



# Cracow's activities in the IFR



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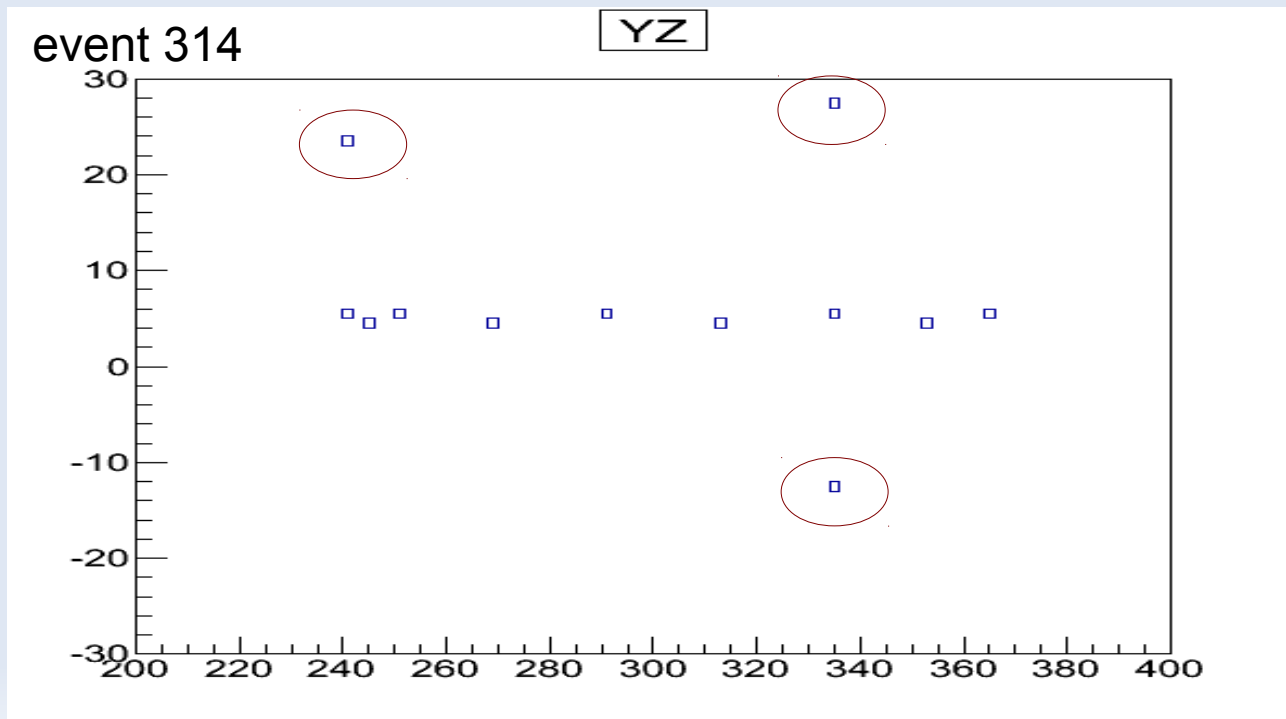


# Clusterizer (Jarek Wiechczyński)

Current version prepared for the purpose of the prototype data analysis to work with muon-like events

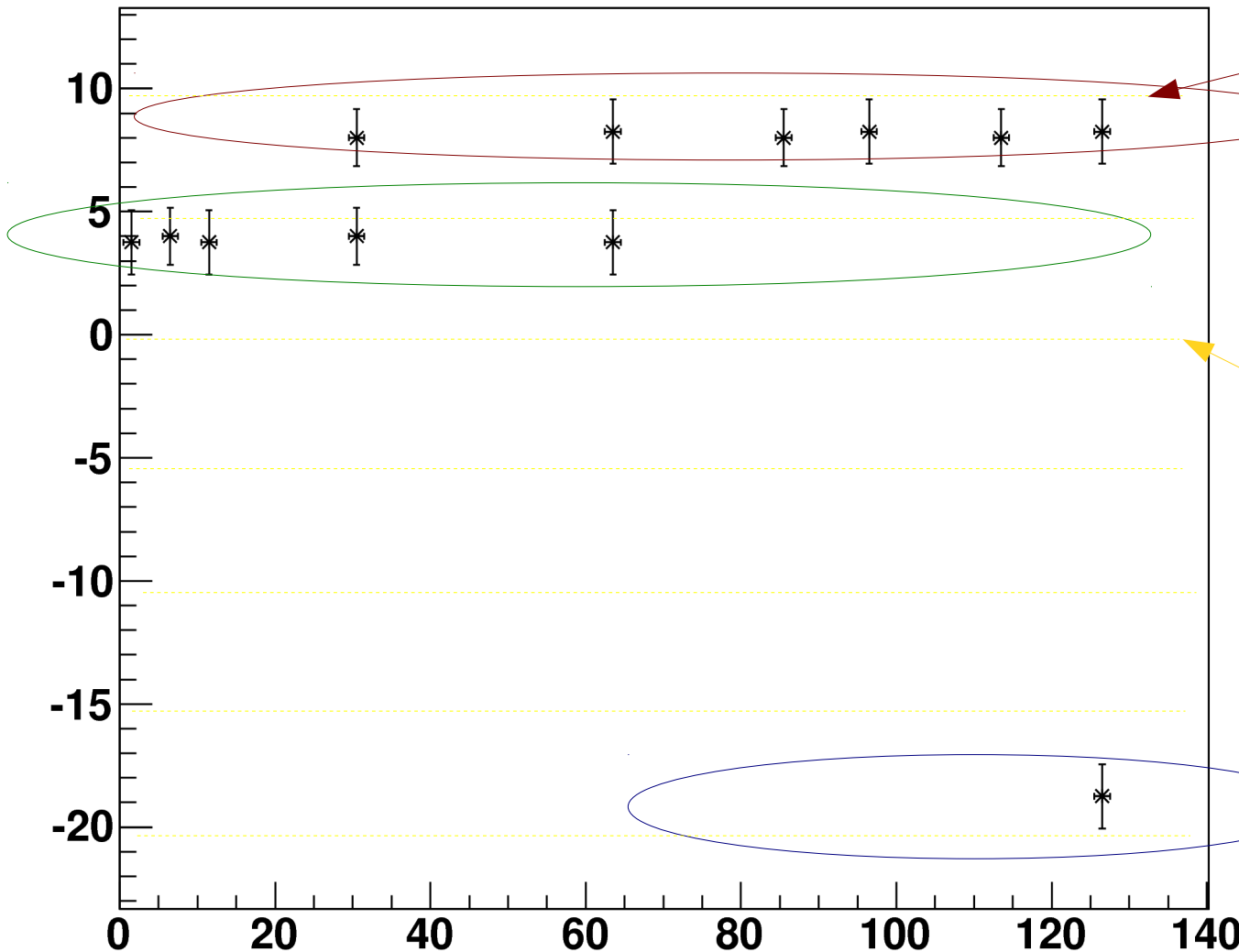
Used for removing possible background hits - recognizing the good muon track for the further fitting

Working on 1dim clusters (IFR3DCluster)



# Clustering YZ plane

18: YZ



the biggest cluster –  
good muon track

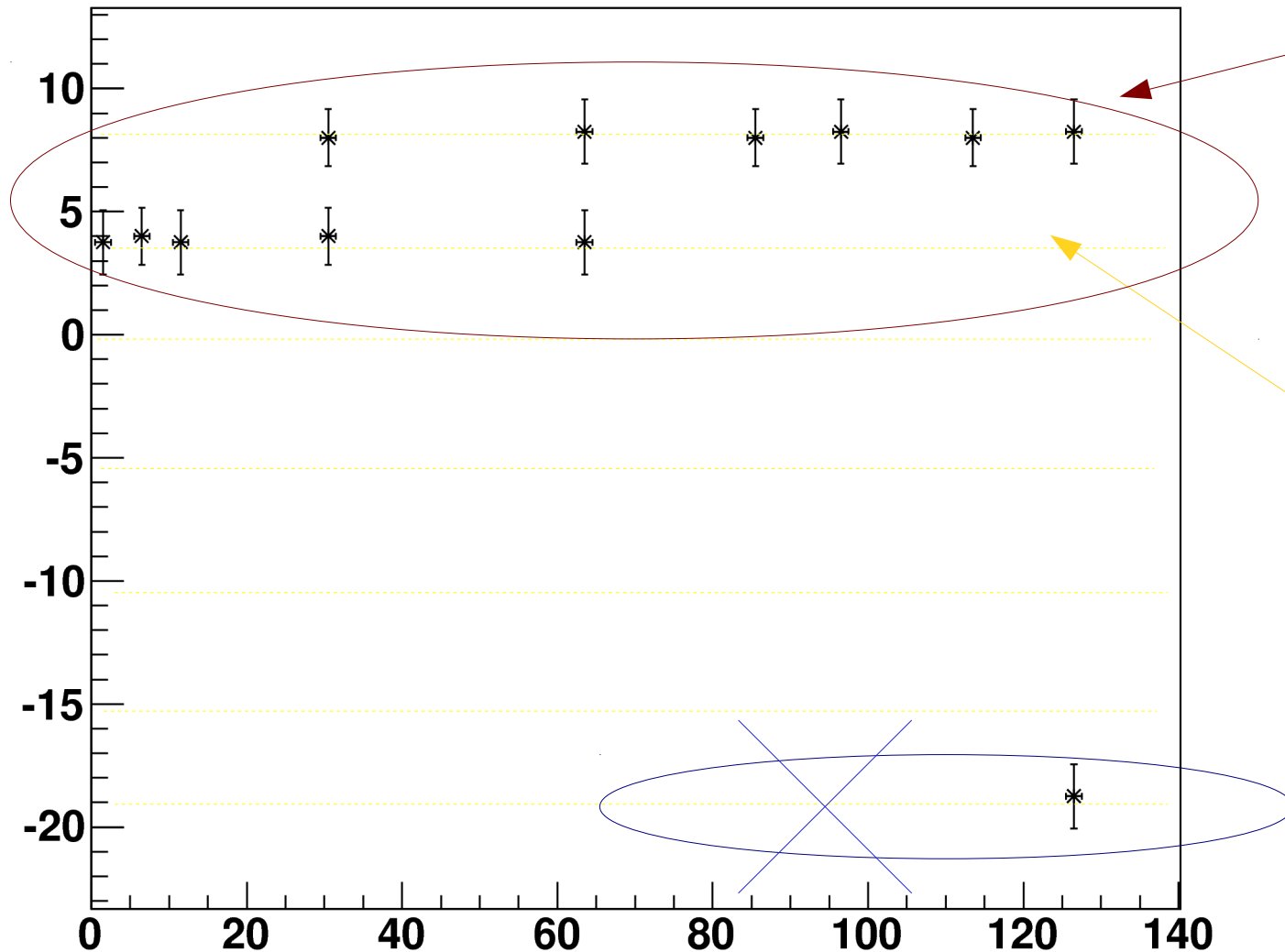
↑ adjacent clusters:  
 $d < 5.1$  cm  
↓ → merge

Centroids -  
initial positions

Points are assigned  
to the closest centroid

# Clustering YZ plane

18: YZ



the biggest cluster –  
good muon track

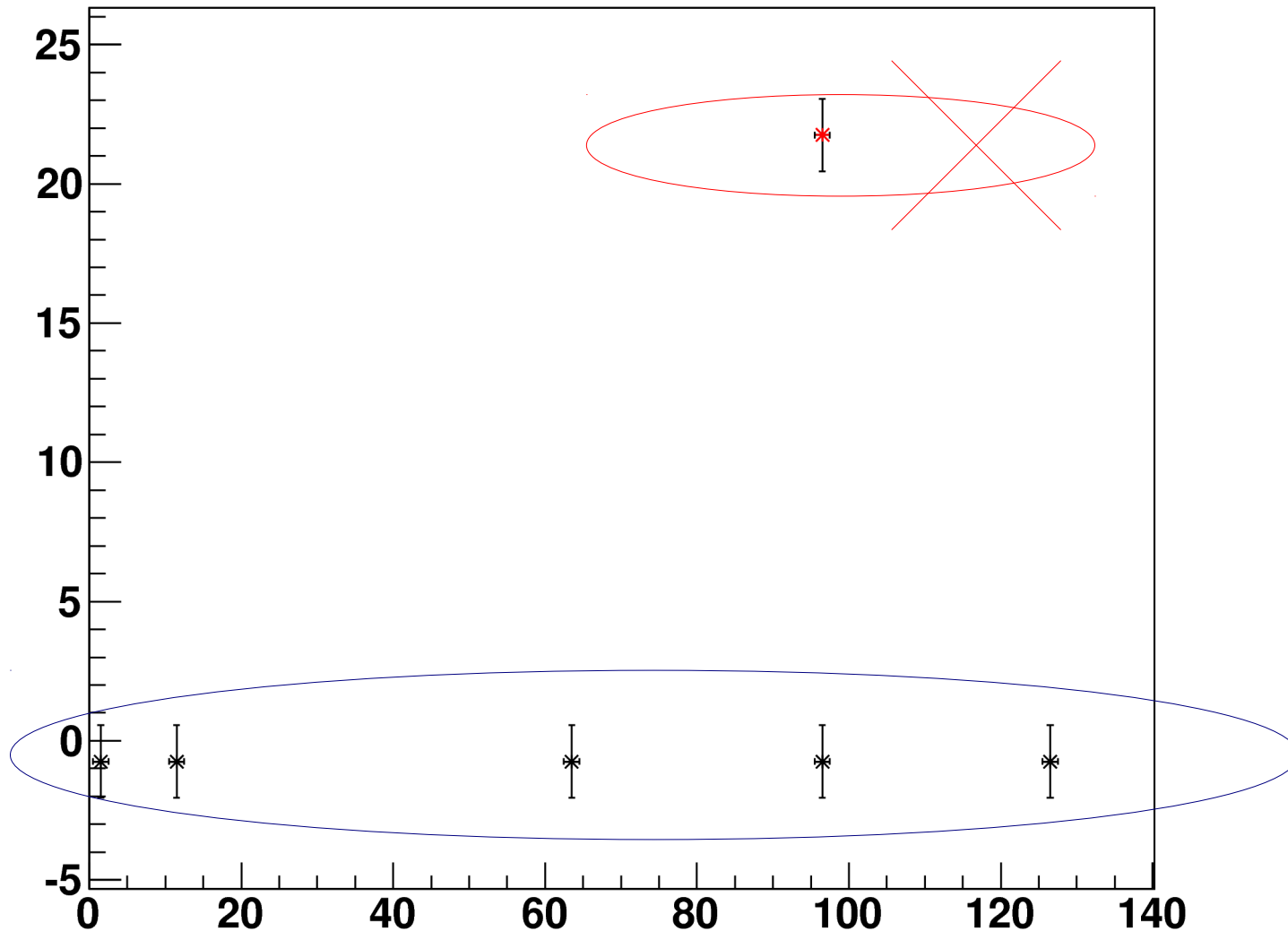


→ merged

Centroids -  
positions  
recalculated  
in the next steps  
according to  
the assigned points

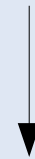
# Clustering XZ plane

9: XZ



1<sup>st</sup> step:

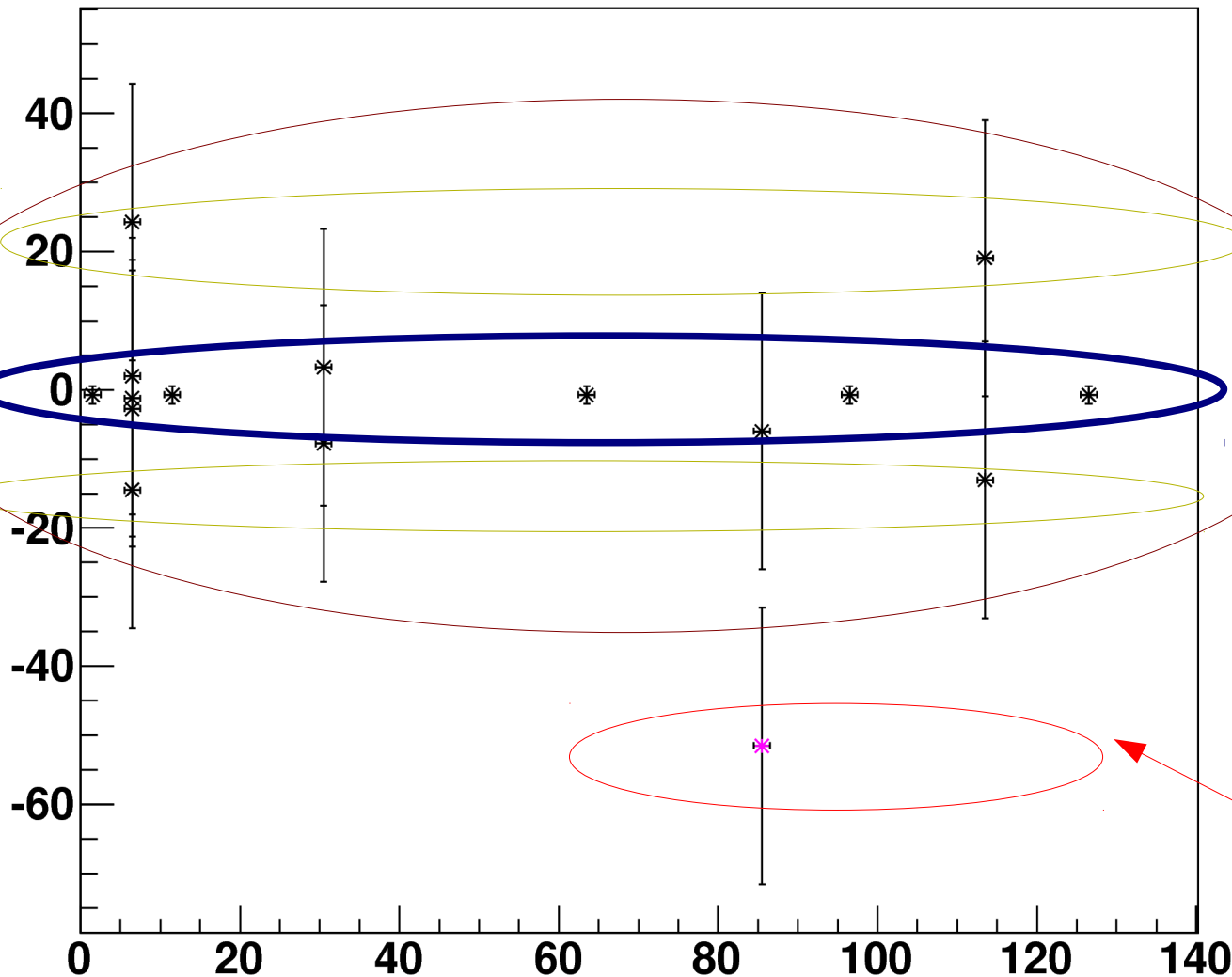
Rejecting only  
BiRO bckg  
points



Choosing  
the reliable  
BiRO track

# Clustering XZ plane

9: XZ



## 2<sup>nd</sup> step:

Including  
TDC hits

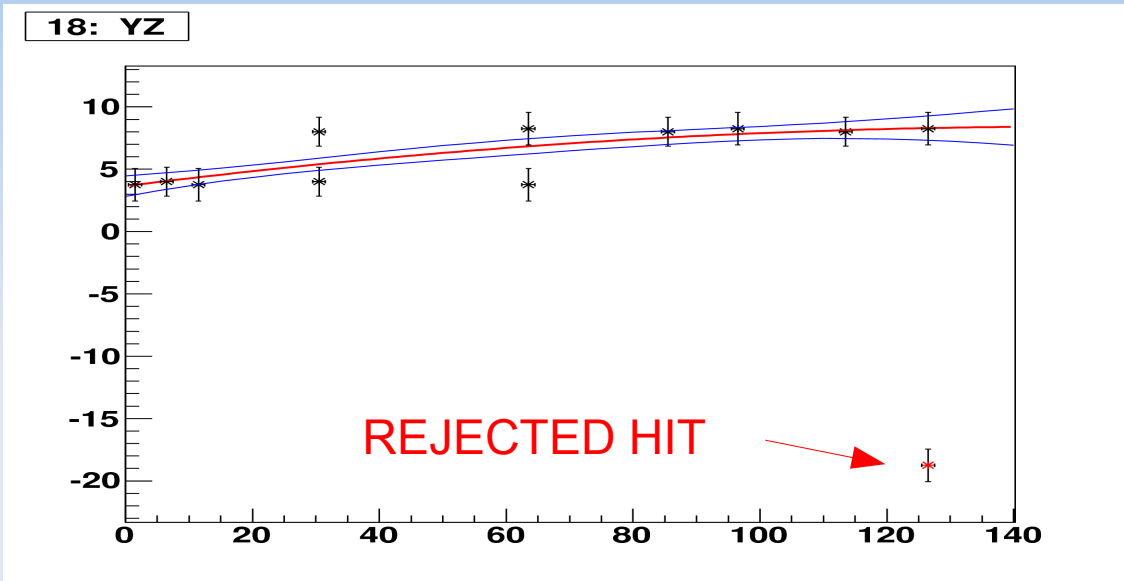
adjacent clusters:  
 $d < 20$  cm  
→ merged

Initial centroids –  
every 20 cm

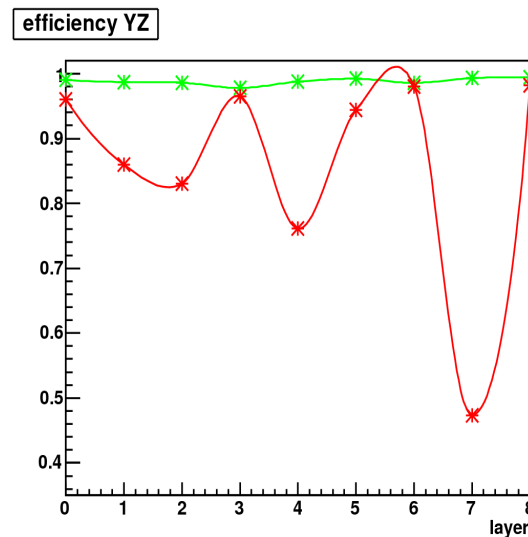
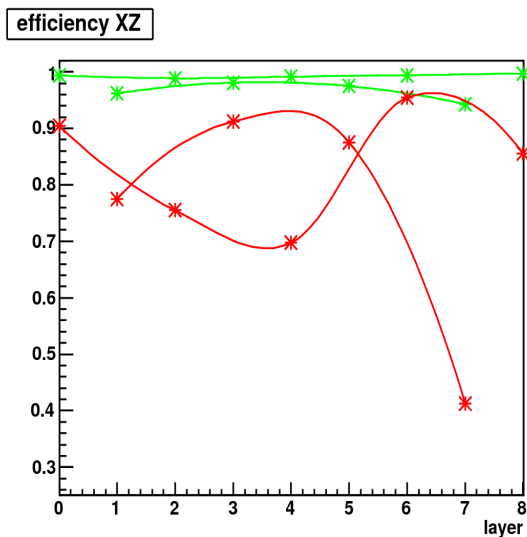
REJECTED

# Fit, efficiency, residuals

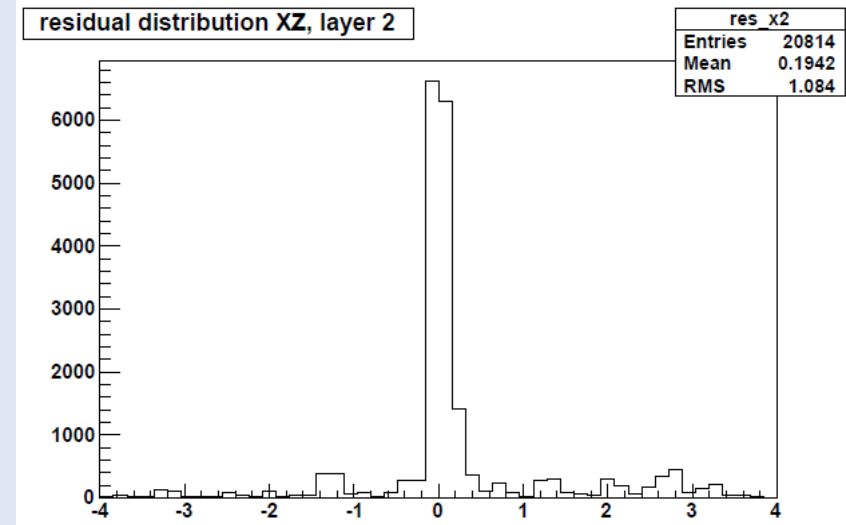
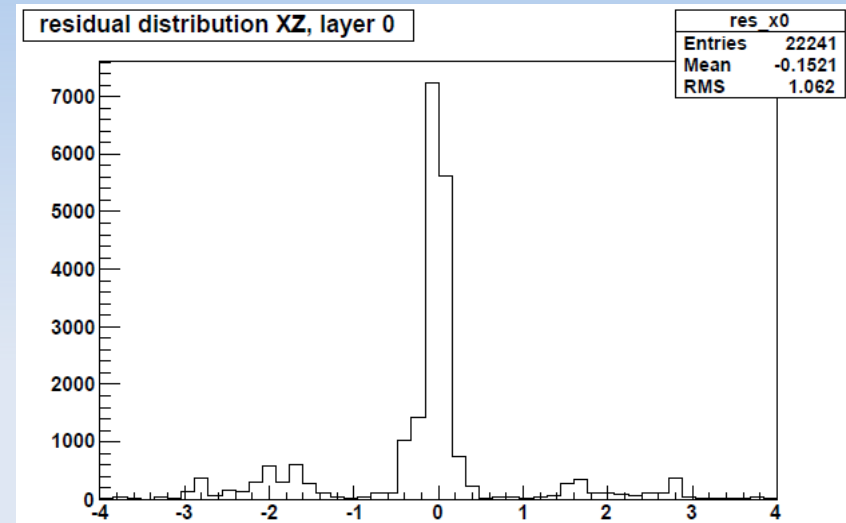
- Fit to the obtained muon track:



- efficiency evaluation

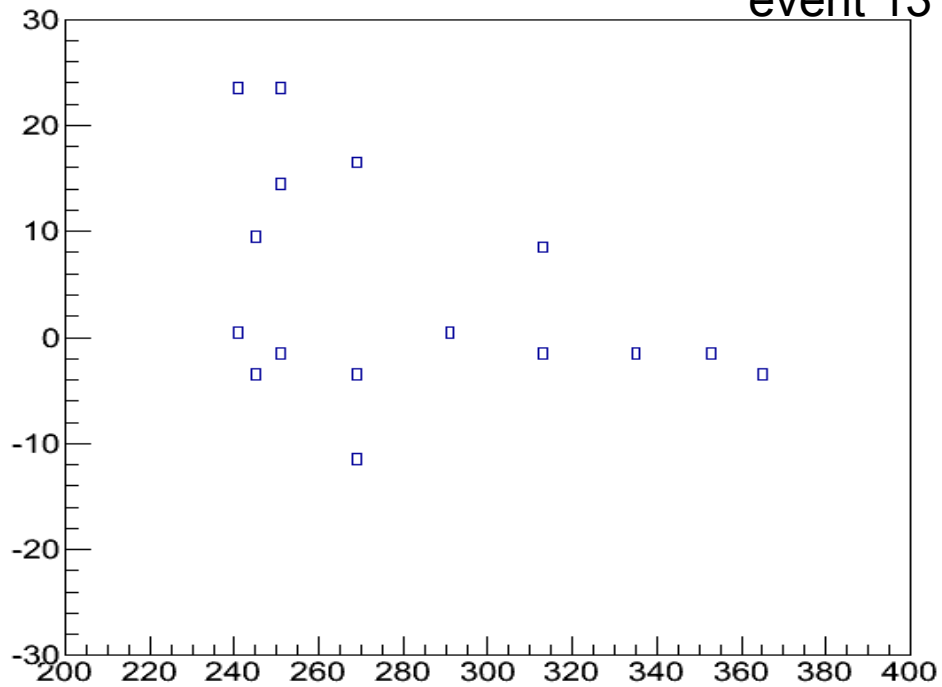


- Example of residual distribution

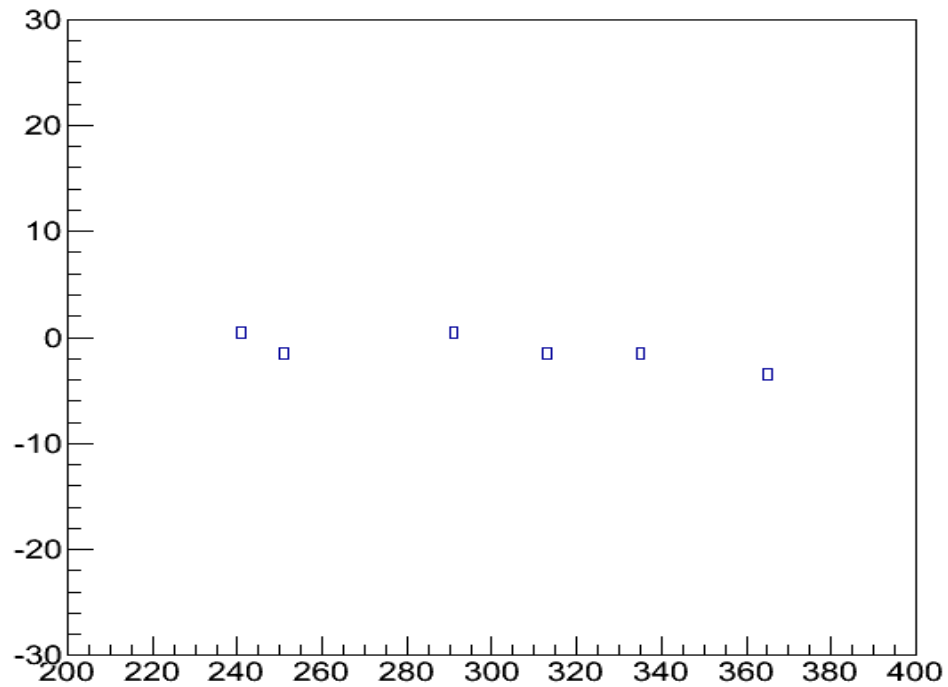


YZ

event 131



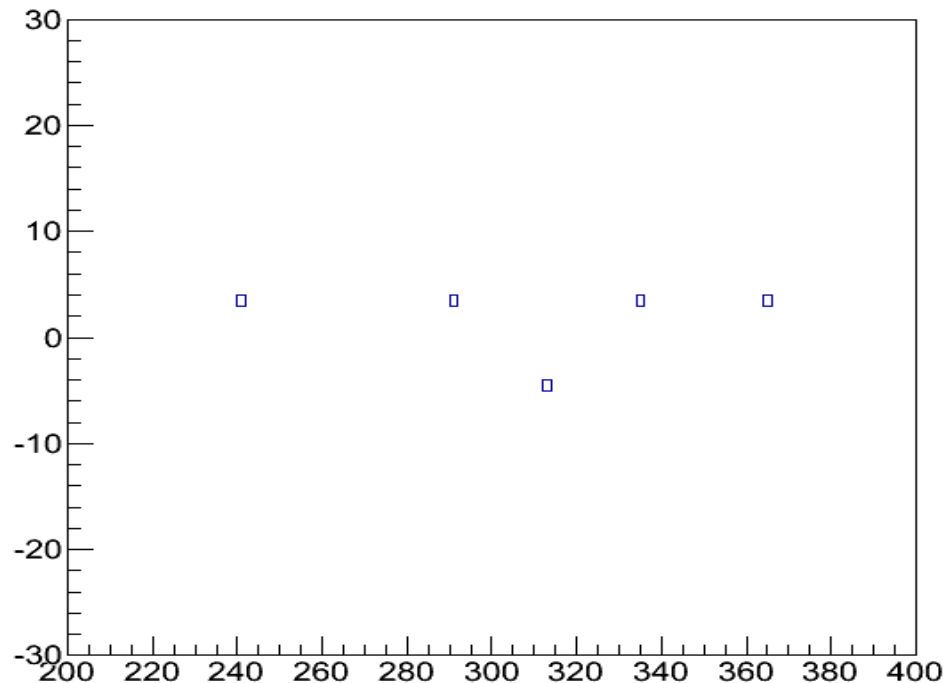
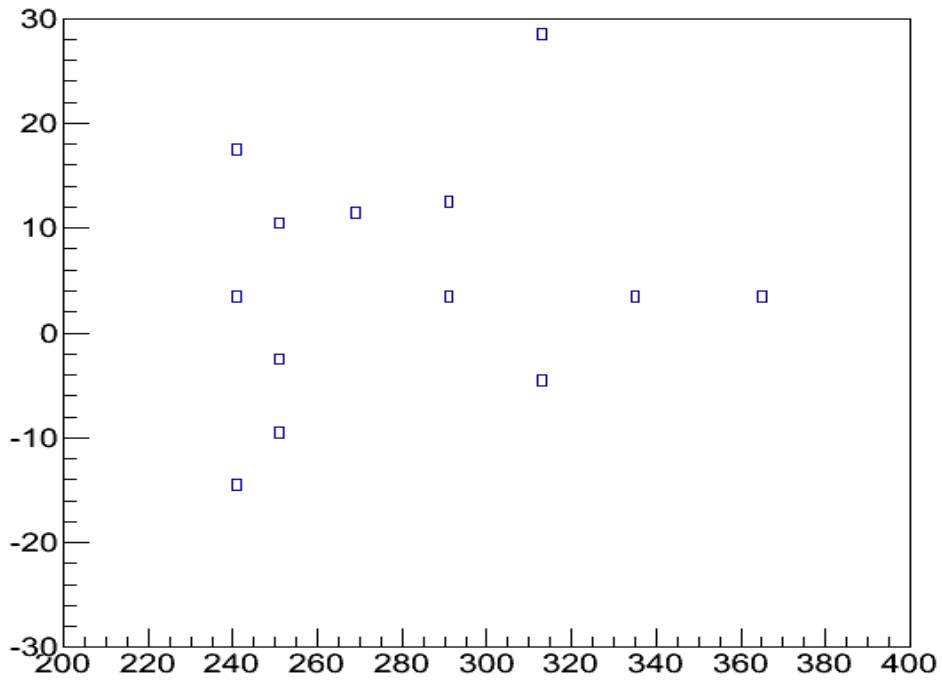
YZ



XZ

clustering

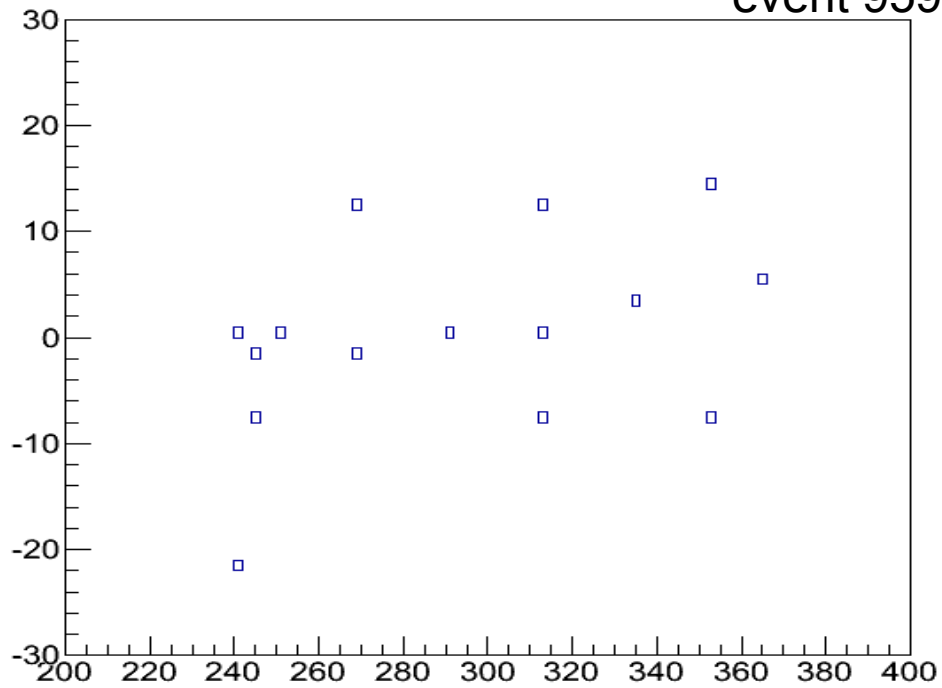
XZ



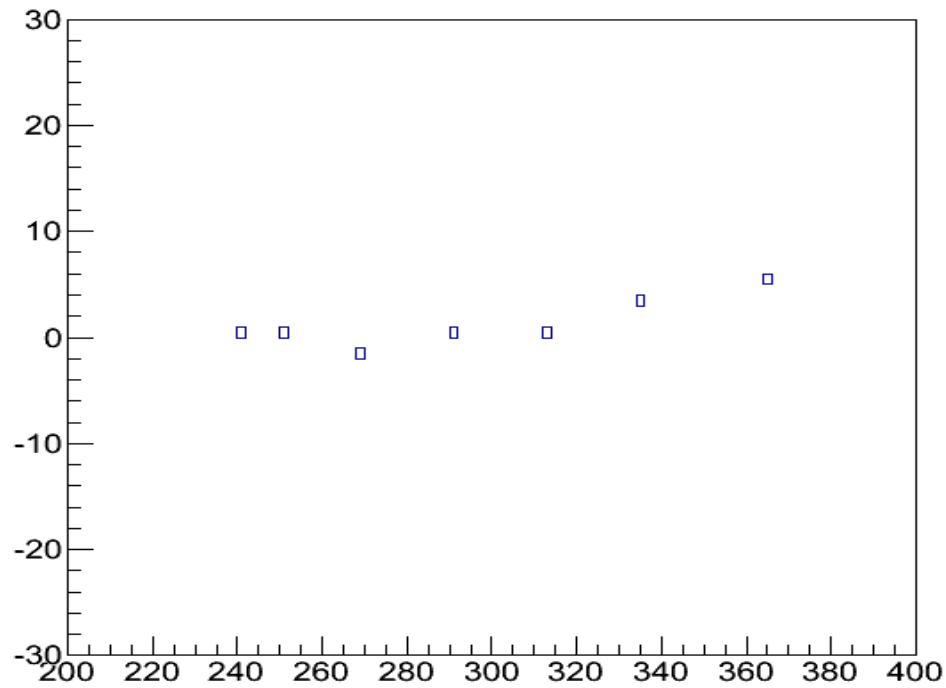


YZ

event 959



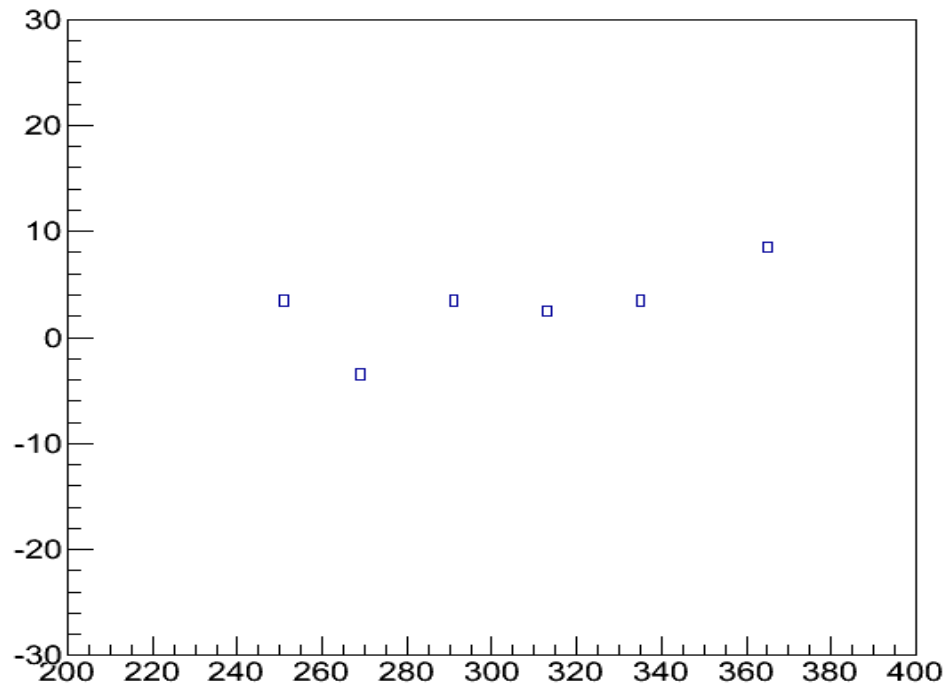
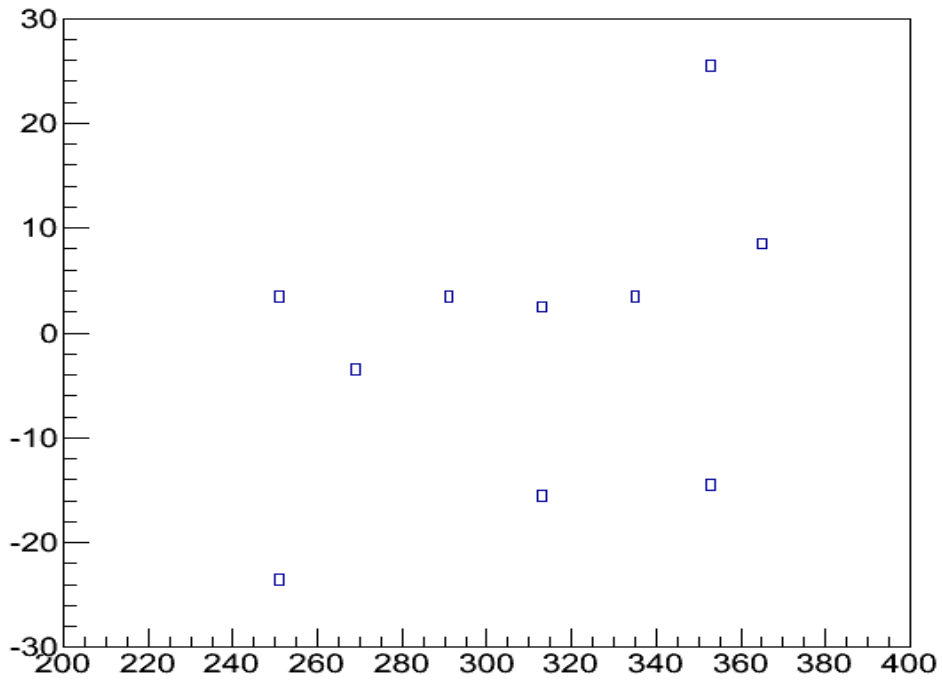
YZ



XZ

clustering

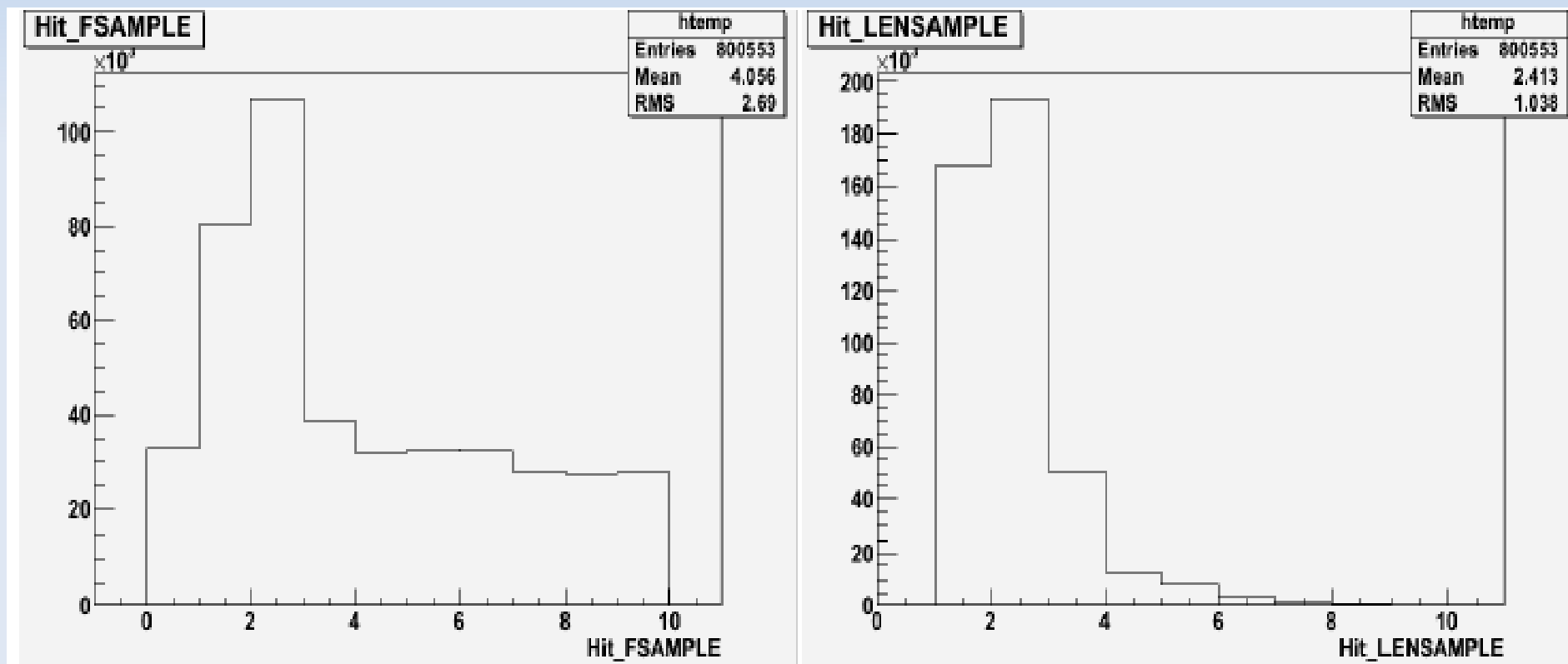
XZ



# Desampler (Marcin Chrzyszcz)

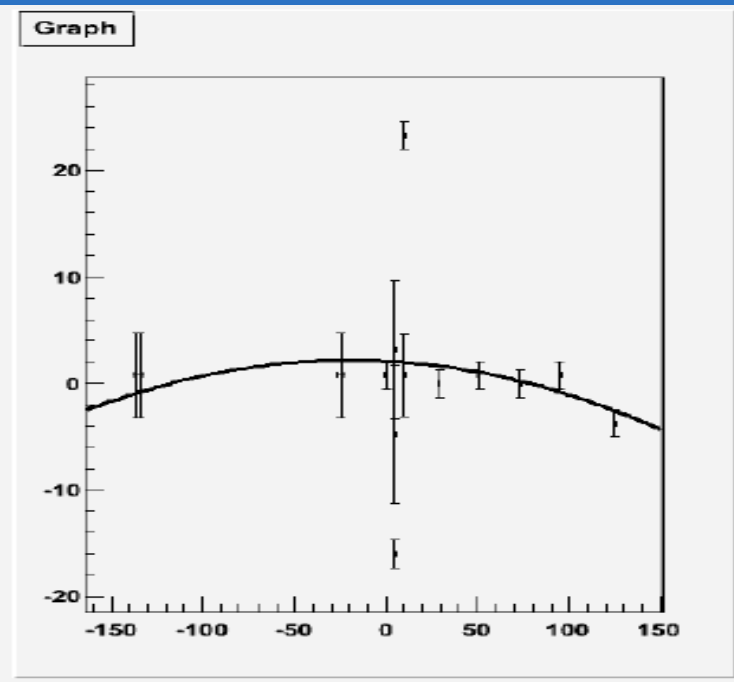
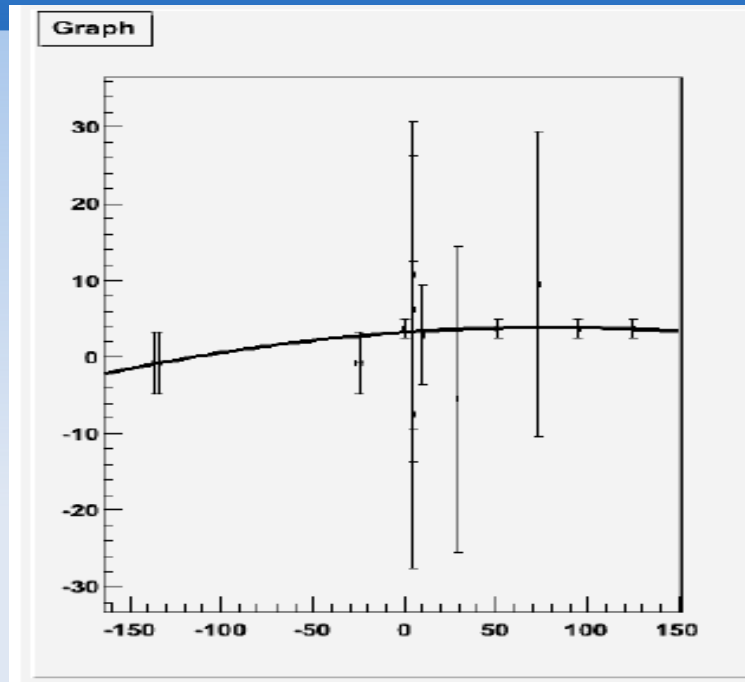
BIRO takes measurements 10 times.

Ex. 0011001110 – counted as two separate hits occurred at 2 and 6 (Hit\_FSAMPLE variable) and lasted for 2 and 3 measurements (Hit\_LENSAMPLE variable)



Valuable for recognizing pion contamination

# FIT and additional information to the ntuple



## • Fitter:

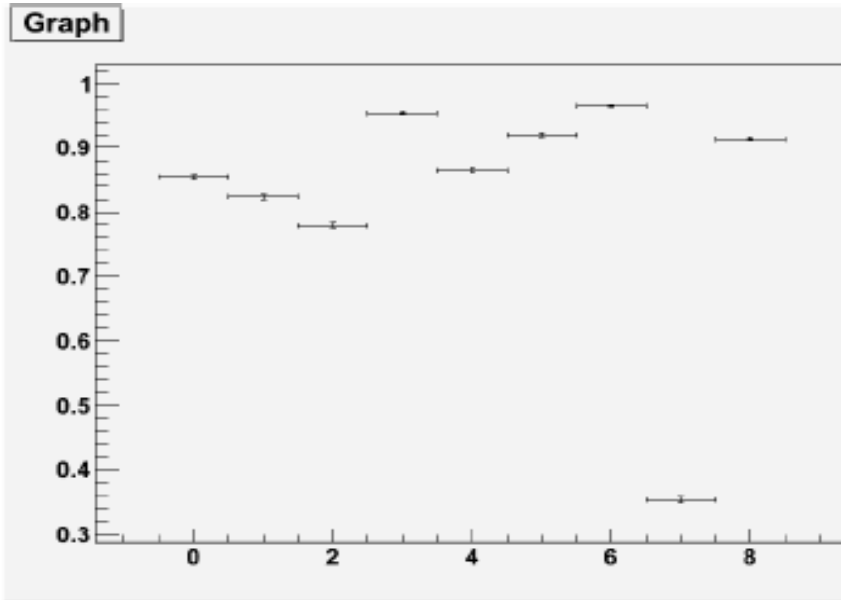
- new branch in ntuple file with variables
- fitted parameters with error, separately for the xz and yz view
- chi2 of the fit on xz and yz view
- chi2 of the hits

## global track informations:

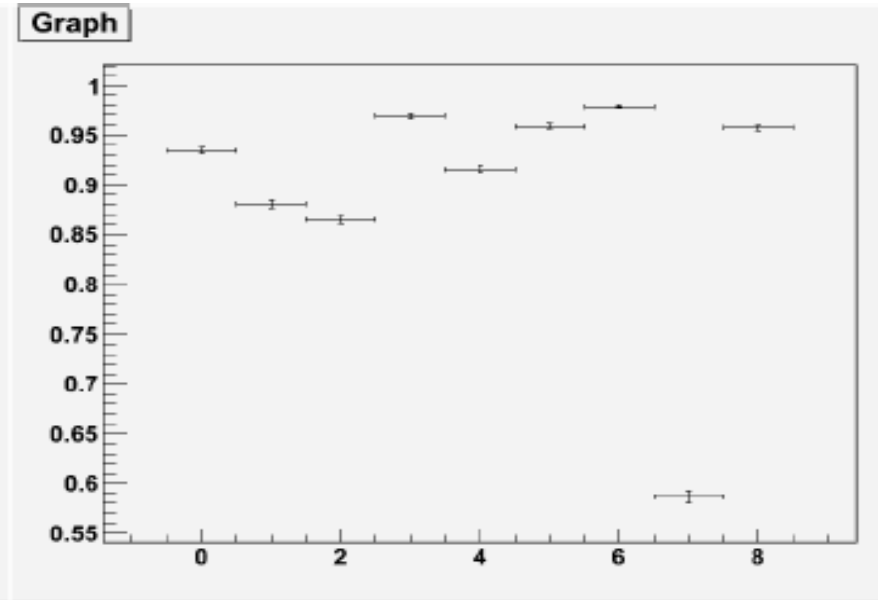
- last activated layer
- first activated layer
- number of active layers
- continuity:  $(\text{number of active layers})/(\text{last})$
- number of clusters
- total numbers of hits

# Efficiency variation from run to run

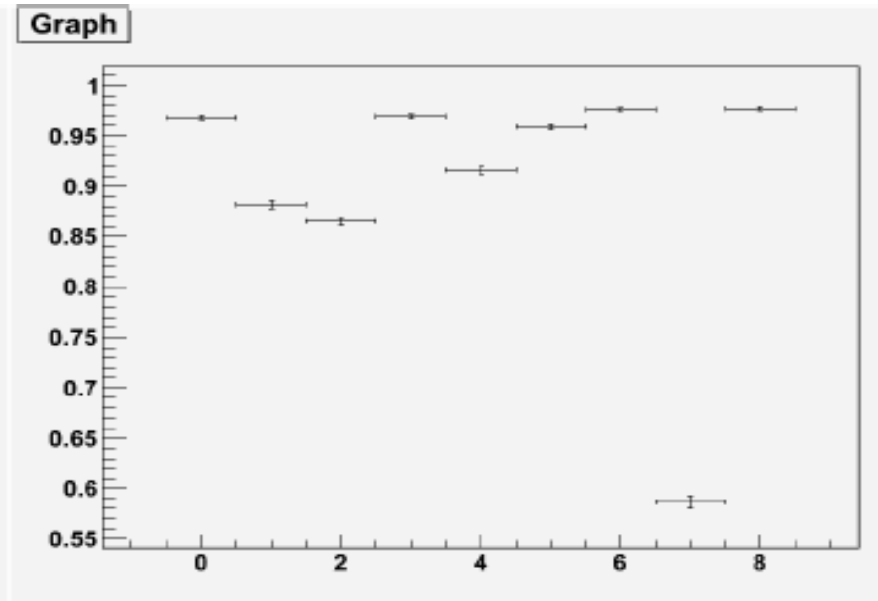
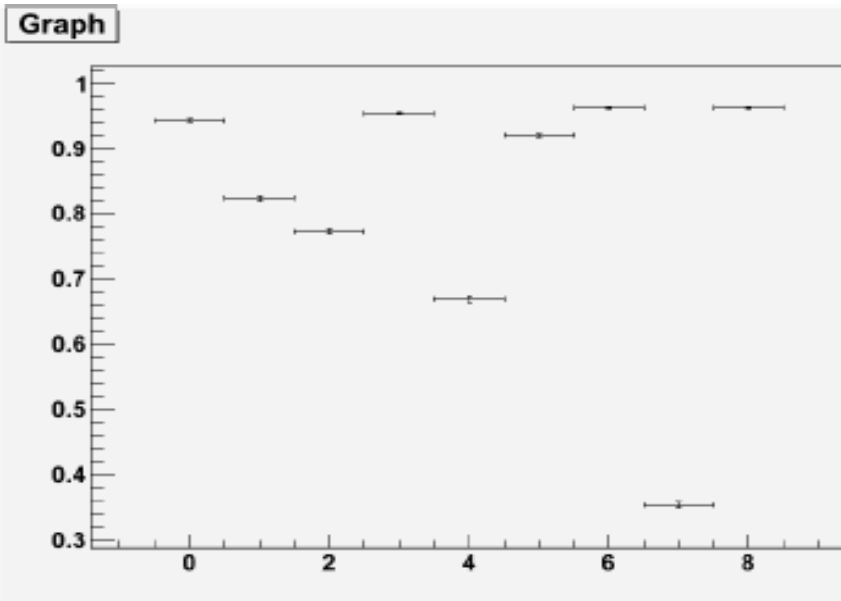
RUN 475



RUN 515



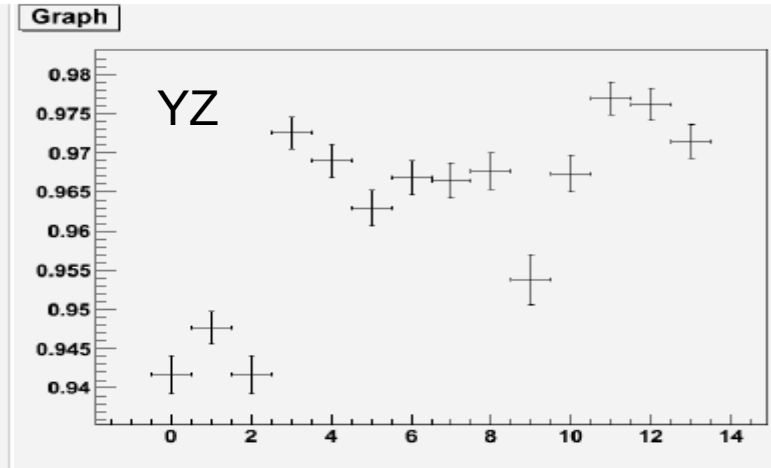
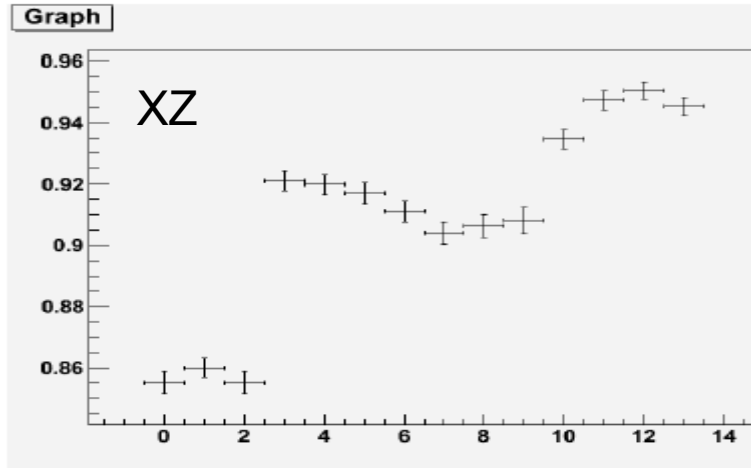
XZ



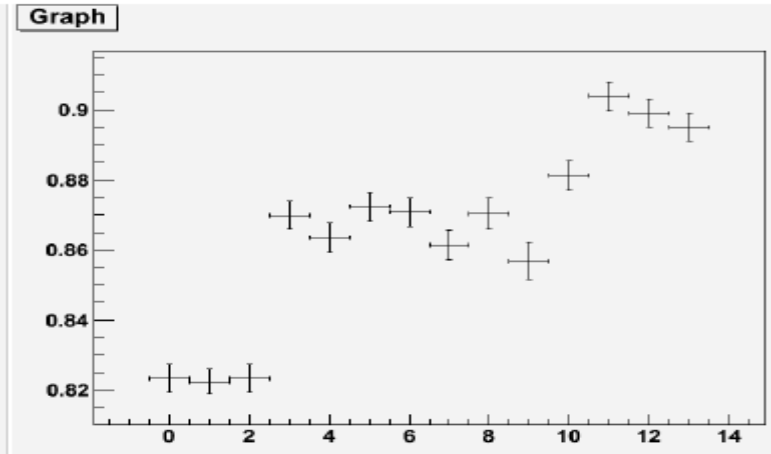
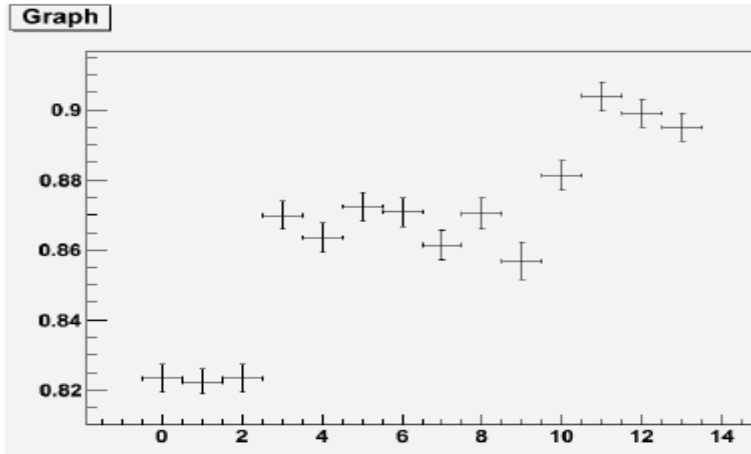
YZ

# Efficiency for separate layers (14 different runs)

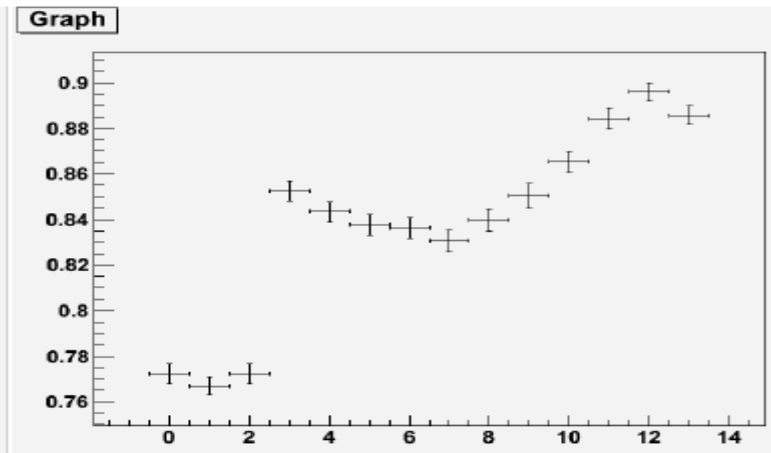
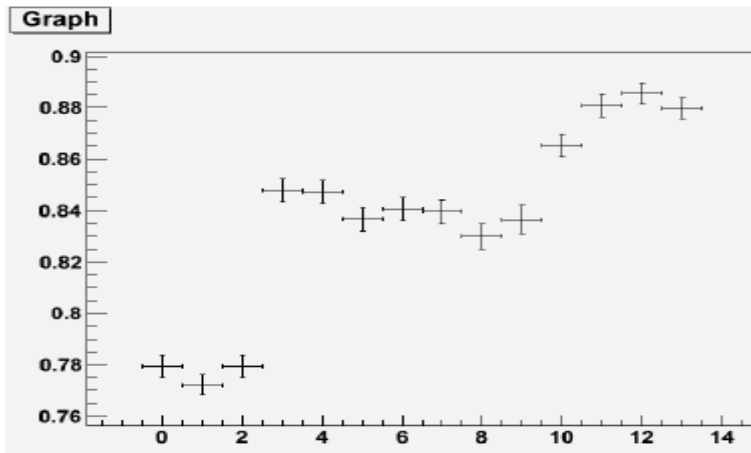
Layer 0



Layer 1



Layer 2

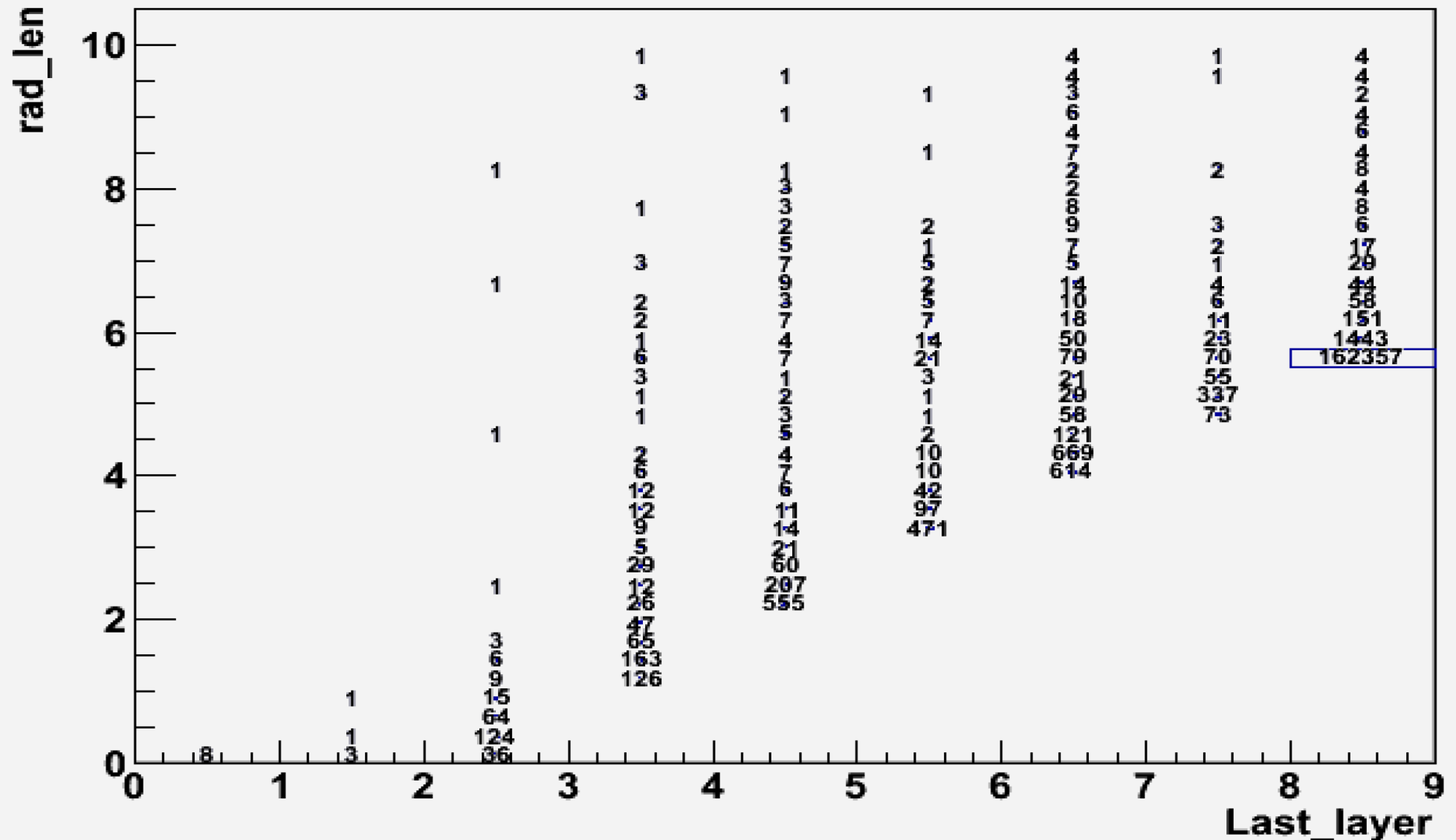


·  
·  
·  
·  
etc

Numbers on the X axis correspond to RUNS: 475,476,477,487,488,489,491,496,497,500,517,525,527,528

# Radiation Length VS last fired layer

rad\_len>Last\_layer {First\_layer==0 && rad\_len<10 && rad\_len>-1}



# IFR display (Paweł Knap)

## Interactive 3D visualization of the hits and tracks in the IFR detector

### **tools:**

- ROOT (newest version)
- QT 4.7
- Graphics in OpenGL

### **features:**

- Scaling, rotating, shifting etc... of the view
- Using the Bezier curves for the function extrapolation

# IFR display (Paweł Knap)

IFRView (alpha)

Właściwości

Kamera:

Translacja X: 0,000

Translacja Y: 0,000

Rotacja OX: 0,000

OY: 0,000

1,00

Nowy zestaw punktów 3D

Nazwa:

Sprawdź nazwę

X: DCHHits.pos.fx

Y: DCHHits.pos.fx

Z: DCHHits.pos.fx

Referencja:  X  Y  Z

Dekorator:

Dodaj Widok

1. Punkt 3D widok prosty

Dodane:

Usuń

Wielkość: 1,00

Kolor:

OK Anuluj

Nazwa zestawu	Wartość maksymalna	Wartość minimalna	Ilość wpisów	Powiązanie	Rodzic
DCHHits.pos.fy	79.9197	-79.8886	17554	<obiekt>	
DCHHits.pos.fz	174.9	-101.5	17554	<obiekt>	
DCH_container_boundary.fvx	81.5489	-81.5497	4111	<obiekt>	
DCH_container_boundary.fvy	81.5407	-81.55	4111	<obiekt>	
DCH_container_boundary.fvz	179.4	-142	4111	<obiekt>	
EMCA_boundary.fvx	136	-135.997	4154	<obiekt>	
EMCA_boundary.fvy	135.978	-136	4154	<obiekt>	
EMCA_boundary.fvz	231.878	-142.728	4154	<obiekt>	
IFRHits.pos.fx	331.442	-332.69	45131	<obiekt>	
IFRHits.pos.fy	293.499	-293.499	45131	<obiekt>	
IFRHits.pos.fz	351.399	-291.7	45131	<obiekt>	
IFR_BWD_boundary.fvx	389.996	-389.994	1111	<obiekt>	
IFR_BWD_boundary.fvy	389.99	-389.76	1111	<obiekt>	
IFR_BWD_boundary.fvz	0	-314.4	1111	<obiekt>	
IFR_barrel_boundary.fvx	390	-389.979	3055	<obiekt>	
IFR_barrel_boundary.fvy	390	-389.998	3055	<obiekt>	
IFR_barrel_boundary.fvz	238.6	-171.4	3055	<obiekt>	
SVTHits.pos.fx	14.4183	-14.4102	12244	<obiekt>	
SVTHits.pos.fy	14.6185	-14.6083	12244	<obiekt>	



# IFR display (Paweł Knap)

IFRView (alpha)

Właściwości

Kamera:

Translacja X: 0,000

Translacja Y: 0,000

Rotacja OX: 45,000

Rotacja OY: -45,000

Skala: 11,41

Dane programu

Nazwa zestawu	Wartość maksymalna	Wartość minimalna	Ilość wpisów	Powiązanie	Rodzic
IFRHITS				<obiekt>	
IFRHITS_X	331.442	-332.69	45131	<referencja>	IFRHits.pos.fx
IFRHITS_Y	293.499	-293.499	45131	<referencja>	IFRHits.pos.fy
IFRHITS_Z	351.399	-291.7	45131	<referencja>	IFRHits.pos.fz
SVTBONF				<obiekt>	
SVTHITS				<obiekt>	
TRUTH				<obiekt>	
DCHHits.pos.fx	79.9176	-79.9957	17554	<obiekt>	
DCHHits.pos.fy	79.9107	-79.8896	17554	<obiekt>	