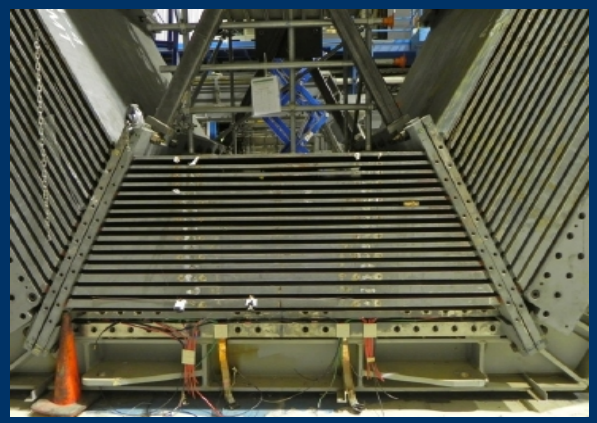

# New features of the IFR reconstruction code

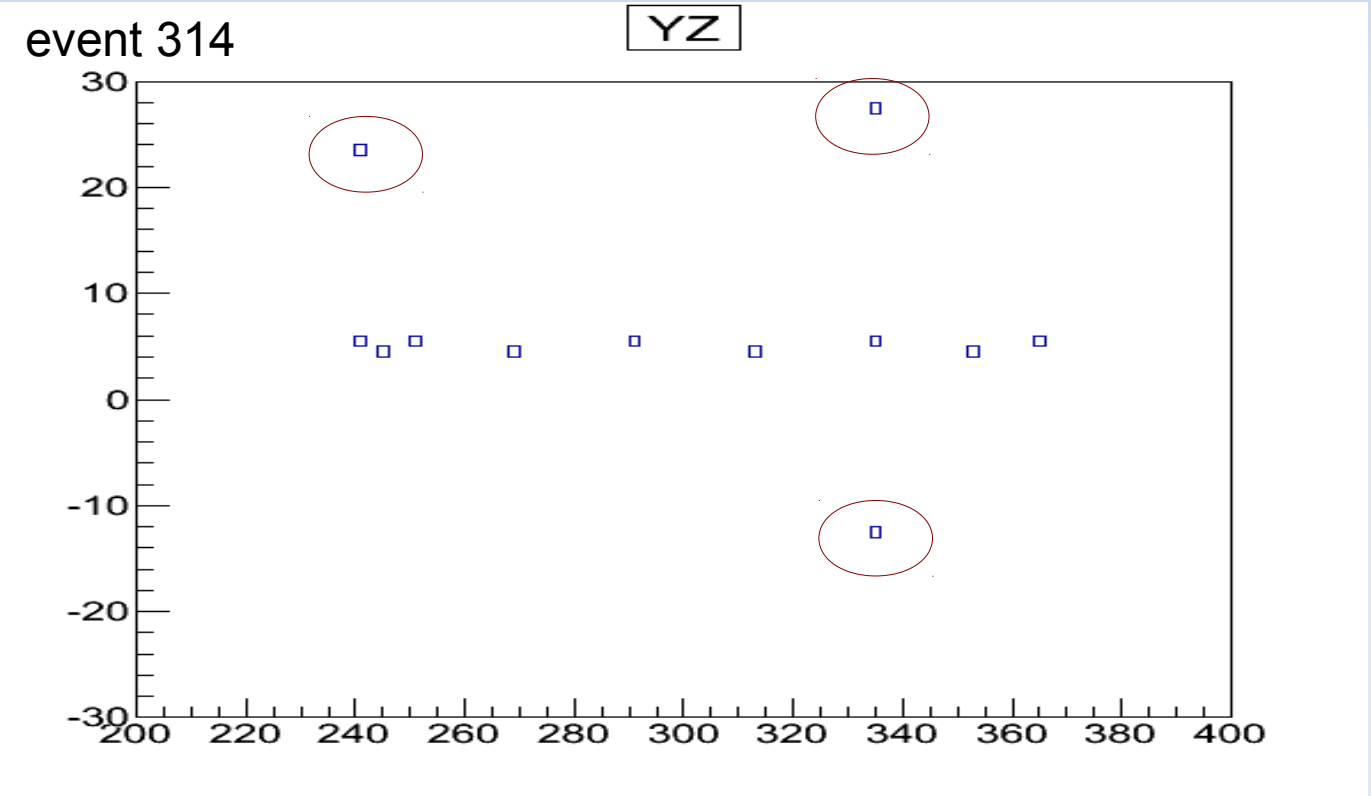


Jarosław Wiechczyński
Marcin Chrząszcz

21.03.2012

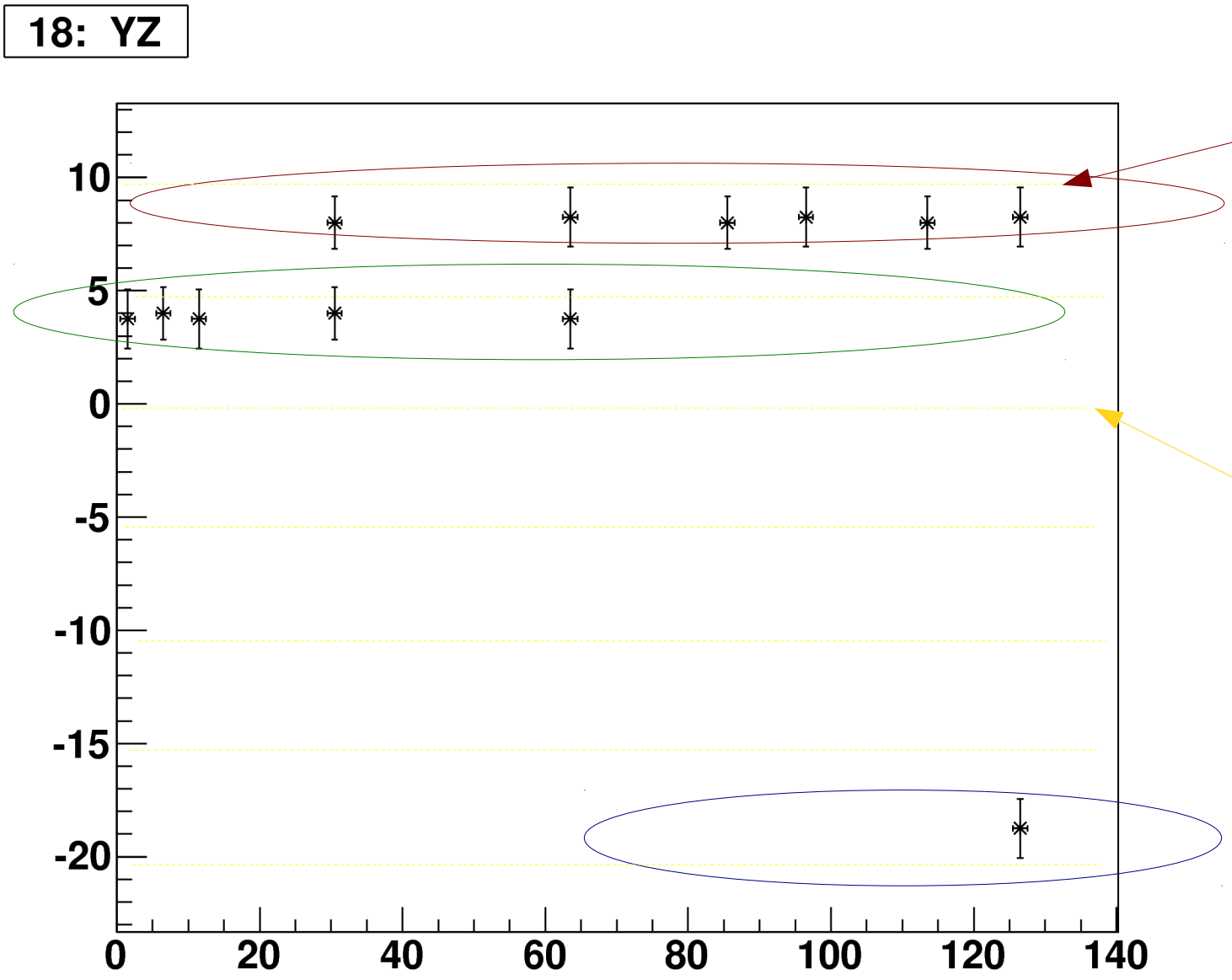
# Clusterizer

Used for removing possible background hits




recognizing the good muon track for the further fitting

# Clustering YZ plane



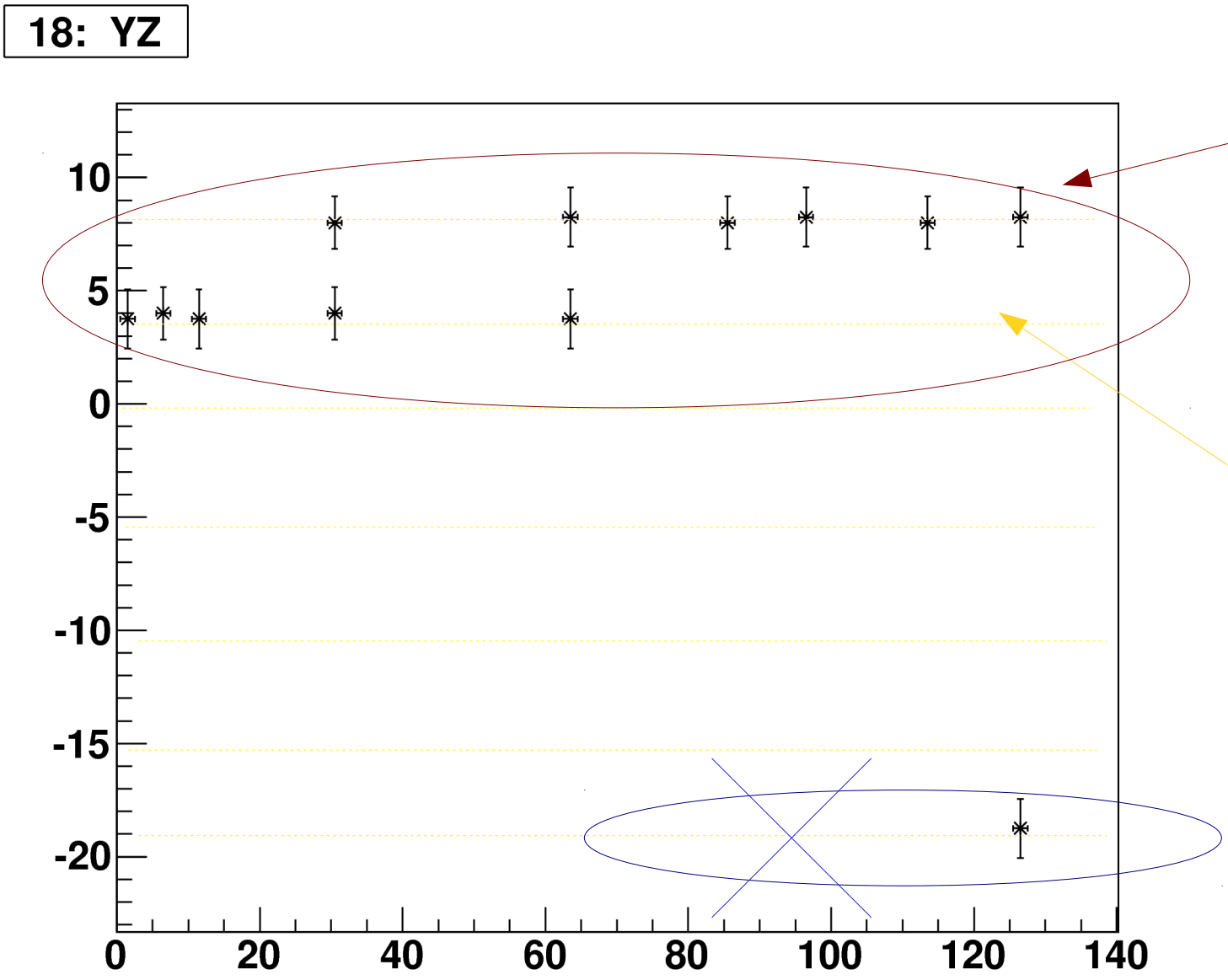

the biggest cluster – good muon track

adjacent clusters:
d < 5.1 cm
→ merge

Centroids - initial positions

Points are assigned to the closest centroid

# Clustering YZ plane

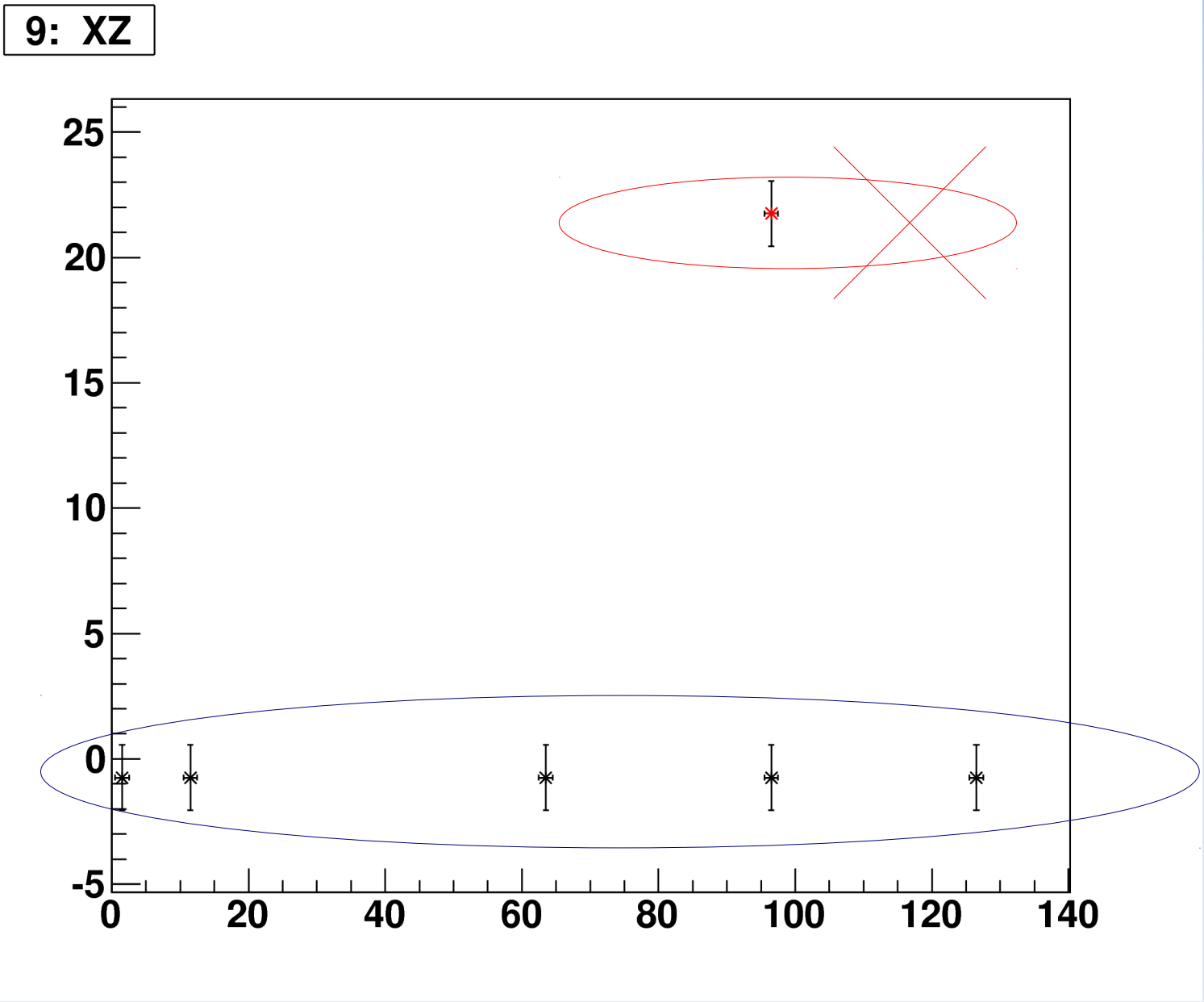



the biggest cluster – good muon track

→ **merged**

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

# Clustering XZ plane



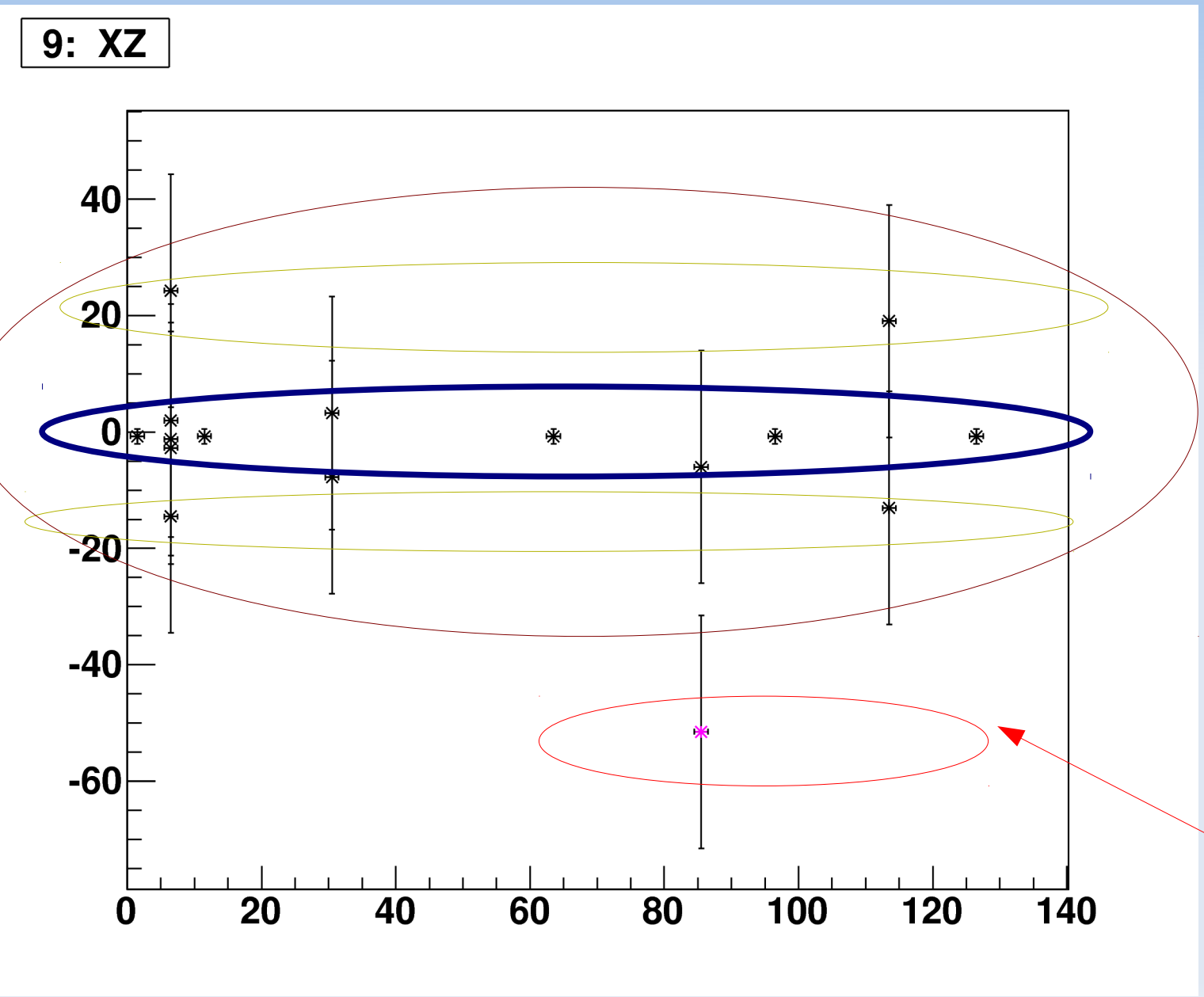

## 1st step:

Rejecting only BiRO bckg points

↓

Choosing the reliable BiRO track

# Clustering XZ plane




## 2nd step:

Including TDC hits

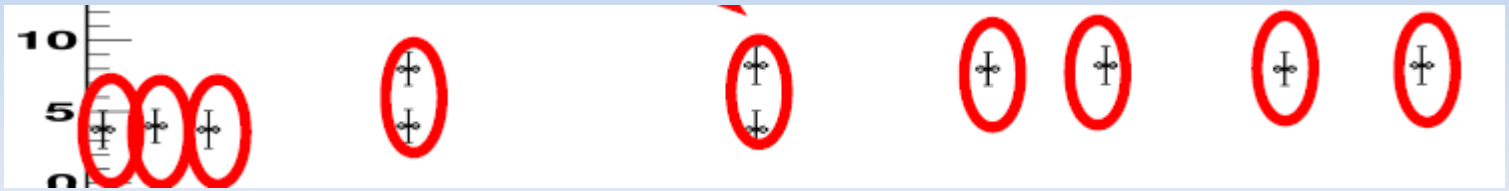
adjacent clusters:
d < 20 cm
→ **merged**

Initial centroids – every 20 cm

REJECTED

# Implementation to the IFR code

1. Working on already implemented 1dim clusters

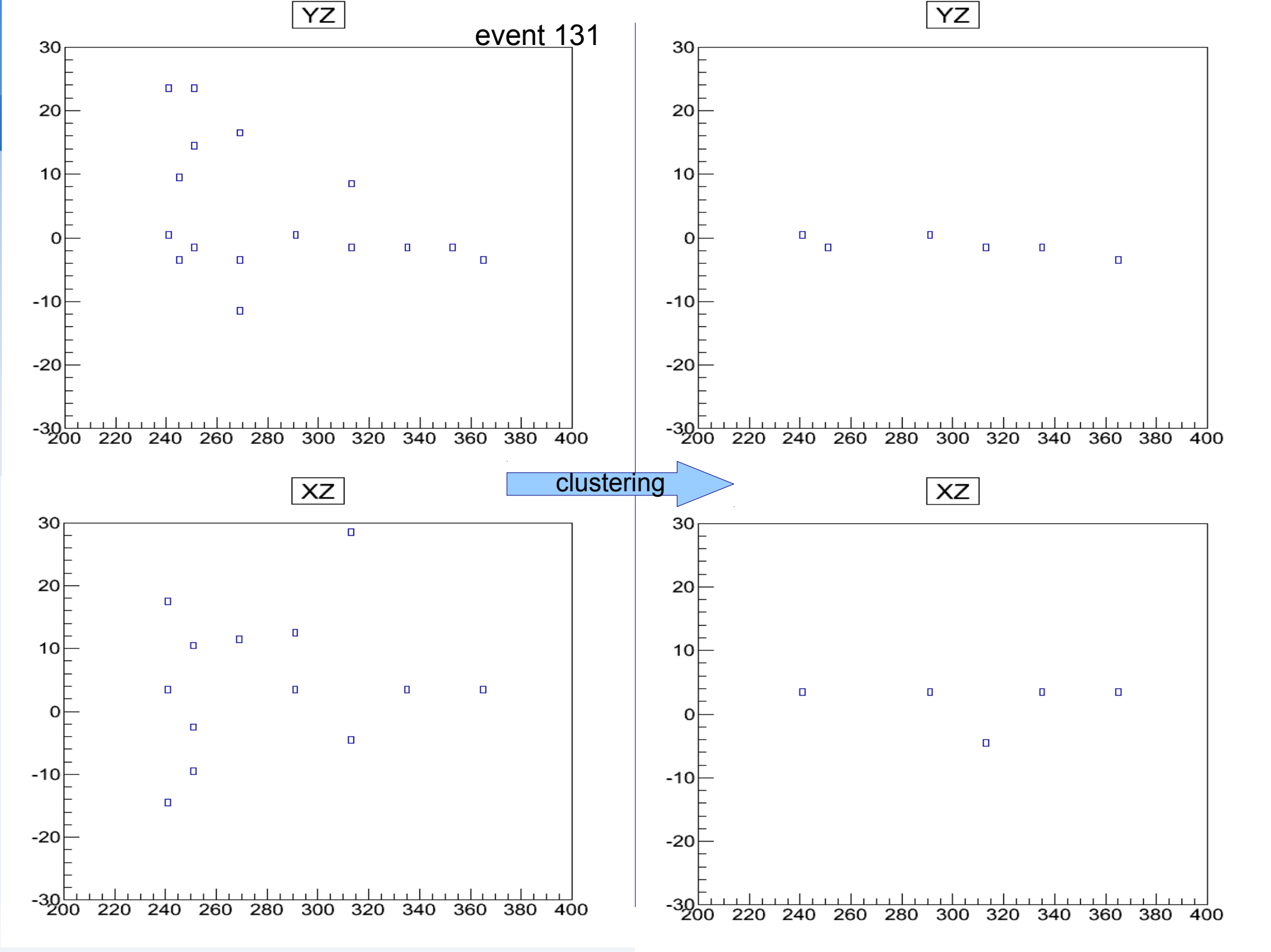


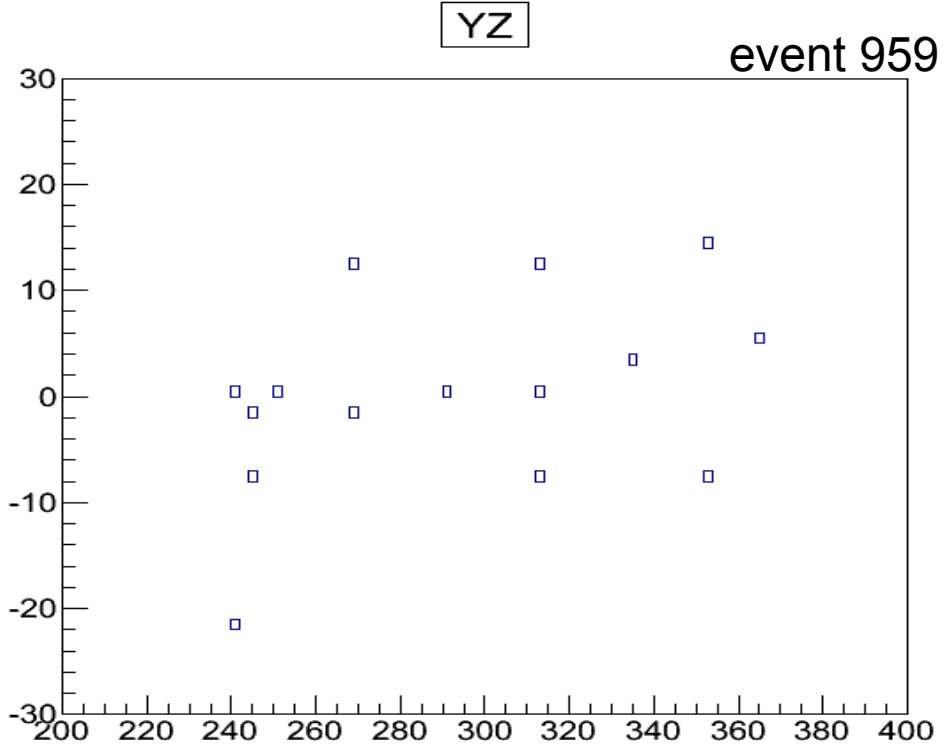

2. **Choosing specific clusters**

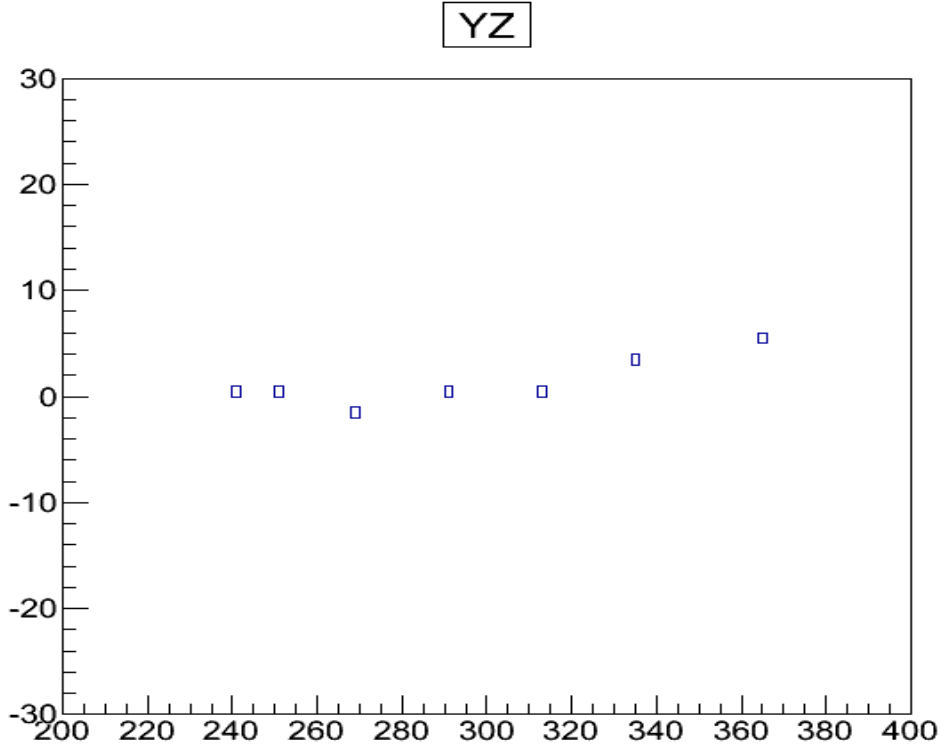
o Prototype Data
zone description

**100 data prototype time readout**
**101 data prototype BiRO X**
**102 data prototype BiRO Y**

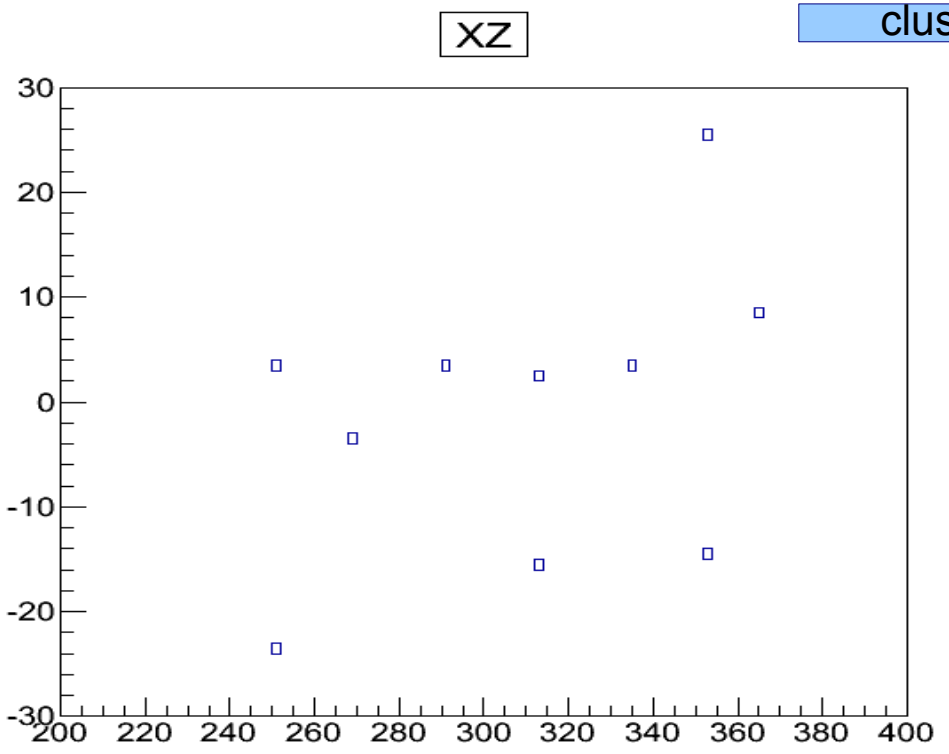
110 data prototype other detectors
-104 data prototype BiRO for time module
-105 data prototype Time Hi Left
-106 data prototype Time Hi Right
-107 data prototype Time Lo Left
-108 data prototype Time Lo Right

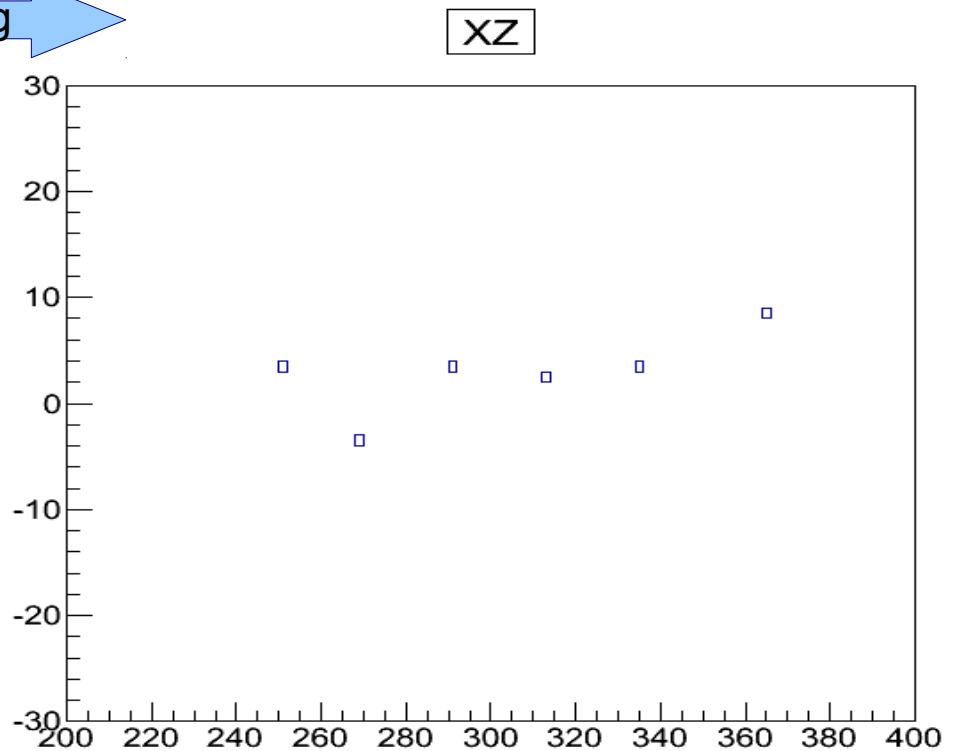

YZ
event 131
YZ
clustering
XZ
XZ
30
20
10
0
-10
-20
-30
200
220
240
260
280
300
320
340
360
380
400


YZ
event 959
30
20
10
0
-10
-20
-30
200 220 240 260 280 300 320 340 360 380 400


YZ
30
20
10
0
-10
-20
-30
200 220 240 260 280 300 320 340 360 380 400

clustering


XZ
30
20
10
0
-10
-20
-30
200 220 240 260 280 300 320 340 360 380 400


XZ
30
20
10
0
-10
-20
-30
200 220 240 260 280 300 320 340 360 380 400

# Status and plans

- Clustrizer can be switched on/off by setting CLUST2D parameter in the *config.txt* file

Current version of the clusterizer is working with the prototype data

→ for the purpose of the test beam data analysis

Further steps:

- Possible modifications
- Extension for working with the full detector data

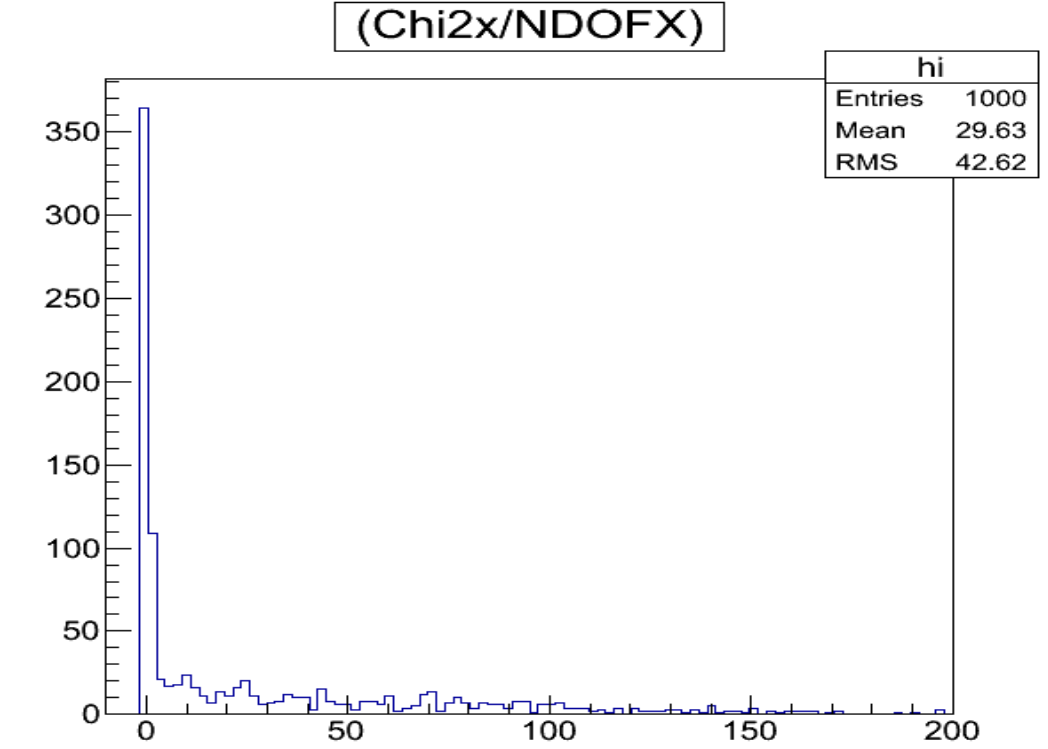
# Marcin's input

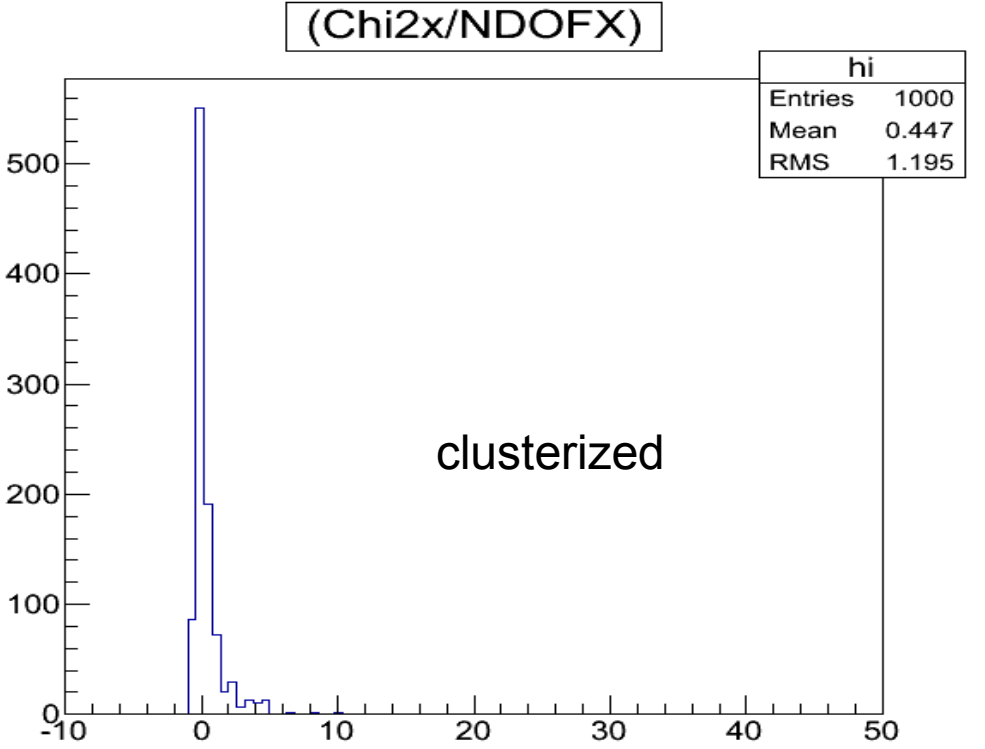
- **Updated software to work with new compilers (tested also by Jarek)**
- **Resampling BIRO readout (only for data)**
  - creates new clusters for multiple hits
  - if there are neighbouring samples that are fired, a certain variable will be filled with the value of the lower sample.
  - stores the number of samples, first sample etc. to ntuple

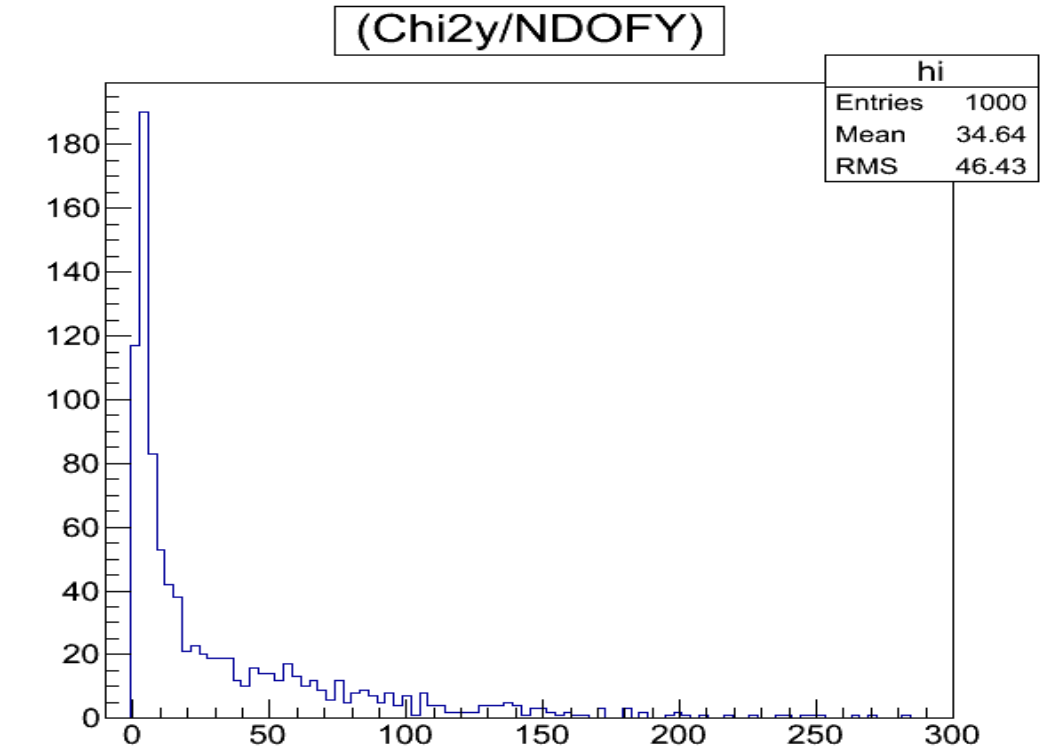
# Marcin's input

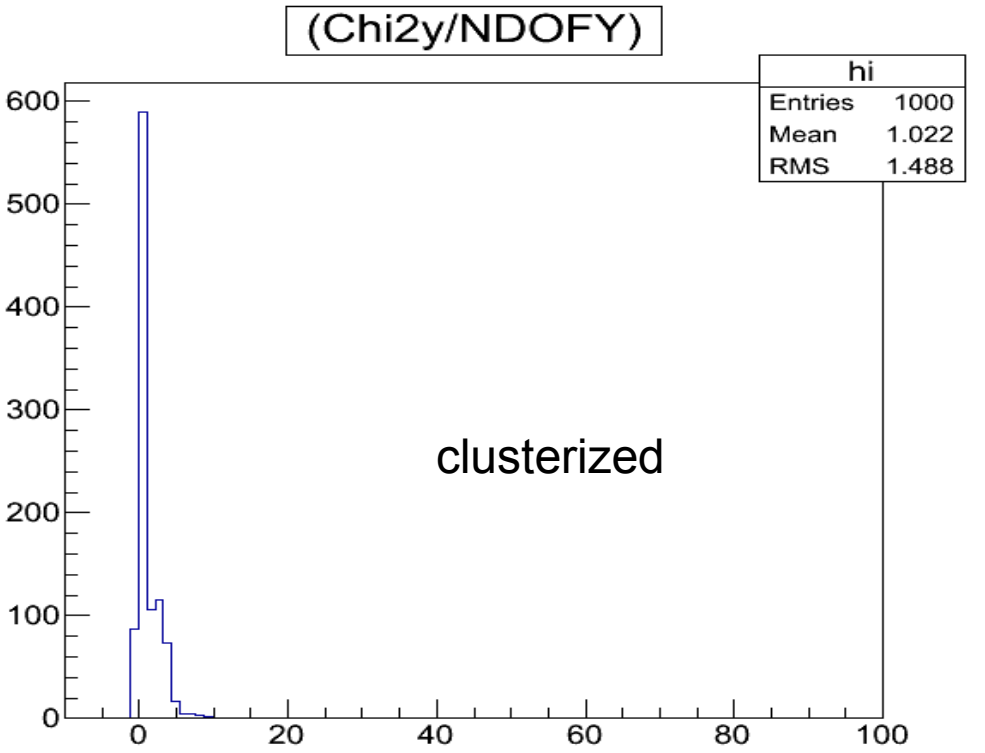
- **Fitter:**
  - new branch in ntuple file with variables
  - fitted parameters with error, separately for the xz and yz view
  - chi2 of the fit on xz and yz view
  - chi2 of the hits

- **global track informations:**
  - last activated layer
  - first activated layer
  - number of active layers
  - continuity: (number of active layers)/(last)
  - number of clusters
  - total numbers of hits


(Chi2x/NDOFX)
hi
Entries 1000
Mean 29.63
RMS 42.62


(Chi2x/NDOFX)
hi
Entries 1000
Mean 0.447
RMS 1.195
clusterized


(Chi2y/NDOFY)
hi
Entries 1000
Mean 34.64
RMS 46.43


(Chi2y/NDOFY)
hi
Entries 1000
Mean 1.022
RMS 1.488
clusterized