

Report on Bari analysis meeting

Pietro Betti
13/12/2023



Bari analysis meeting

<https://agenda.infn.it/event/38379/>

- 6-7 December 2023
- Bari, Lecce, GSSI for PSD
- Perugia for SCD
- Firenze for CALO
- Define a data format for sharing data
- Reference geometry for tracks: reference system of SCD
- Data to be shared on storm in RECAS
- CALO-SCD alignment
- PSD-CALO(charge tagger) alignment

To be done:

CALO(charge tagger)-PSD-SCD alignment in single file

Definition of files with good CALO-SCD-PSD events

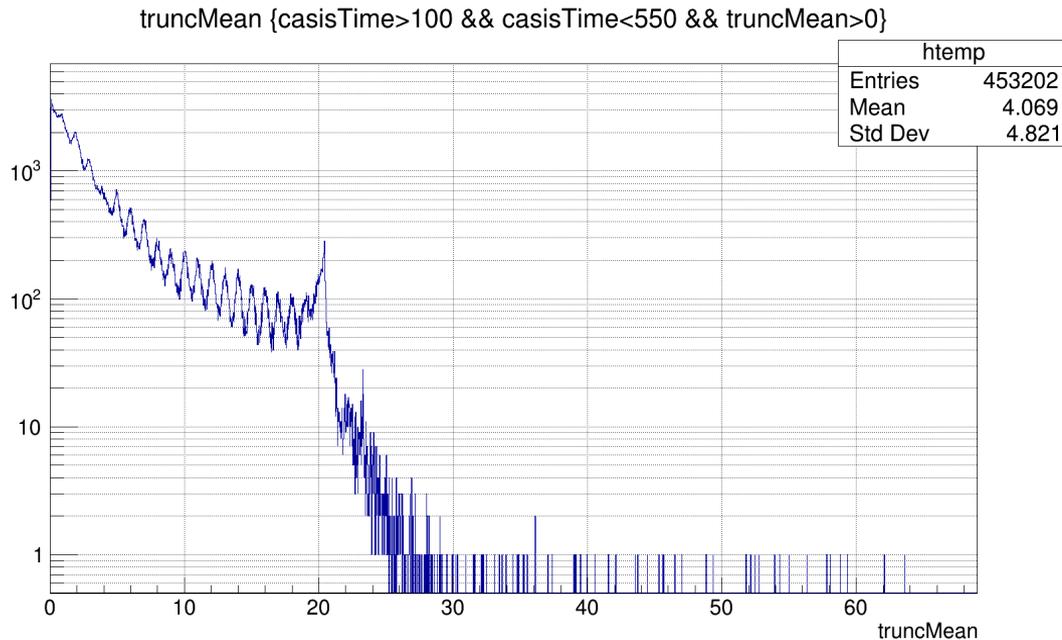
- Electrons: tracks only from run 300 (we lose some good electron files)
- Ions: golden charge files 484-485 are ok, while multiple files without one between CALO, SCD and PSD → logbook with highlighted good files on the document server
- For PS only 5 files in common with PSD (no checks with SCD)
- SCD data currently on CERNbox (Jiang reference person):
<https://cernbox.cern.ch/s/AccIDqNsBjQqljU>
- PSD data on RECAS storm (Davide and Leonardo reference persons)
- CALO run 474, 484, 485 (good charge tagger data) on RECAS caloPD folder

Programs to produce common files and aligned files in CaloCubeBTSoftware

- align_signals : calo → common data format
 - input file: file analyzed with analyze_alone PDs signals and gains mapped by [chip][channel]
 - output file: the same tree with LPD and SPD signals and gains separated and mapped by [Row][Column][Layer]
- align_caloscd : calo+SCD → calo info + tracks
 - input file: calo file produced by align_signals
 - input file: file of SCD
 - output file: tree with merged tree of the two input files aligned by TriggerCounter

First check of CALO data using tracks

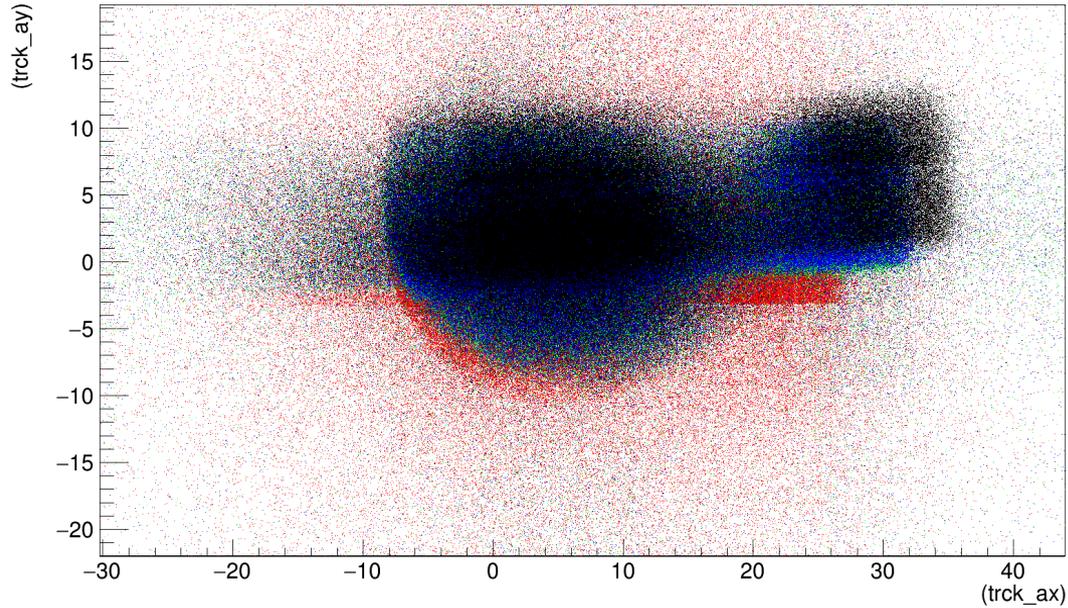
- Run 484 for ions
- Run 102 for electrons @243 GeV



RUN 484

Beam profile

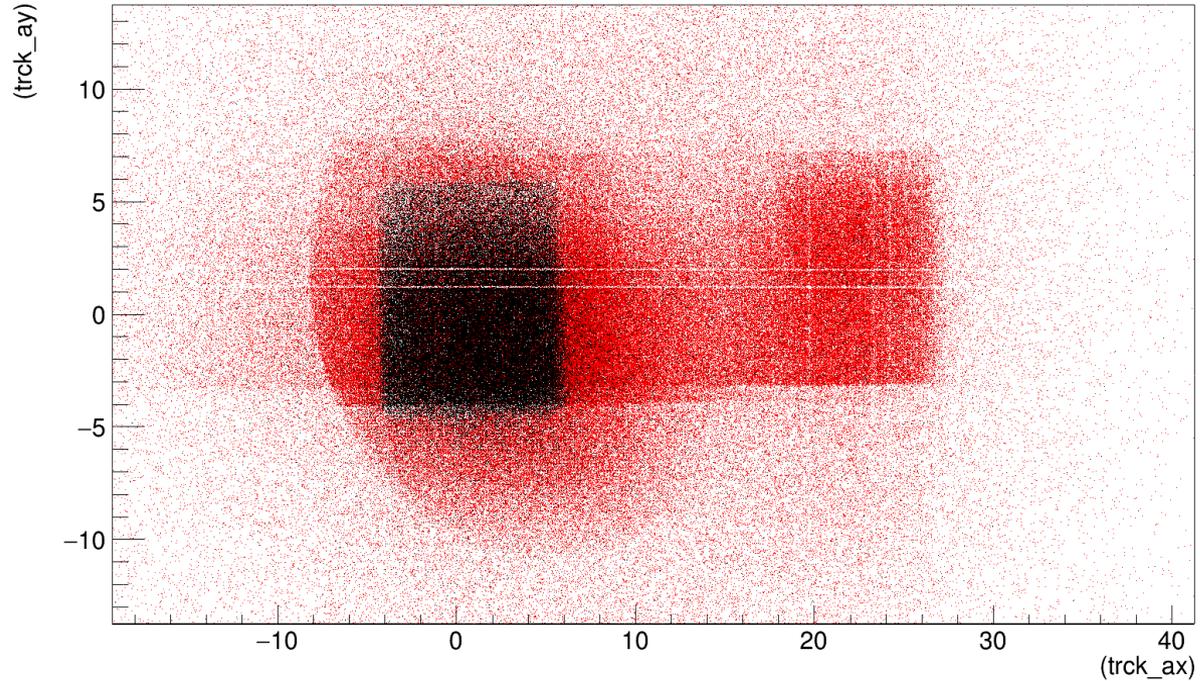
(trck_ay):(trck_ax) {casisTime>100 && casisTime<550}



Red: at SCD
Green: at charge tagger
Blue: at CALO top face
Black: at CALO bottom face

Beam profile - SCD

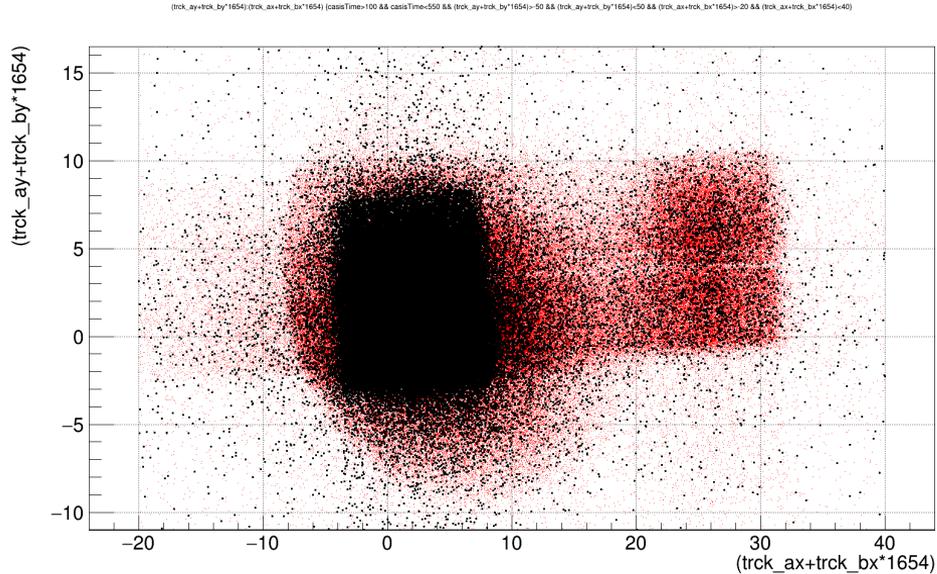
`(trck_ay):(trck_ax) {casisTime>100 && casisTime<550}`



Bema profile at SCD
coordinate

Red: all tracks
Black: Z>4 on charge
tagger

Beam profile – Charge Tagger

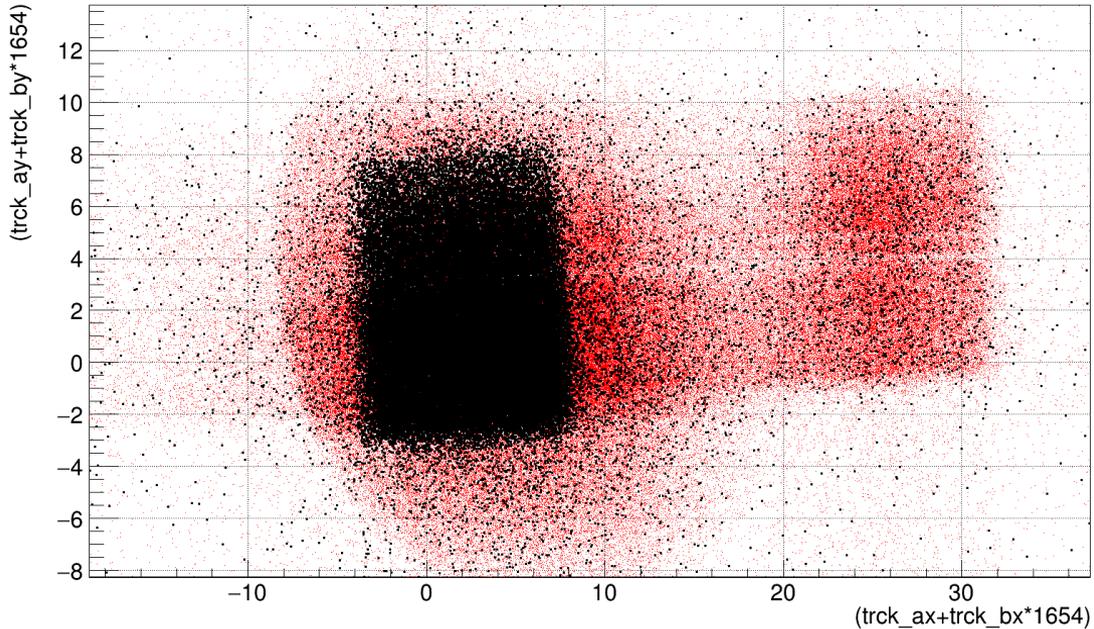


Bema profile at charge
tagger coordinate

Red: all tracks
Black: $Z > 4$ on charge
tagger

Beam profile – Charge Tagger

(trck_ay+trck_by*1654)(trck_ax+trck_bx*1654)(casisTime>100 && casisTime<590 && (trck_ay+trck_by*1654)>50 && (trck_ay+trck_by*1654)<50 && (trck_ax+trck_bx*1654)>20 && (trck_ax+trck_bx*1654)<20 && (trck_ax+trck_bx*1654)<40)

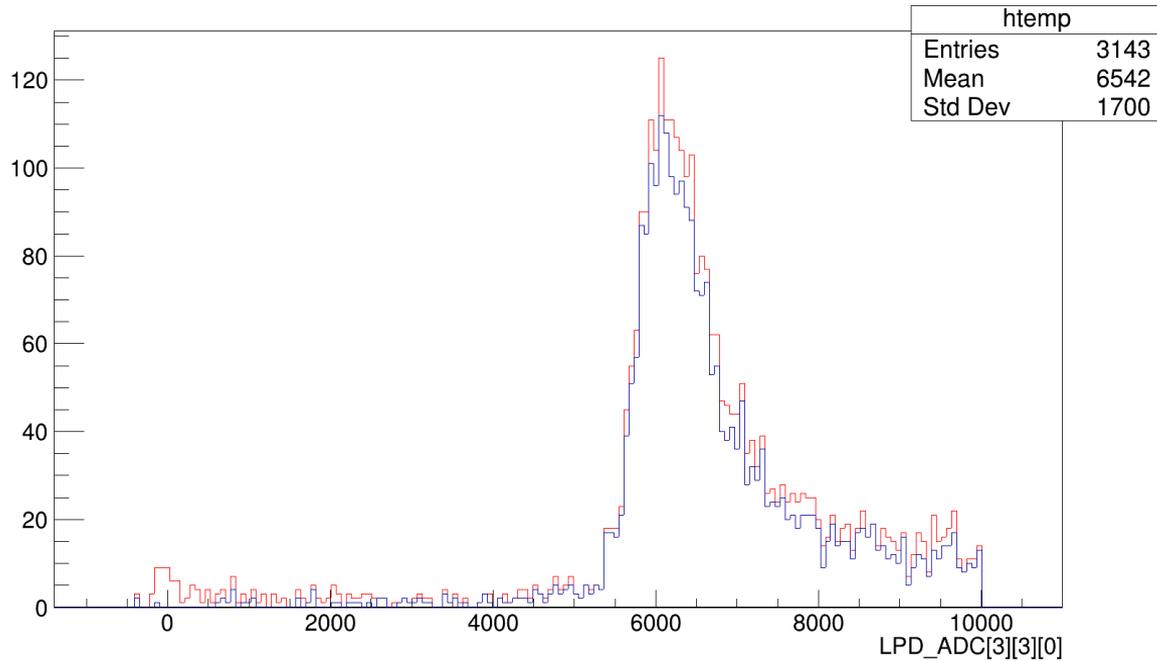


Beam profile at charge tagger coordinate

Red: all tracks
Black: $Z > 6$ && $Z < 18$ on charge tagger

MIP peak Z~6

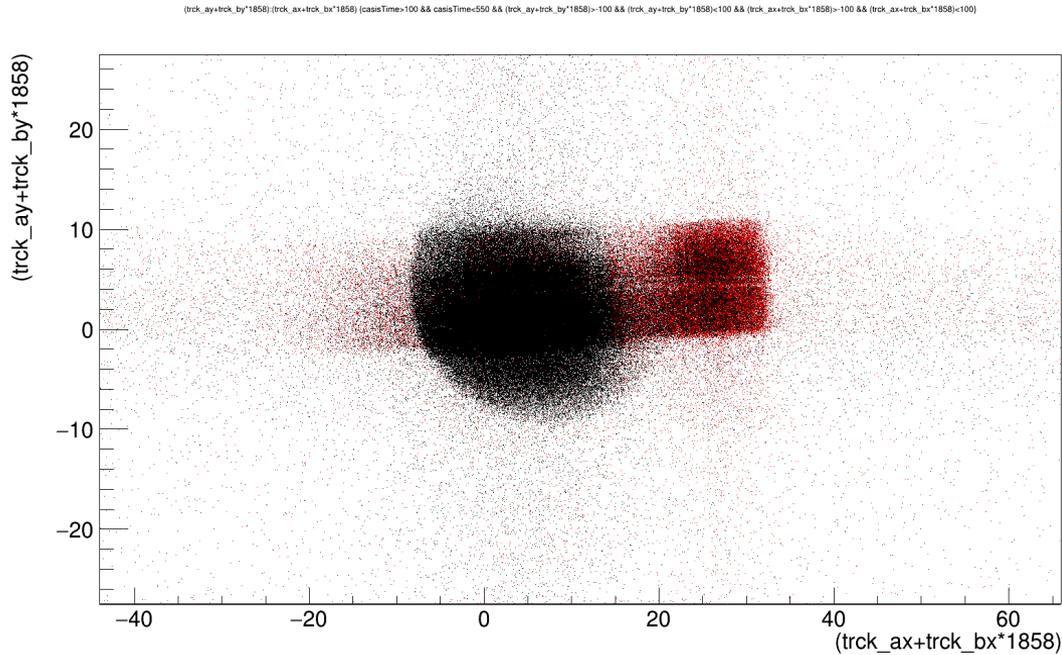
LPD_ADC[3][3][0] (casisTime>100 && casisTime<550 && truncMean>5.5 && truncMean<6.5 && LPD_ADC[3][3][0]<10000)



$5.5 < Z_{\text{truncMean}} < 6.5$

Red: all
Blue: tracks on charge tagger

Beam profile – CALO top face

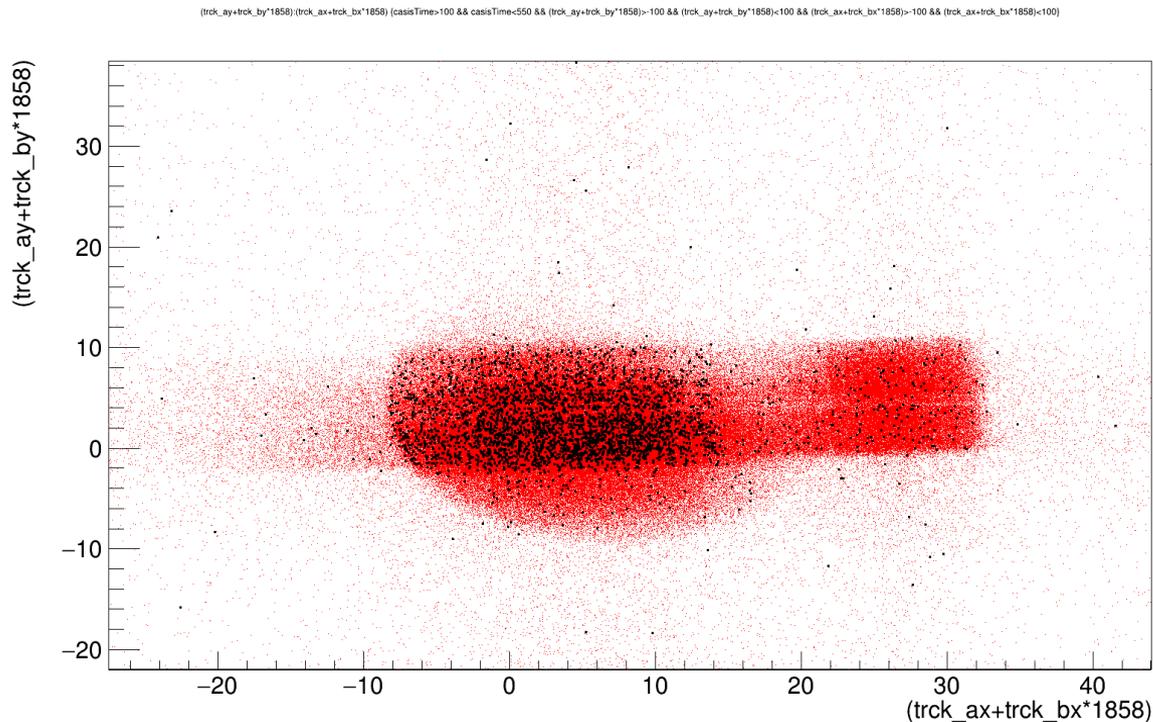


Projection on first cube

Read: all

Black: cube signal >5000 ADC

Beam profile – CALO top face

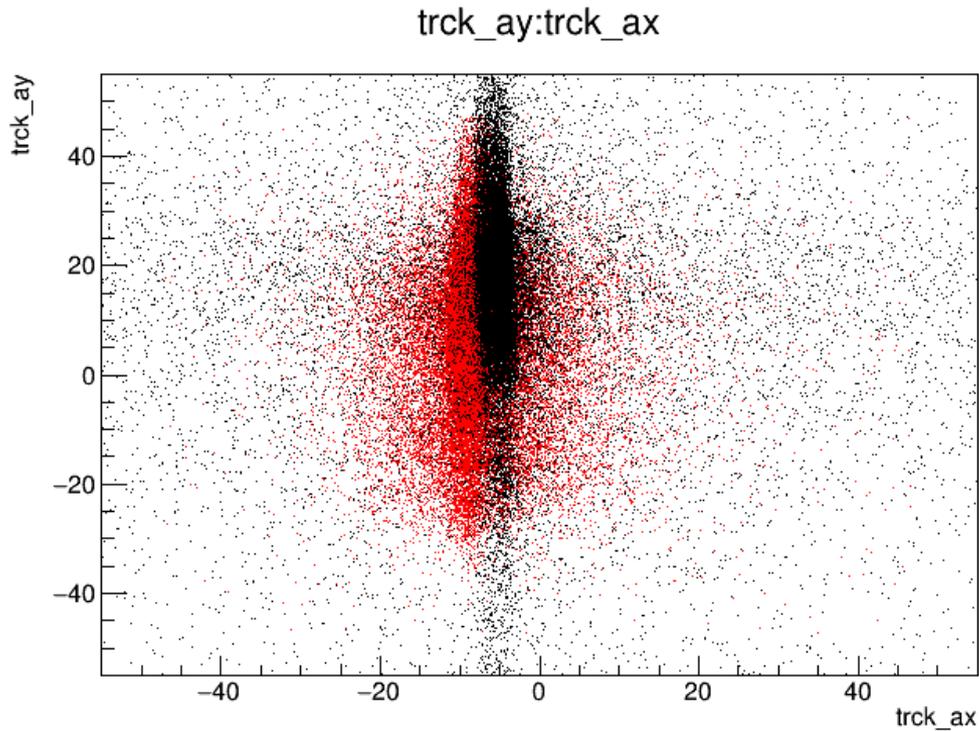


Projection on first cube

Red: all

Black: signal of first and second cube compatible with $Z = 6$ peak

RUN 302

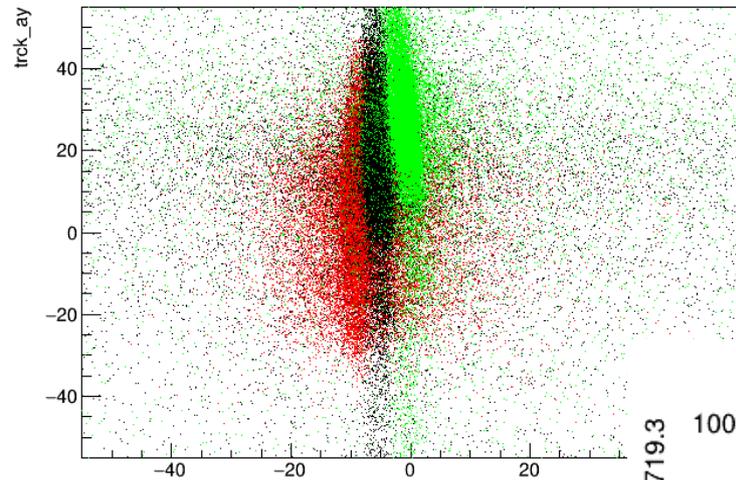


Beam profile

Red: at SCD

Black: on top face of CALO

trck_ay:trck_ax



Beam profile

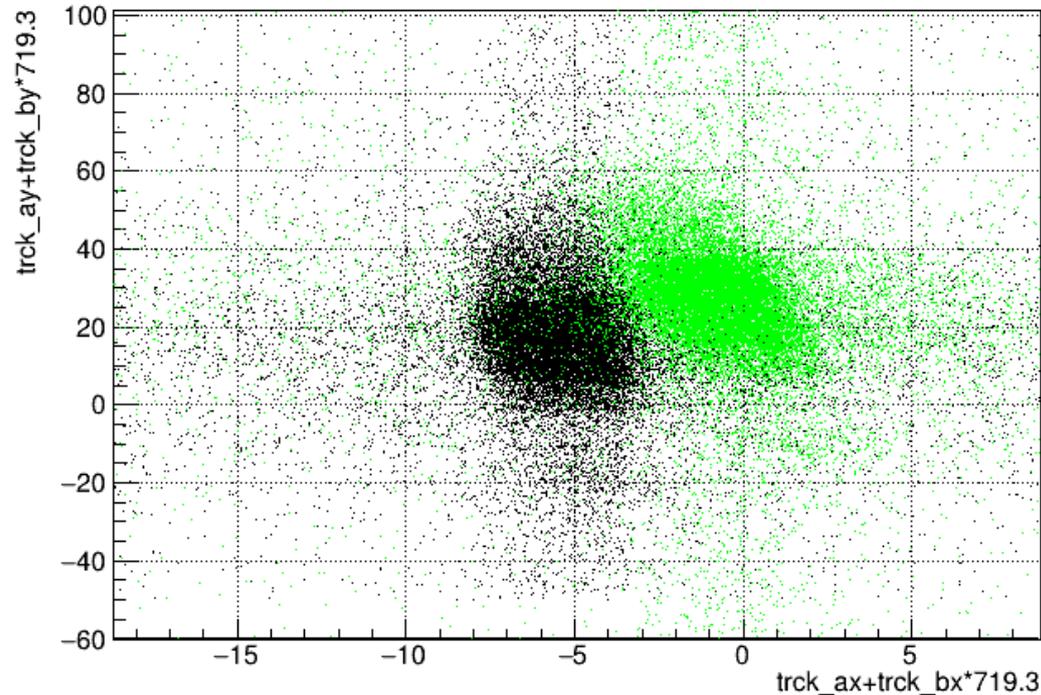
Beam profile

Red: at SCD

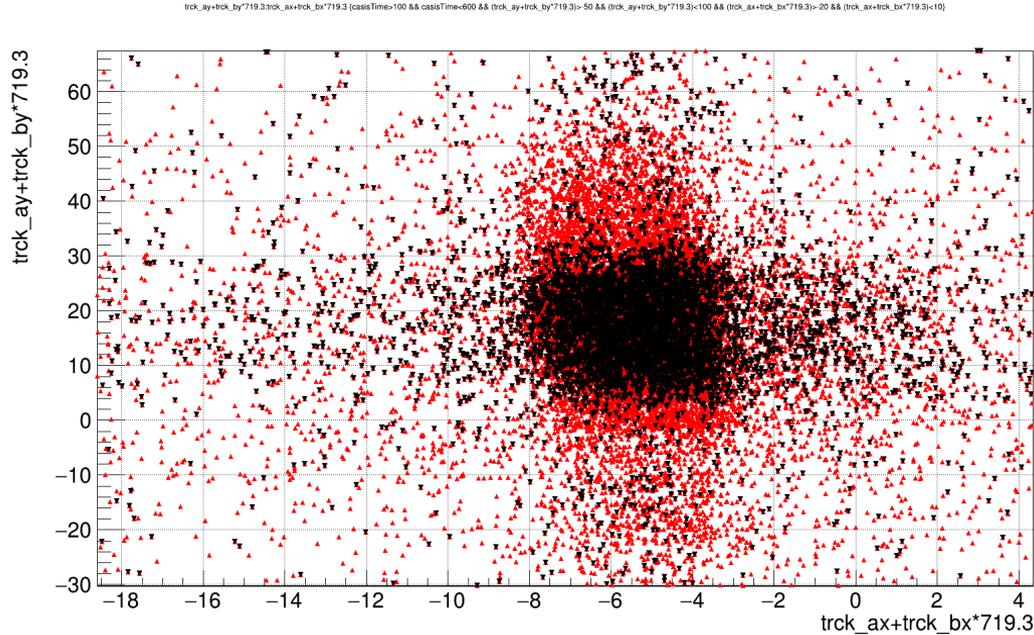
Black: on top face of Calo

Green: on bottom face of Calo

trck_ay+trck_by*719.3:trck_ax+trck_bx*719.3 ((trck_ay+trck_by*719.3)>=50 && (trck_ay+trck_by*719.3)<100 && (trck_ax+trck_bx*719.3)>=20 && (trck_ax+trck_bx*719.3)<20))



Beam profile – CALO top face



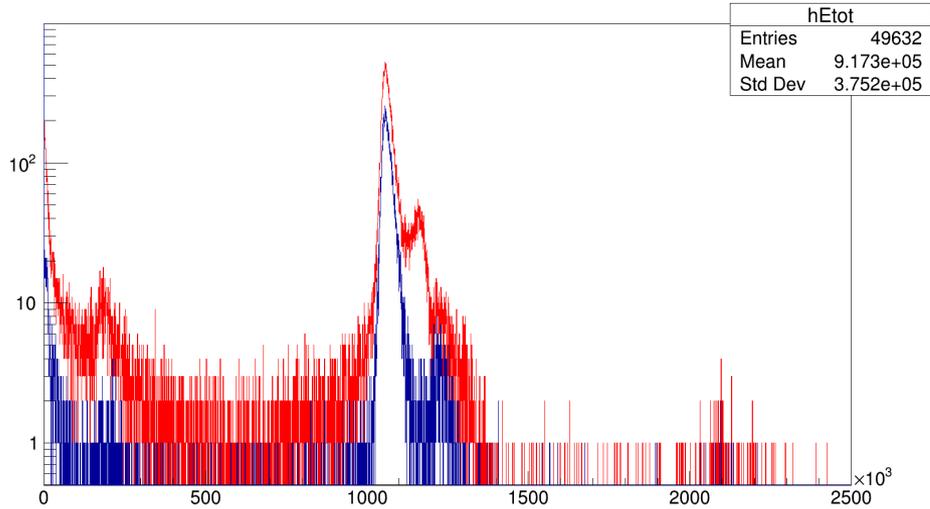
Projection on first cube

Red: all

Black: signal on the first cube $> \sim 2.5$ GeV

Energy release on 3x3

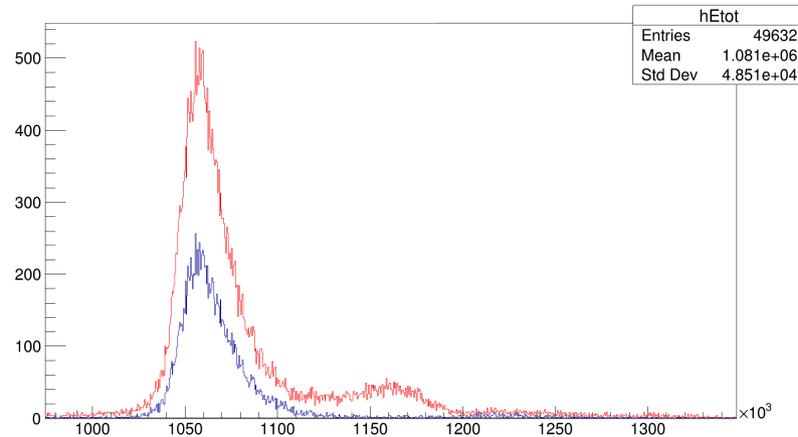
hEtot



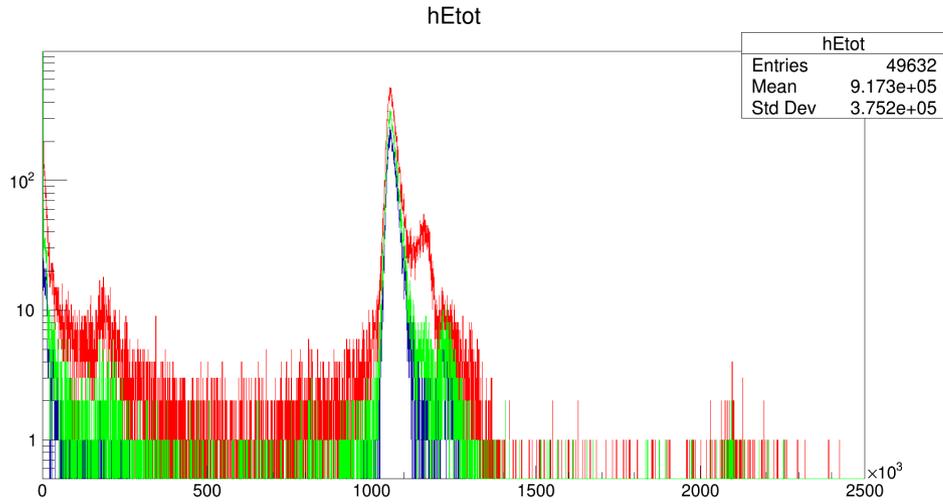
Energy sum on 3x3

Red: all

Blue: tracks on the first cube ($-8 < x < -3$,
 $4 < y < 30$)



Energy release on 3x3

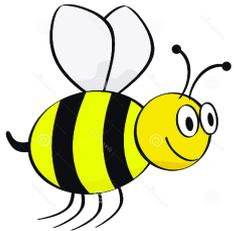
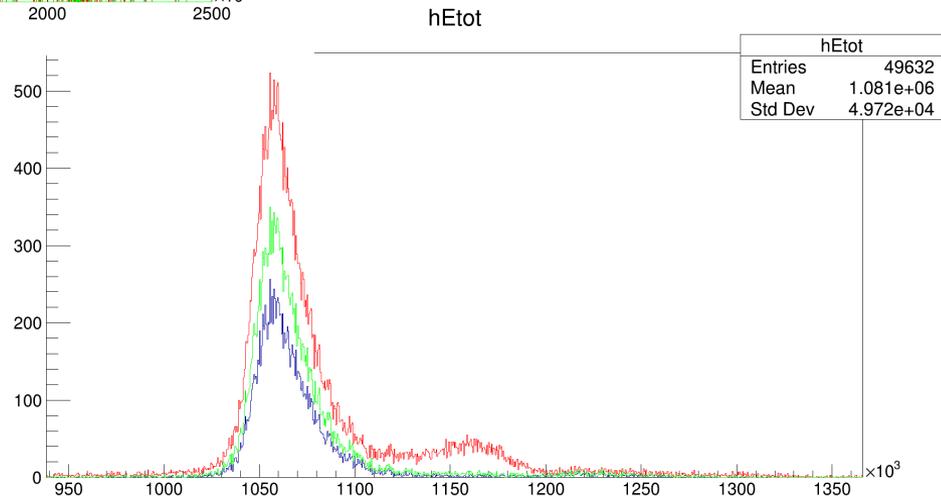


Energy sum on 3x3

Red: all

Blue: tracks on the first cube ($-8 < x < -3$,
 $4 < y < 30$)

Green: tracks on the first cube ($4 < y < 30$)



Conclusions

- Definition of detectors data format
- Alignment of events with SCD
- Tracks seems usable in the analysis
- Alignment of detectors
- Understand why beam profile rotate with distance form the SCD