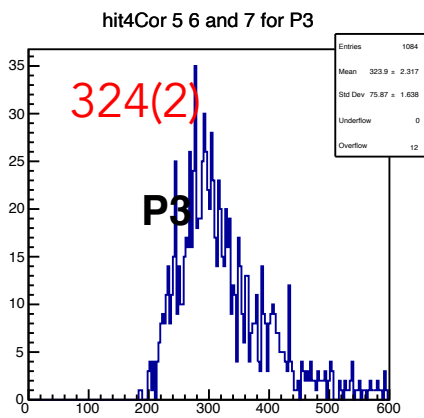
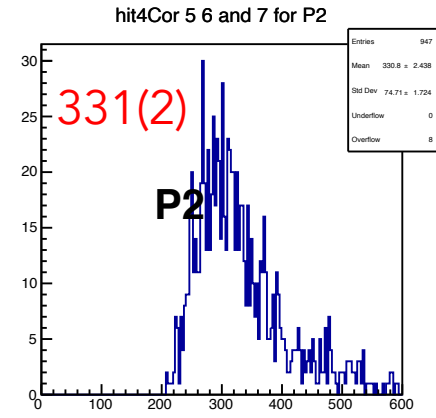
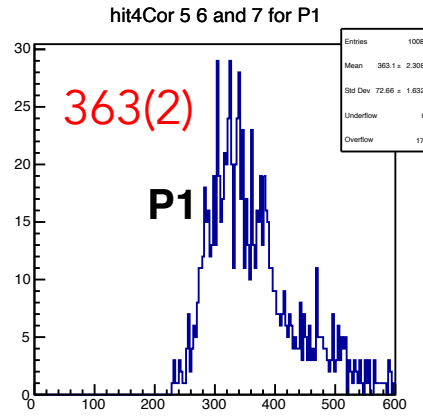
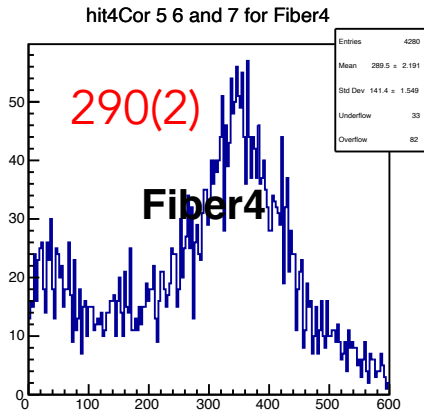
hit4Cor + hit5Cor + hit6Cor + hit7Cor
only in the following slides

Let's look at the variation of hit4Cor + hit5Cor + hit6Cor + hit7Cor when the muon is in Fiber4, Fiber7 and P1 to P5

Muon Run (59,60)

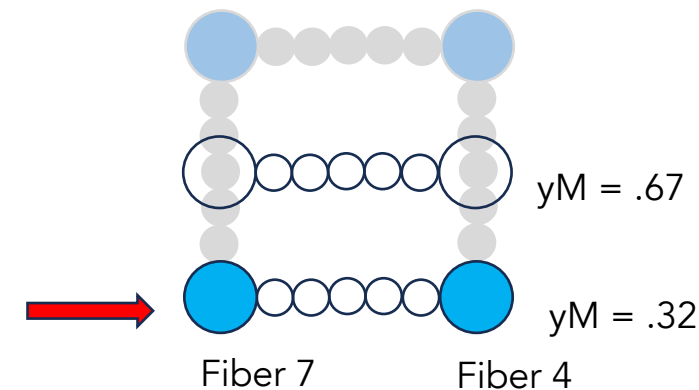
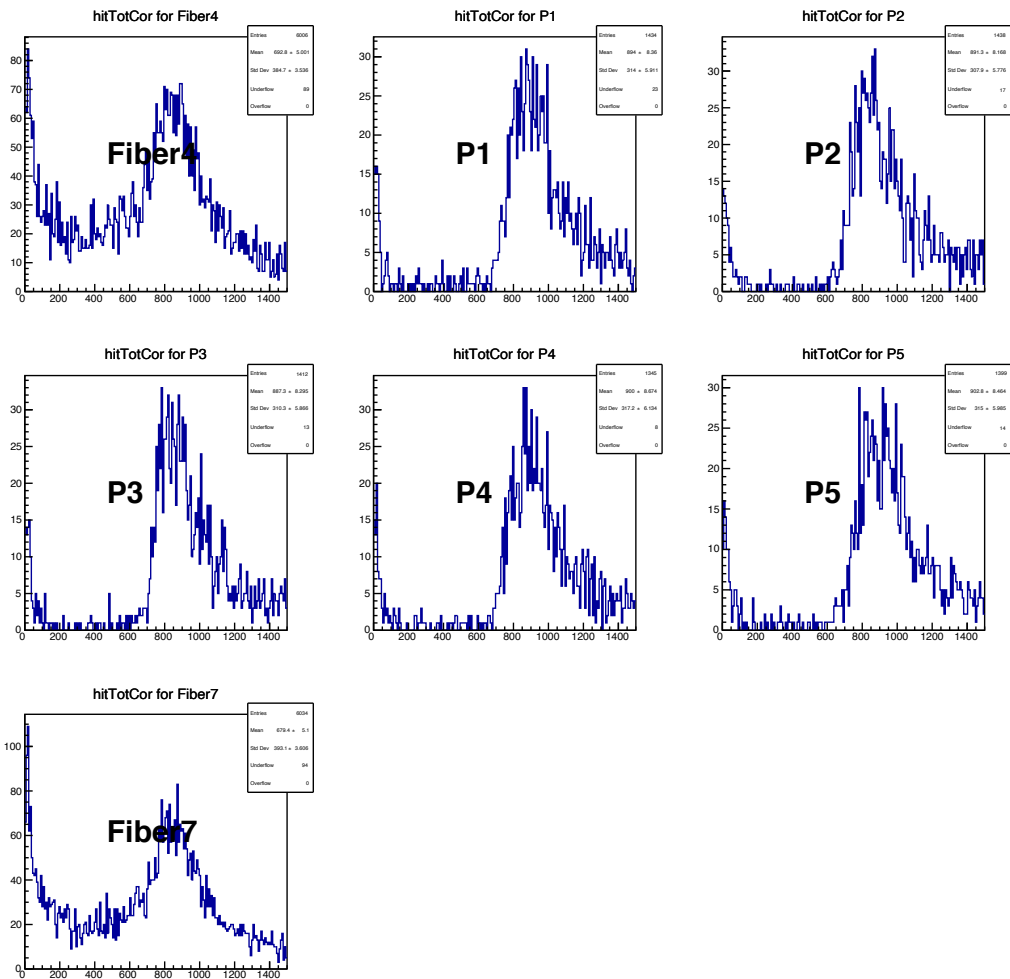


- When we are IN a fiber we have less light
- When we are out but nearby (P1, P5) we have the max of light
- When we are the further away (P3) we loose light (due to absorption ?)

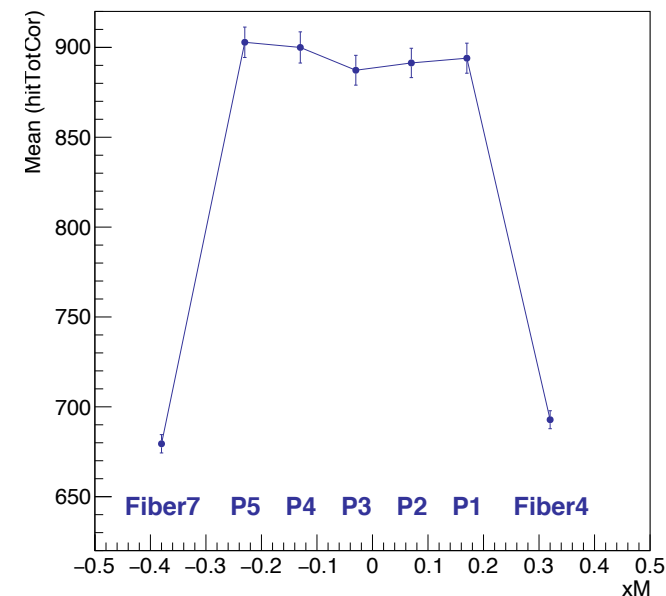


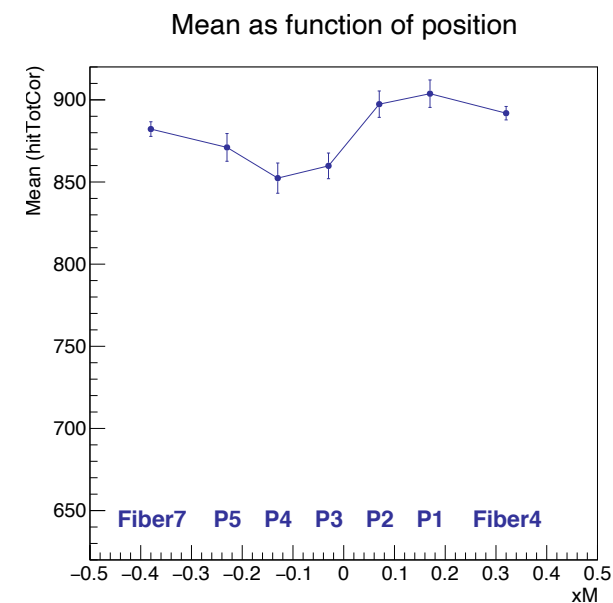
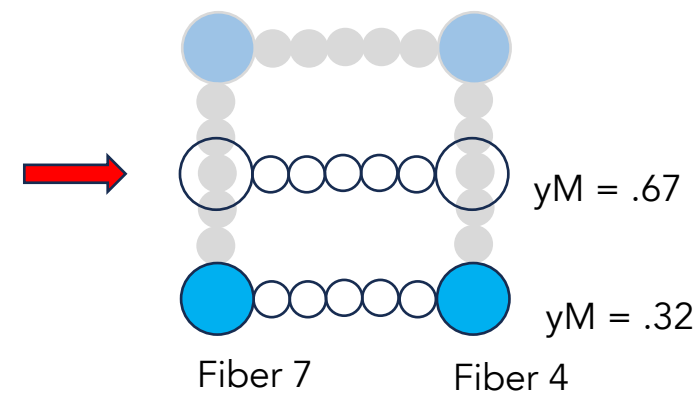
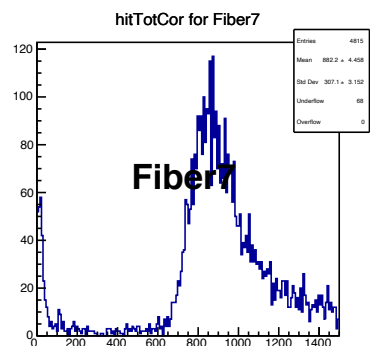
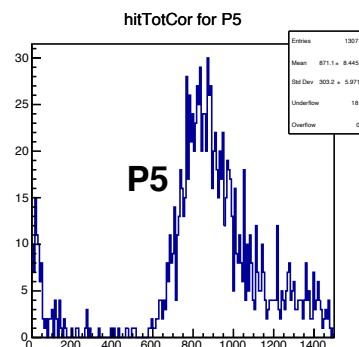
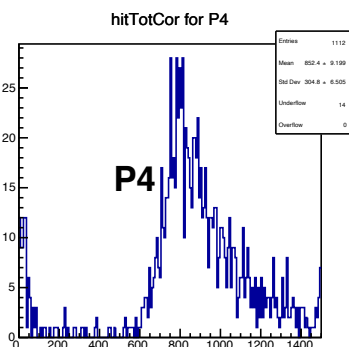
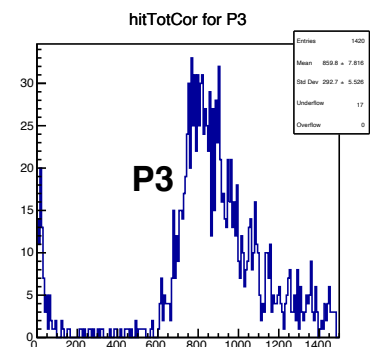
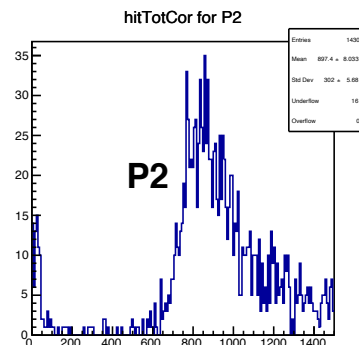
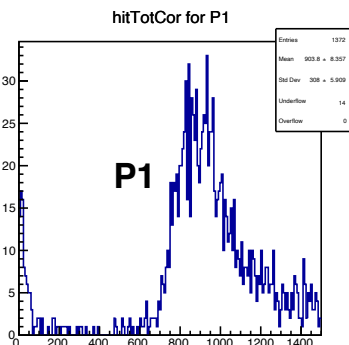
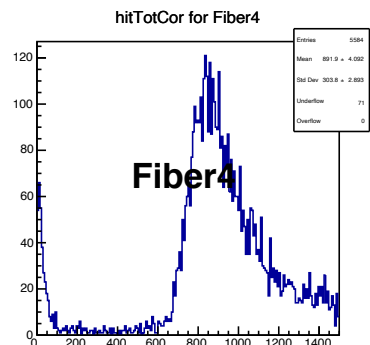
hit4Cor + hit5Cor + hit6Cor + hit7Cor

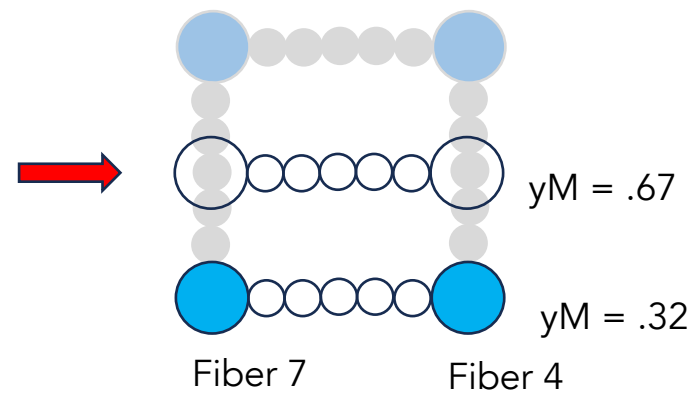
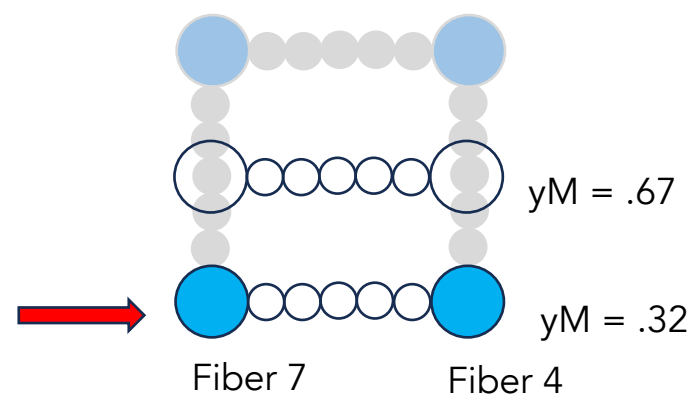
hitTotCor in the following slides



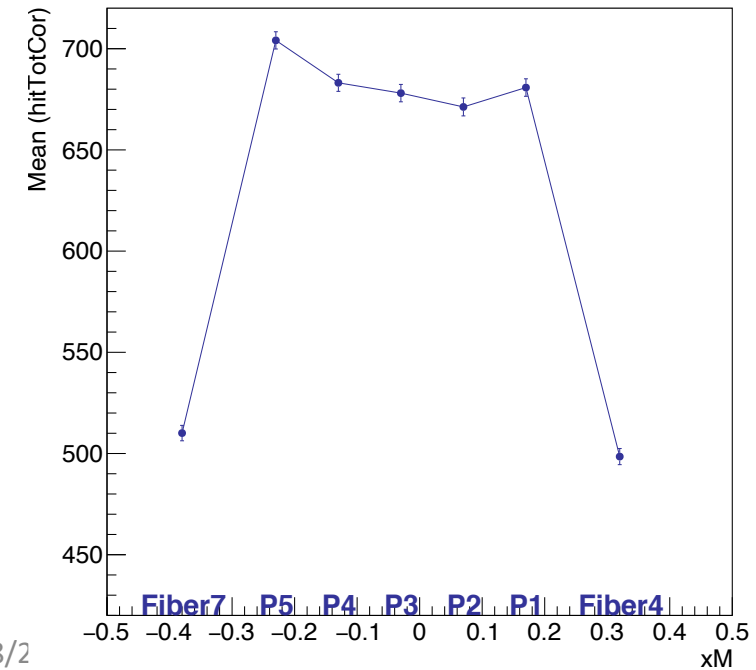
Mean as function of position







Mean as function of position



Mean as function of position

