Silicone Detector Updates in SRC Run

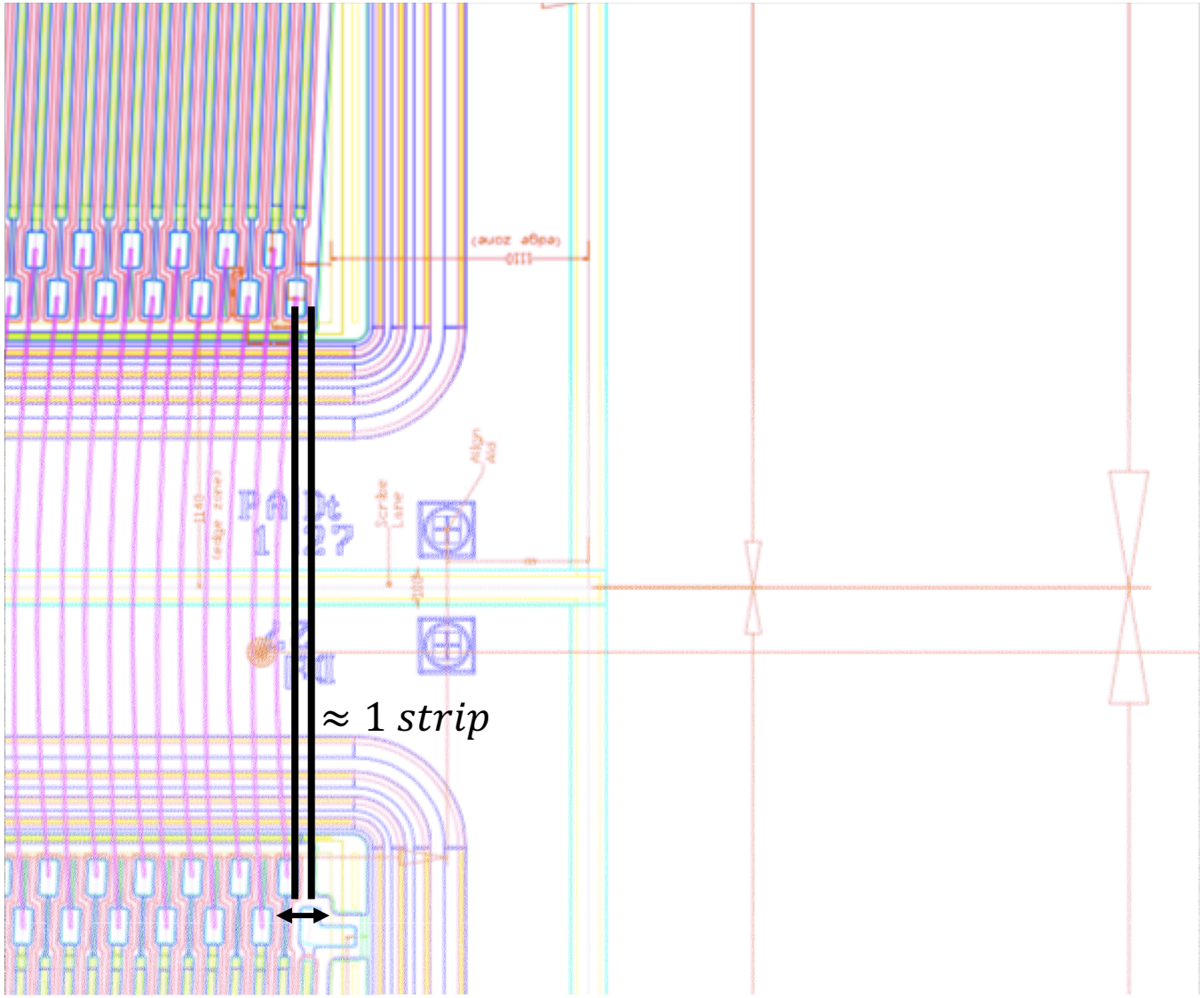
Vasilisa Lenivenko

2019/03/15

- **Run number** : 3431
- **Beam** : C
- **Target** : 0 mm

Date	Shift Leader	Type	№ Run	Trigger	DAQ Status	SP-41, A	SP-57, A	VKM2, A	Beam	Energy, GeV	Target	Comment
2018-03-16 10:35:56	Dryablov	New Run	3431 per.7	SRC BT (Beam Trigger) = BC1 & BC2	All	100			C	3.17	(0 mm)	Beam duration: 2.5 sec. Flux: 4*10^5, 5.6 mv, 100 K events. BT: BC1&BC2&!VC, Empty Air

The lower part of the long module shift



Picture from E. Zubarev

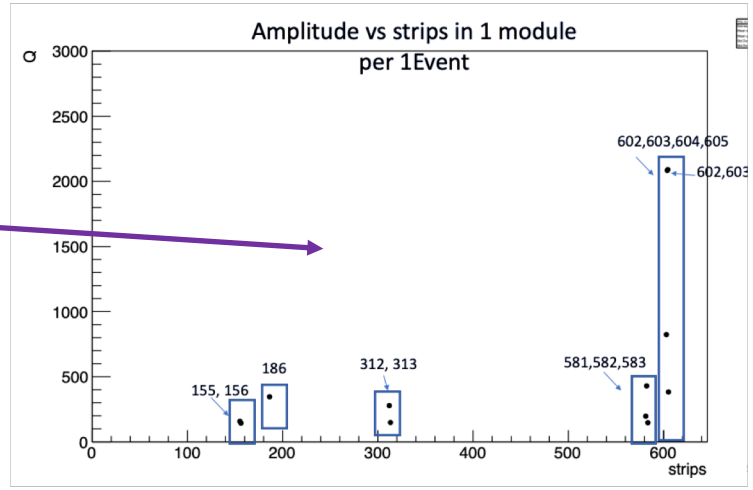
Cluster conditions

Carbon cut

- X - clusters: neighbor strips with signal.

  Cluster coordinate: Center-of-gravity $CoG = \frac{\sum^N A_i * i}{\sum^N A_i}$

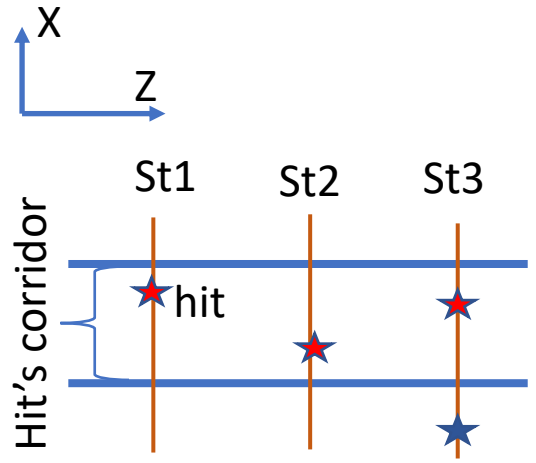
- X'- clusters (angle is 2.5°): I require the same conditions



Track conditions:

- Hit's corridor for X & X'

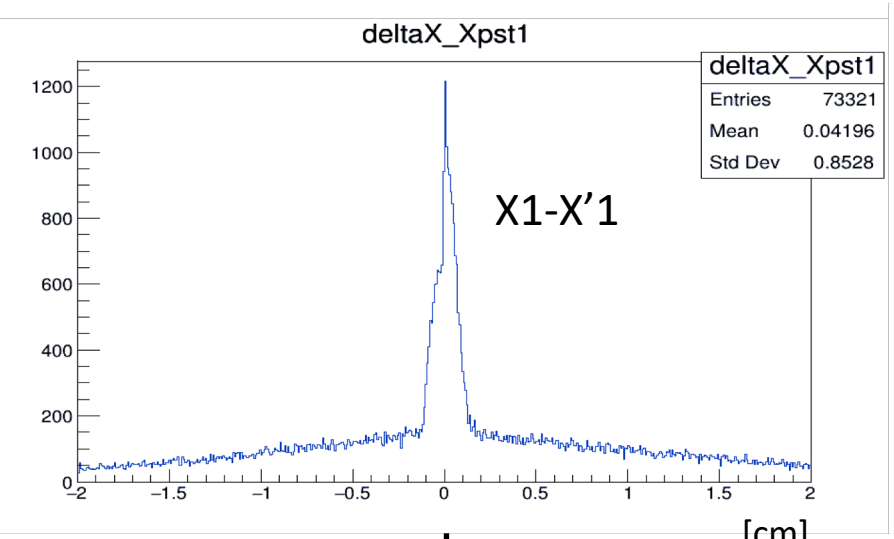
(2/3X + 2/3X' hits per track)
but minimum 5/6 hits per Si-track

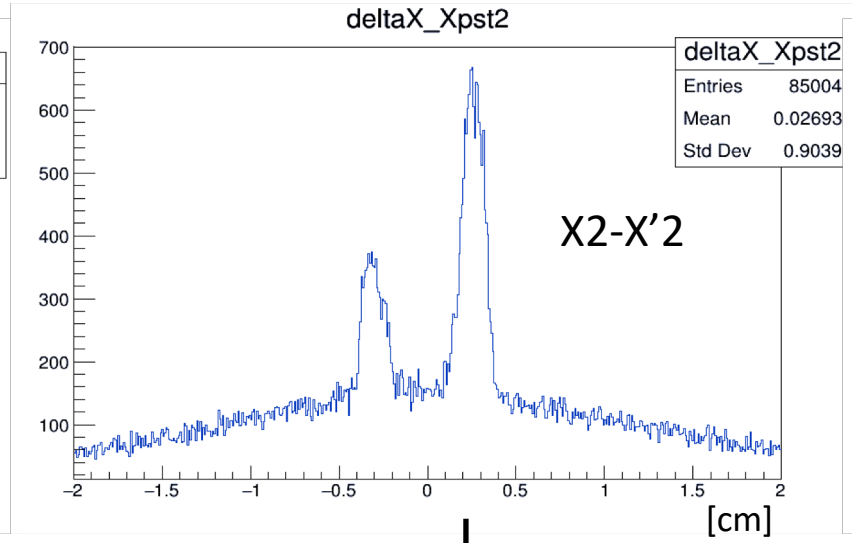


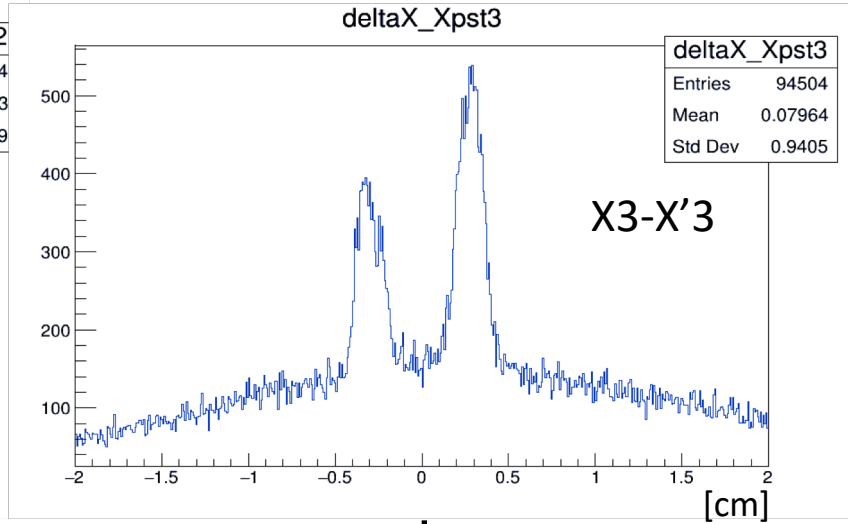
- Si-track through 3 stations

Fit X + Fit X' -> Y - clusters: $Y = \frac{X' - X}{tg2.5°}$ –> X & Y spatial

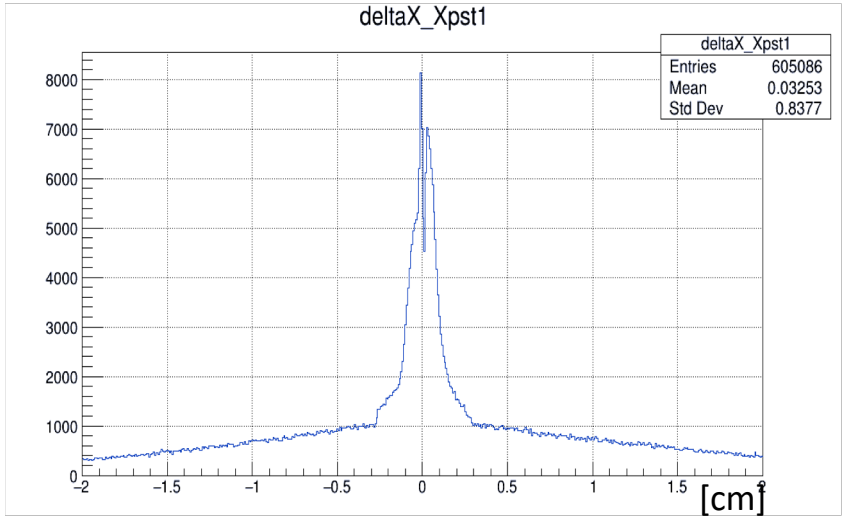
The coordinate difference

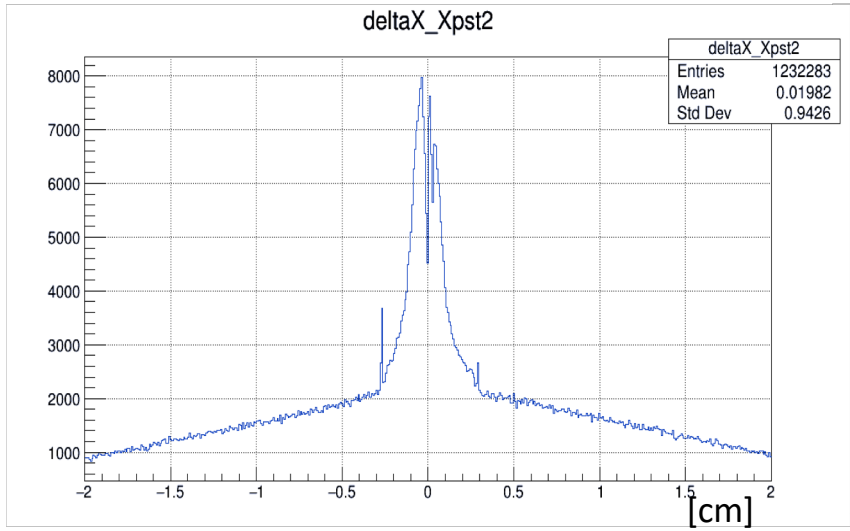


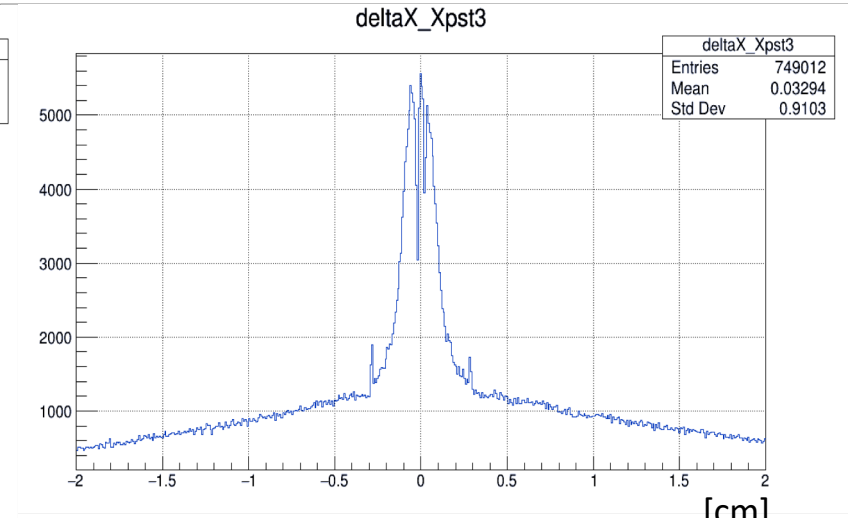




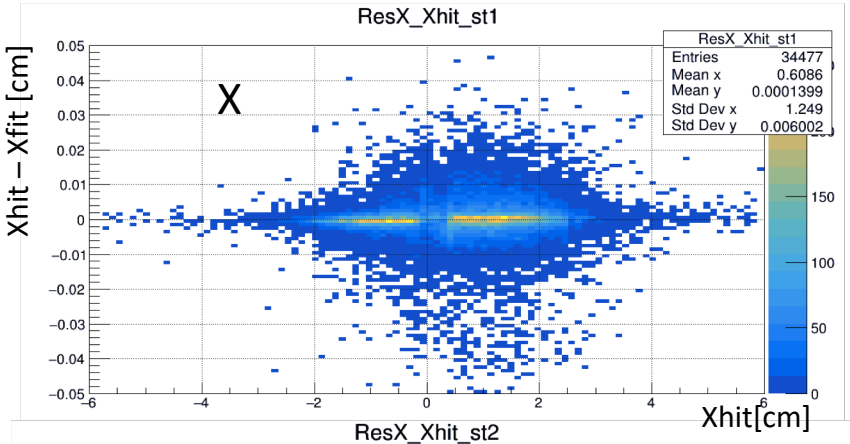
after correct shift X'

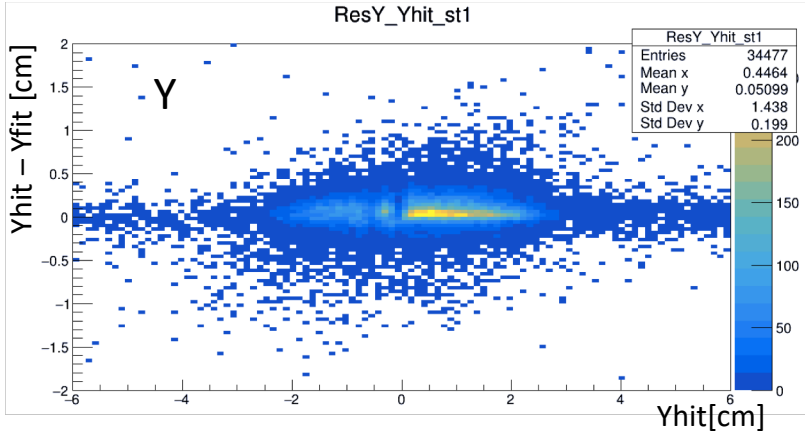


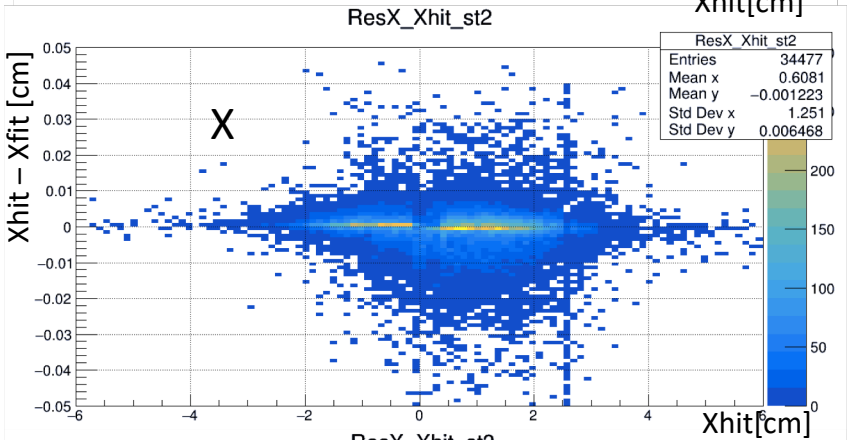


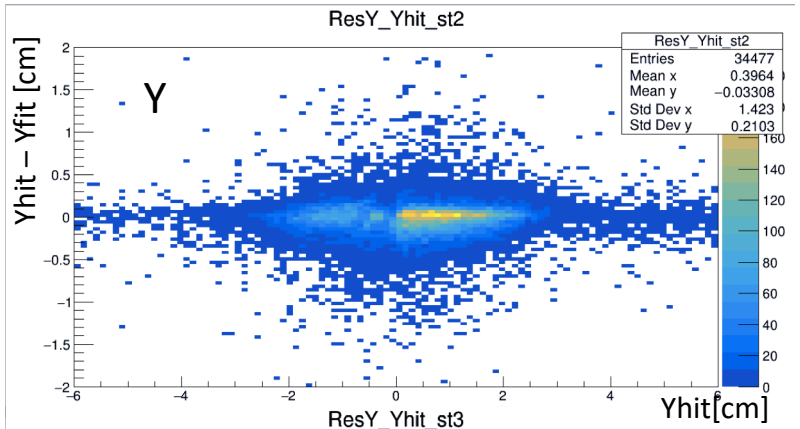


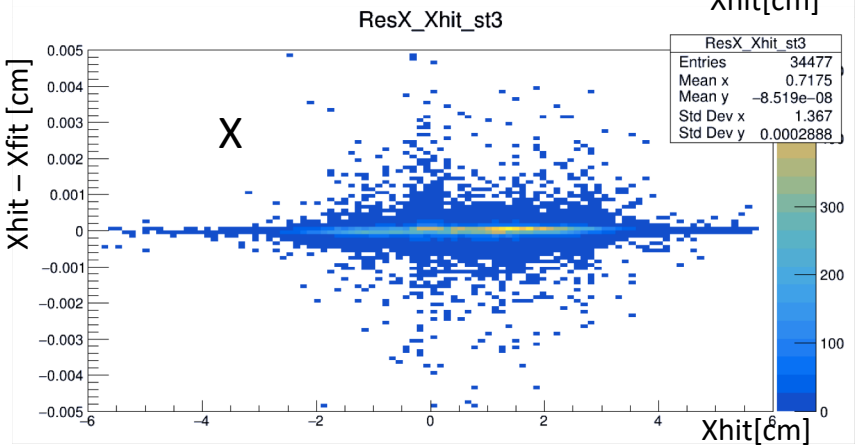
Residuals vs Hits

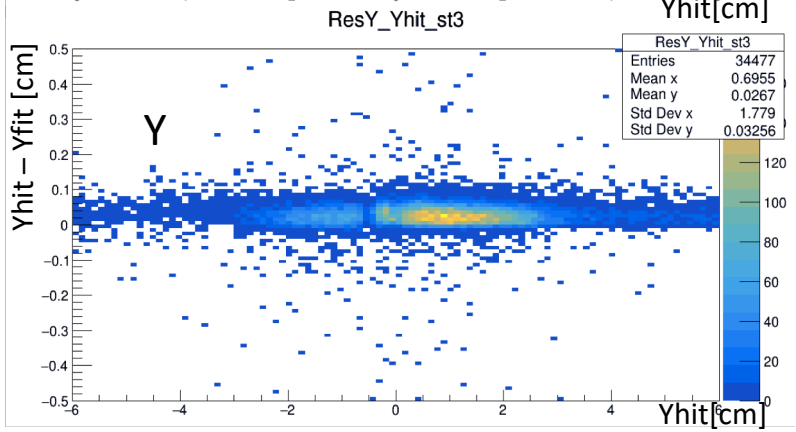




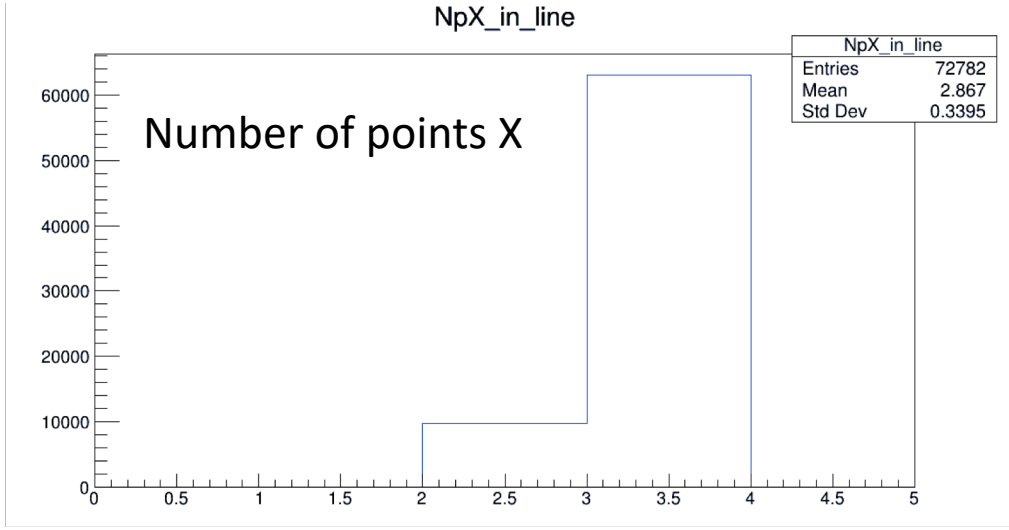


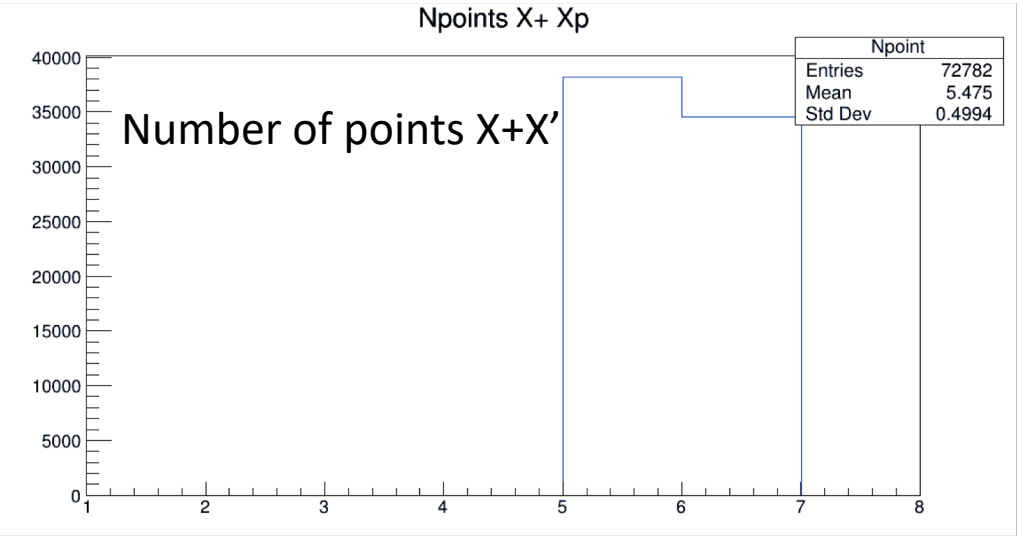


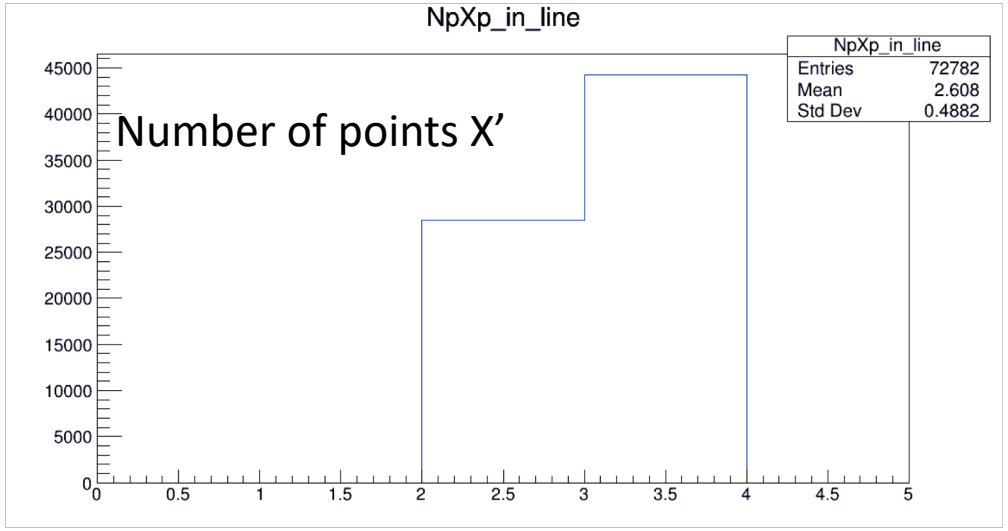


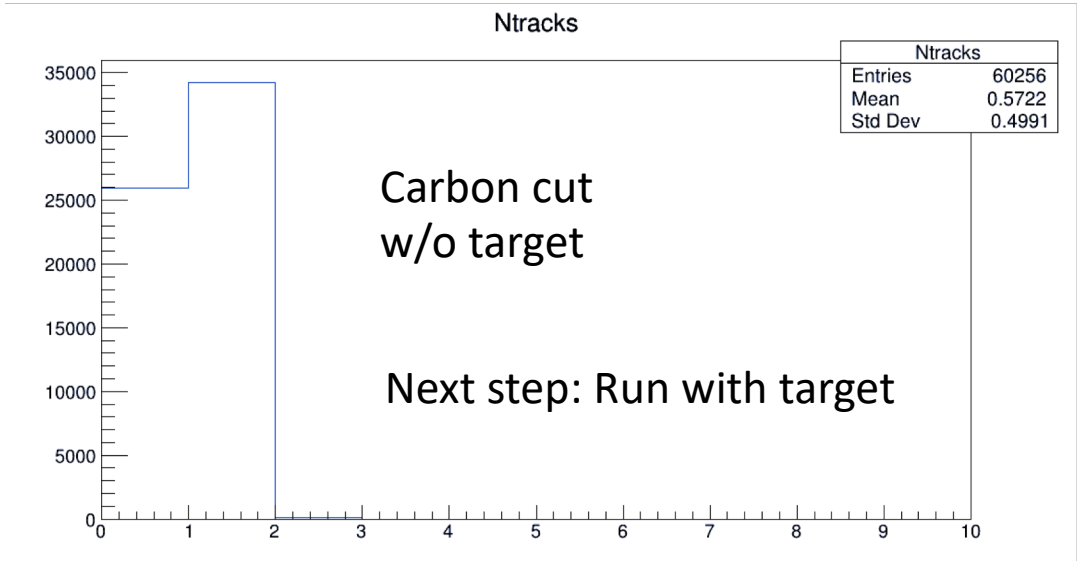


Number of points & Number of tracks









Tracking plan

- Alignment

✓ Alignment of X coordinates

✓ Alignment of Y coordinates.

- Alignment of Z coordinates -> Z-coordinate is not sensitive.

- Si-Track through X and X’

✓ ~~X-track: 3points~~

✓ ~~X-track + find X’- hits around X (min 3X + 1X’) base 1 & 3 station.~~ (too big base)

✓ minimum 5/6 point per track: 4 point from 1&2 station + find points in 3 station

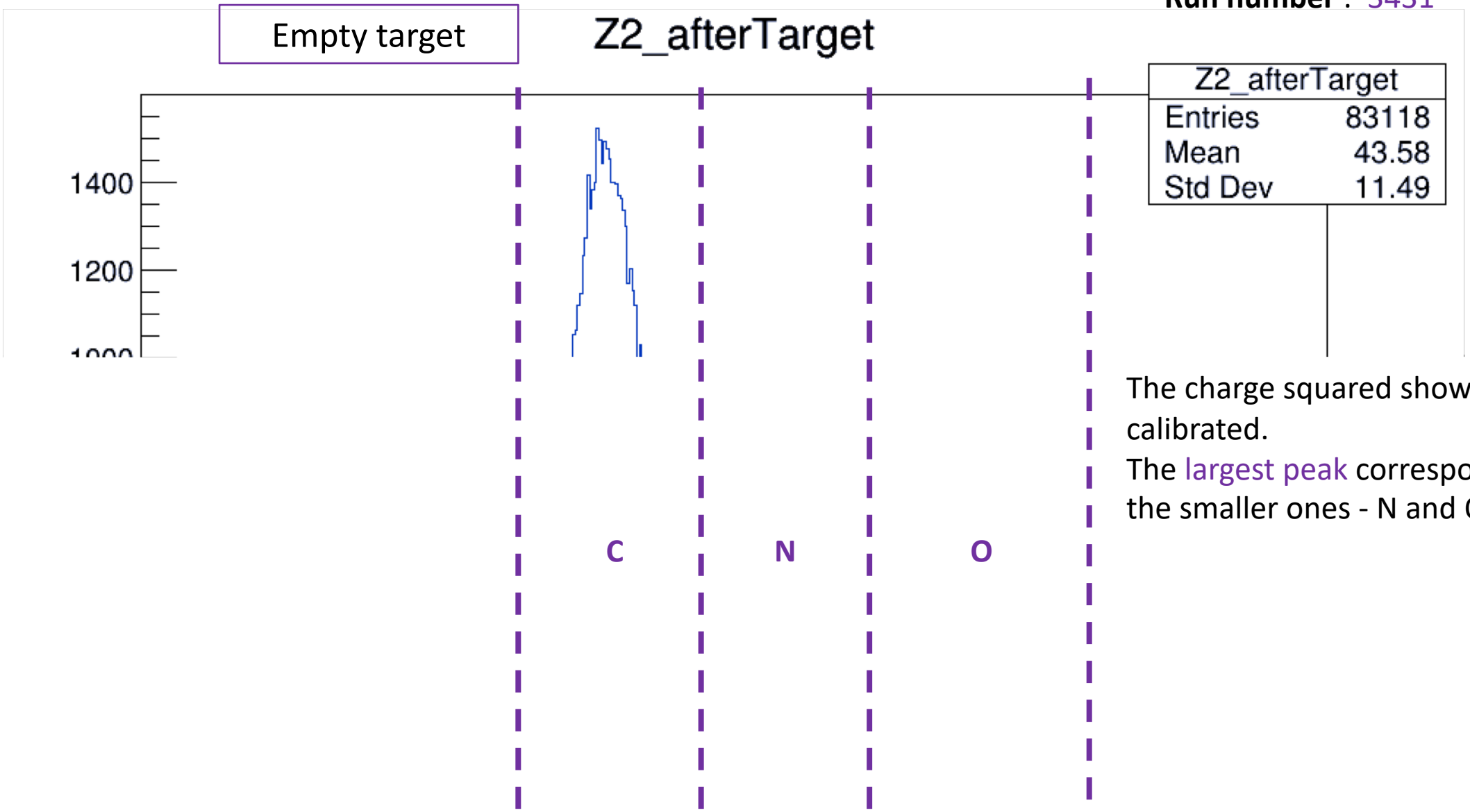
✓ Fit X + FitX’ -> X & Y spatial $Y = \frac{X' - X}{tg2.5^\circ}$

- combined track through Si-detector and MWPCs
- minimum Si-point 2(3) spatial + MWPC-segment

✓ Add Cut beam - Z2;

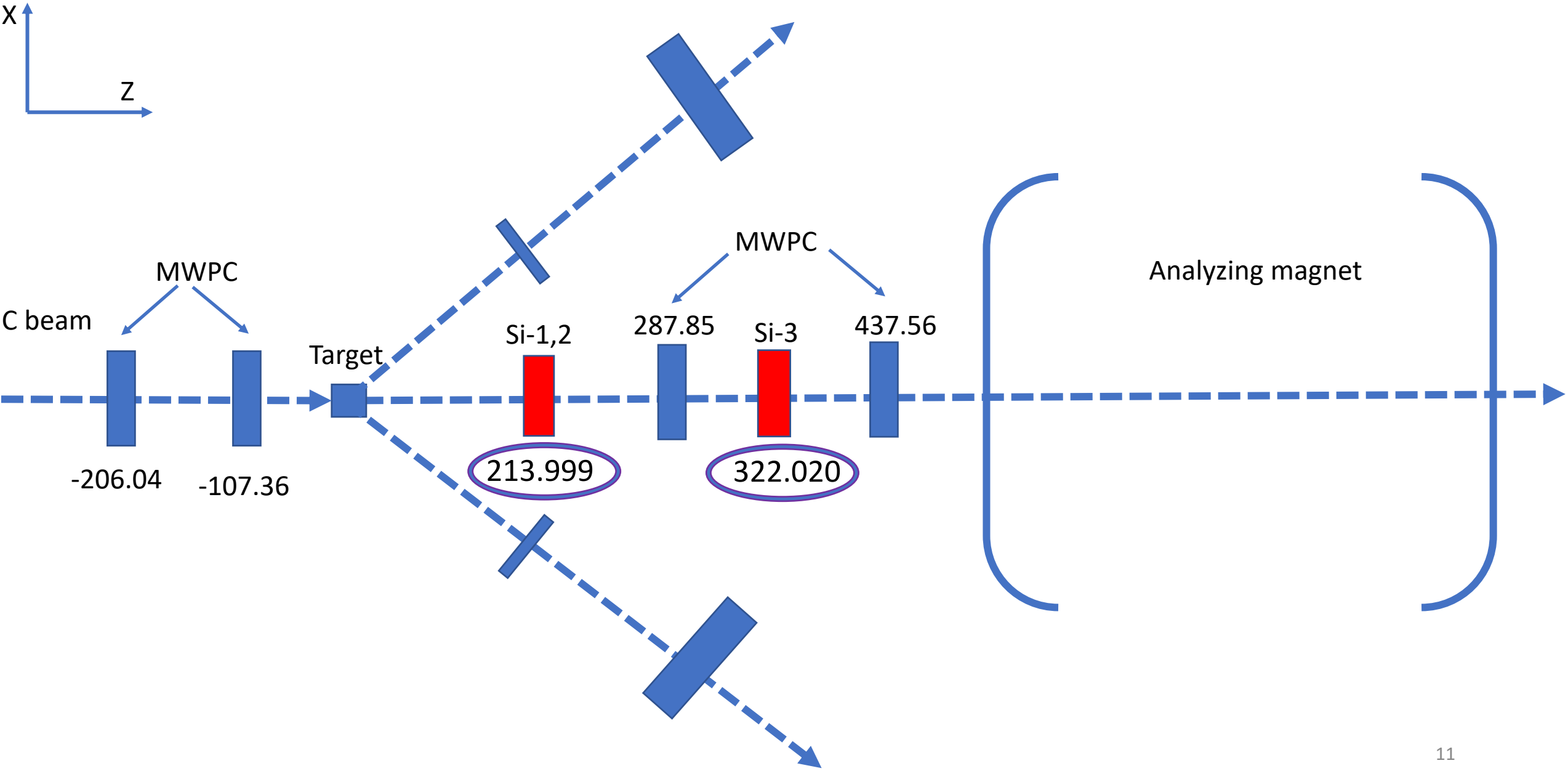
Back up

Run number : 3431



The charge squared shown on X axis is not calibrated.
The largest peak corresponds to C,
the smaller ones - N and O

SRC Run configuration:



Expected Silicon detector coordinate resolution

$\Delta x = 0.95$ [mm]; $\Delta x' \approx 0.103$ [mm];

$\sigma_x = \frac{\Delta x}{\sqrt{12}}$; $\sigma_{x'} = \frac{\Delta x'}{\sqrt{12}}$;

$Y = \frac{X' - X}{tg2.5°} \quad => \quad \sigma_y = \sqrt{\frac{{\sigma_{x'}}^2 - {\sigma_x}^2}{tg2.5°^2}}$;

$\sigma_x = 0.05$ [mm]; $\sigma_y = 1.15$ [mm];

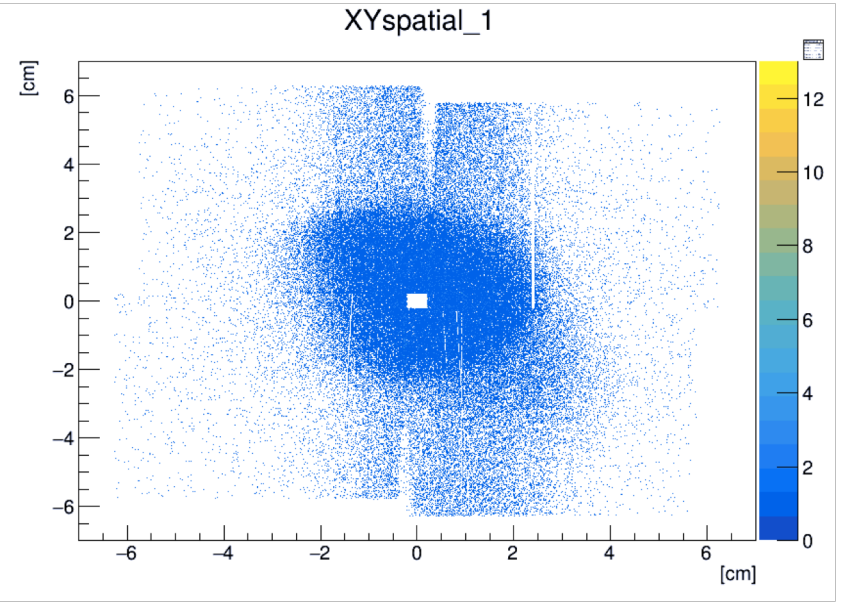
Amplitude

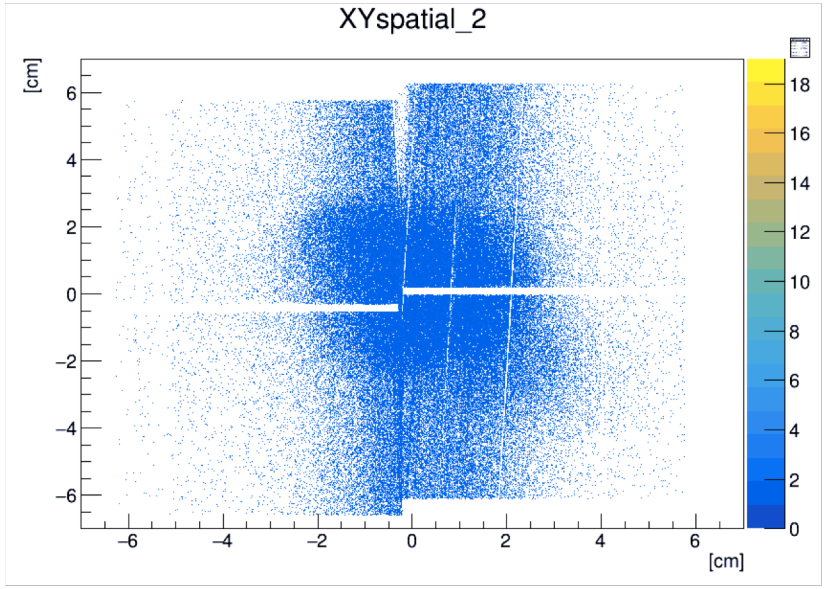
Proton amplitude $\approx 250 \ -300\ adc$ (from the expert)

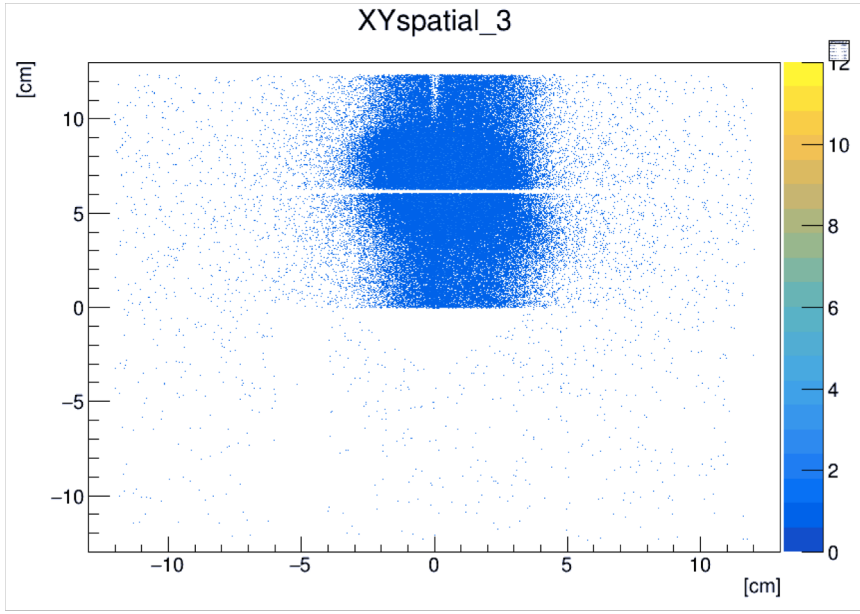
Carbon amplitude = 36 * proton amplitude

Alpha amplitude = 4 * proton amplitude $\approx 1200\ adc$

Beam profile in Si-detectors



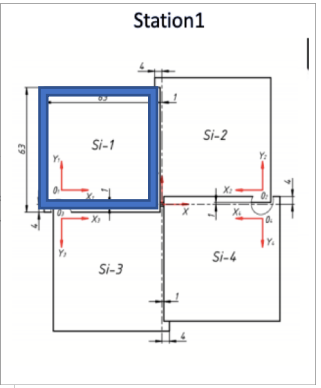


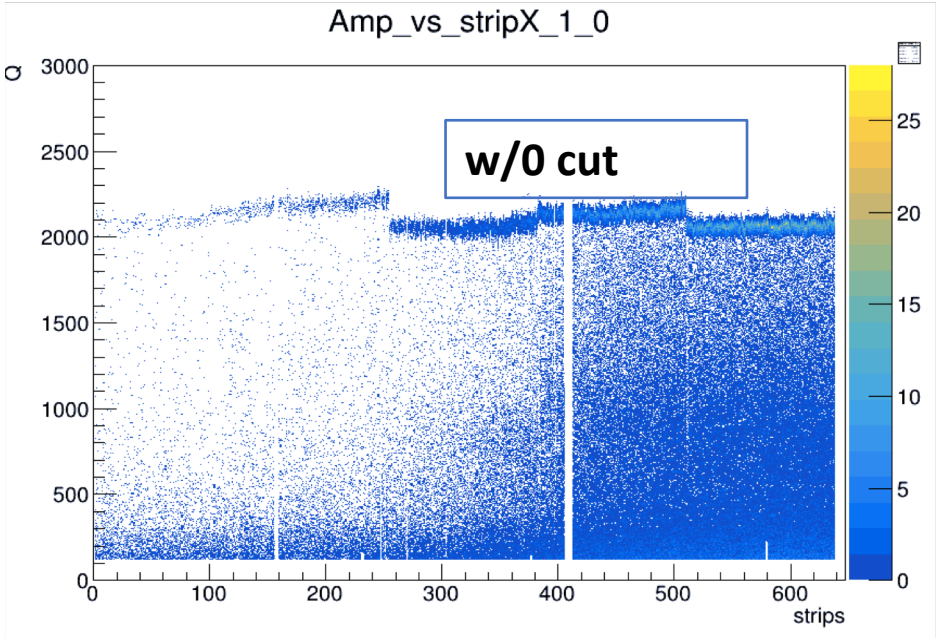


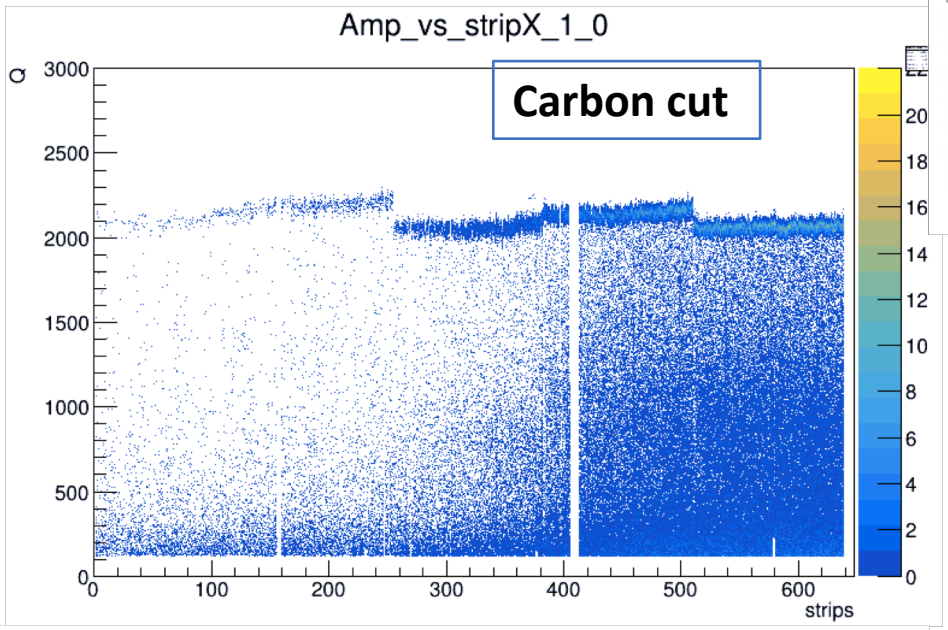
Amplitude vs strips in module for all Events (Station1)

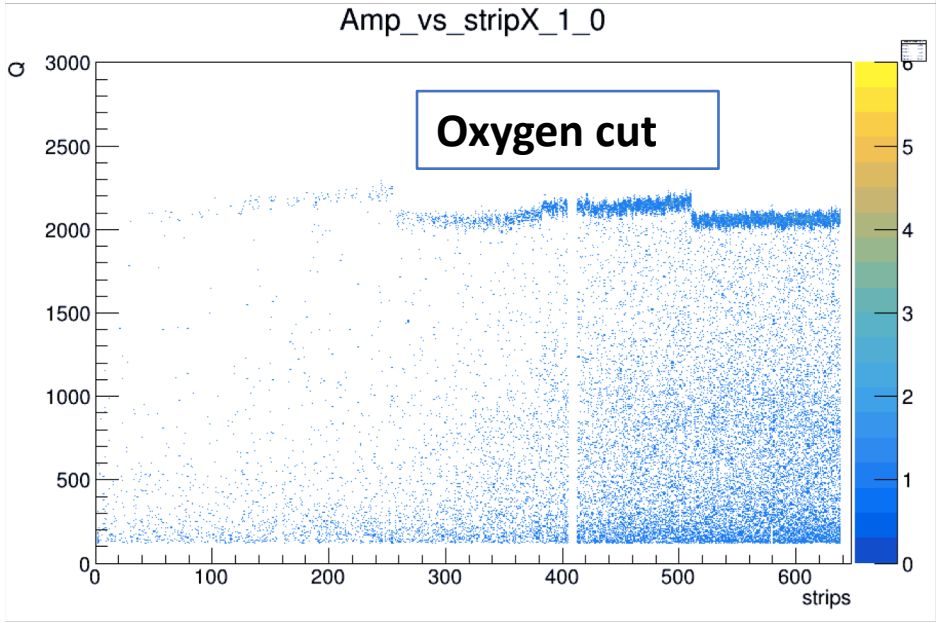
X strips

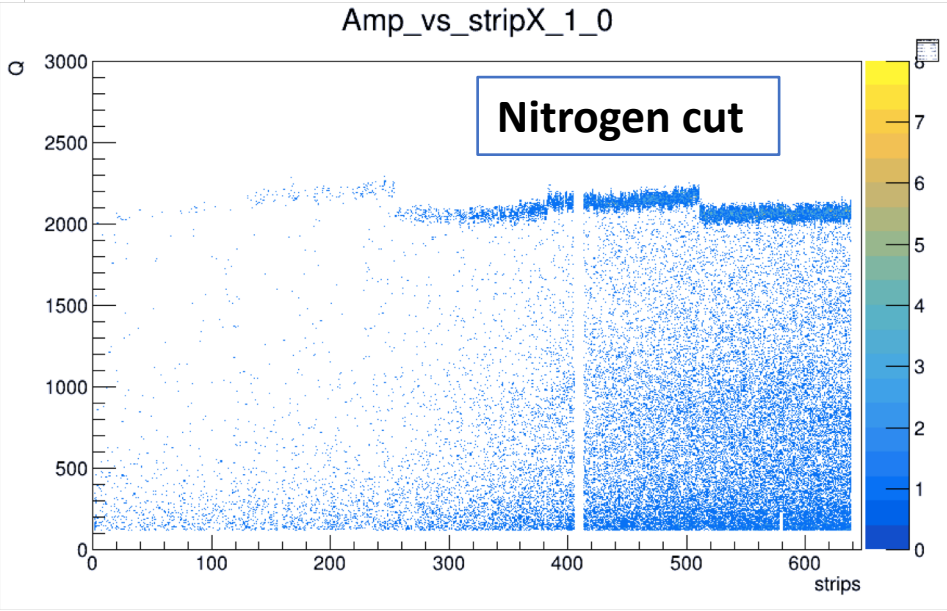
Module 1











Amplitude vs strips in module for all Events (Station1)

X’ strips

Module 1