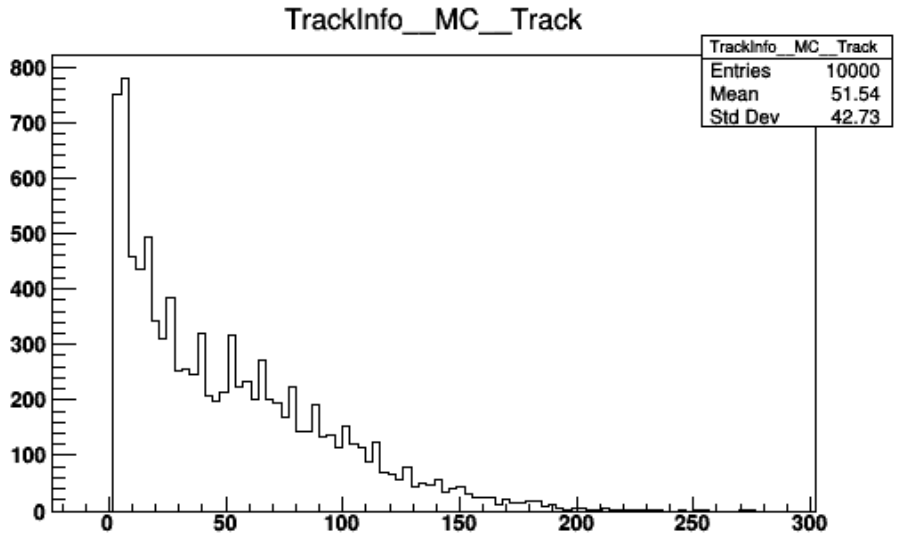
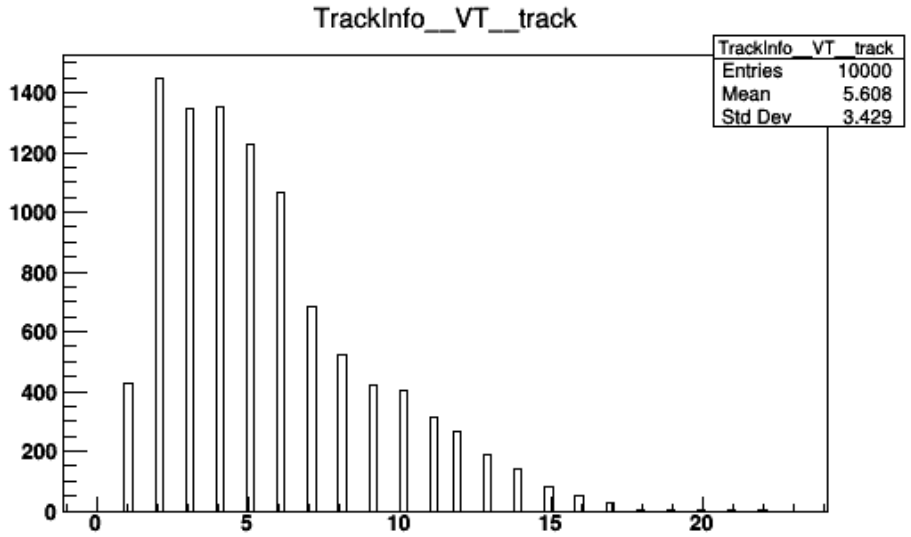
Reconstruction Software Update & Multitracking Preliminary Study

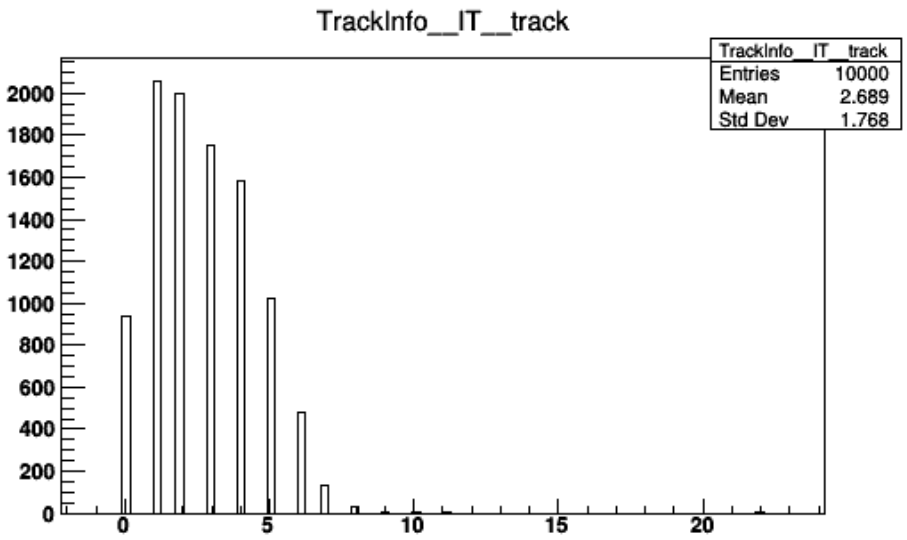
Alberto Mengarelli INFN Bologna

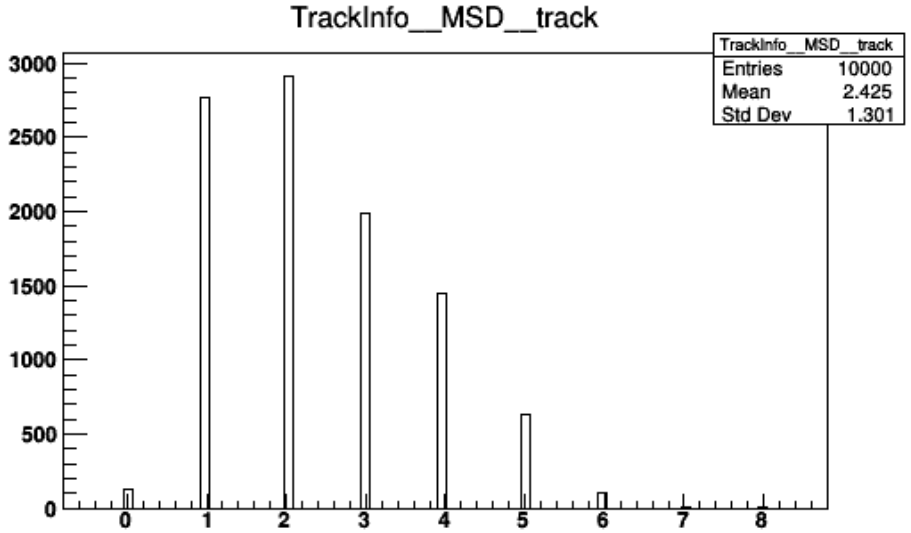
Control Plots for tracking inside SHOE

Track Multiplicity

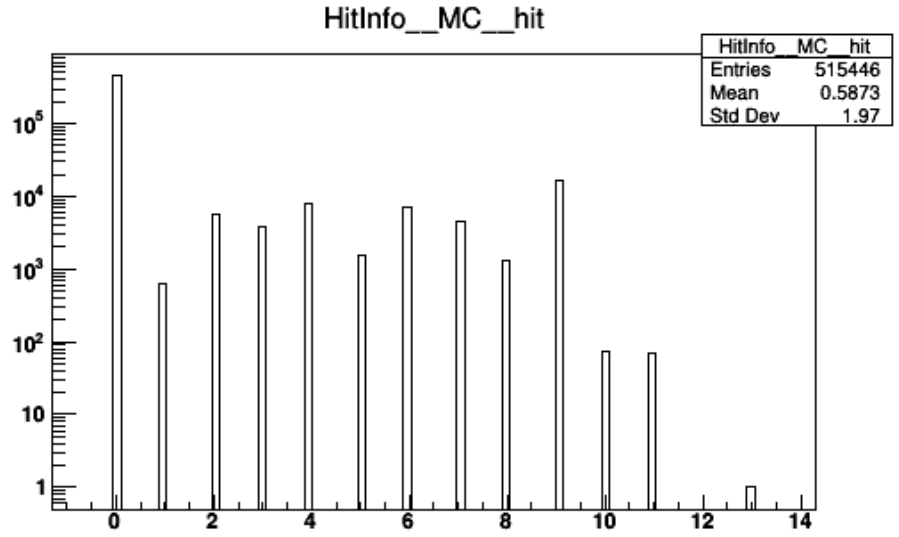


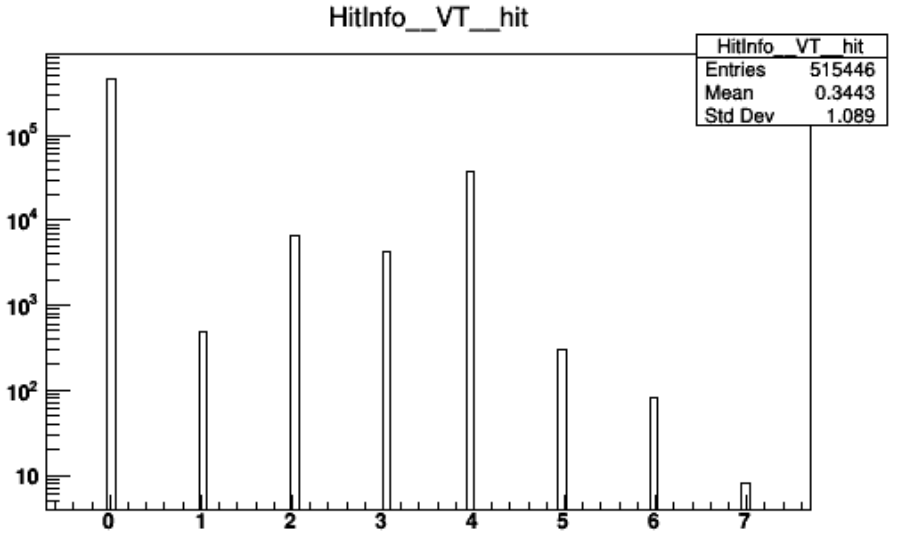


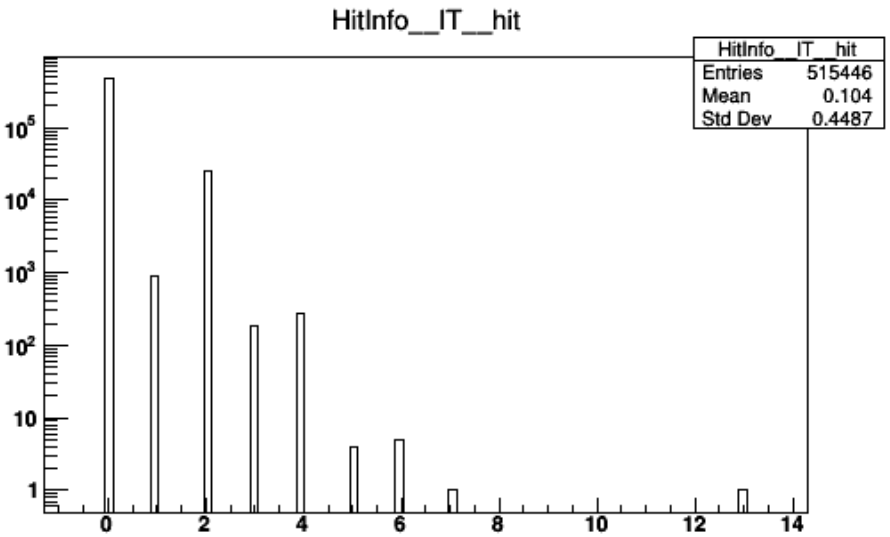


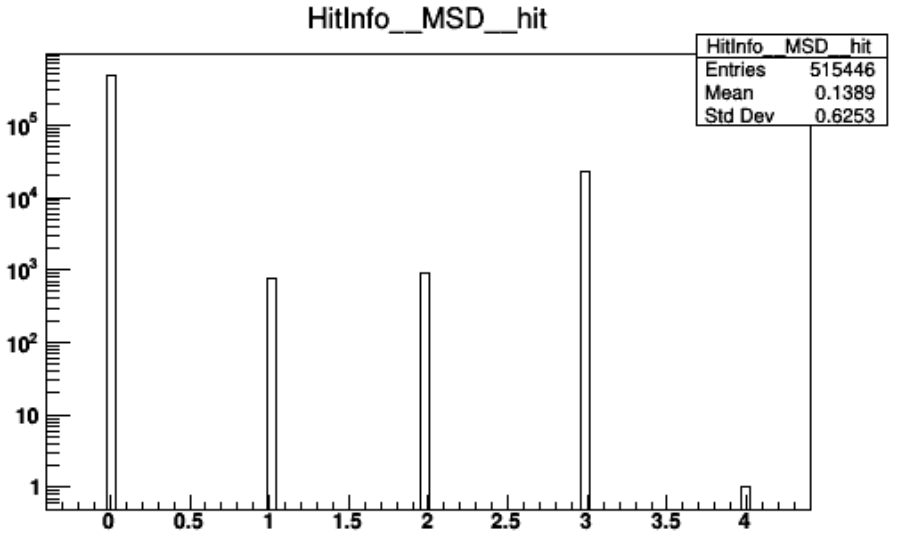


Hit Multiplicity

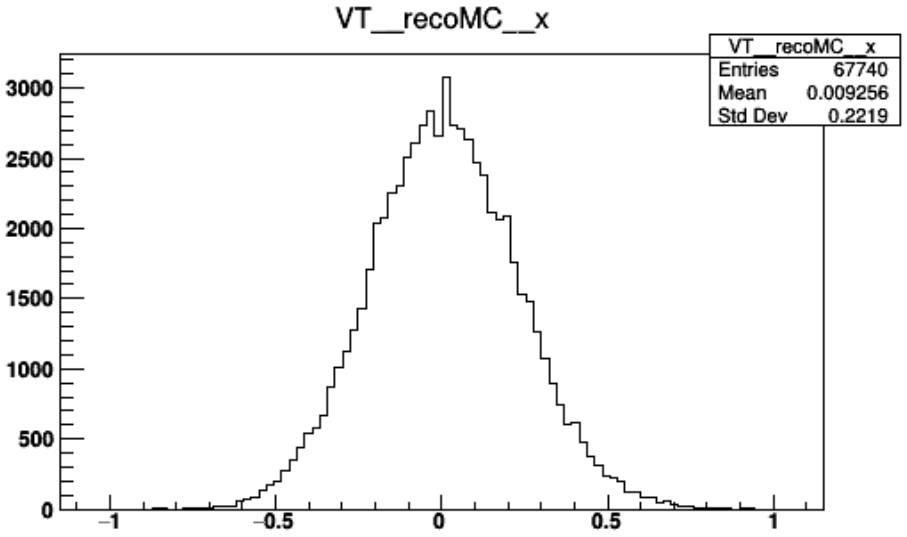


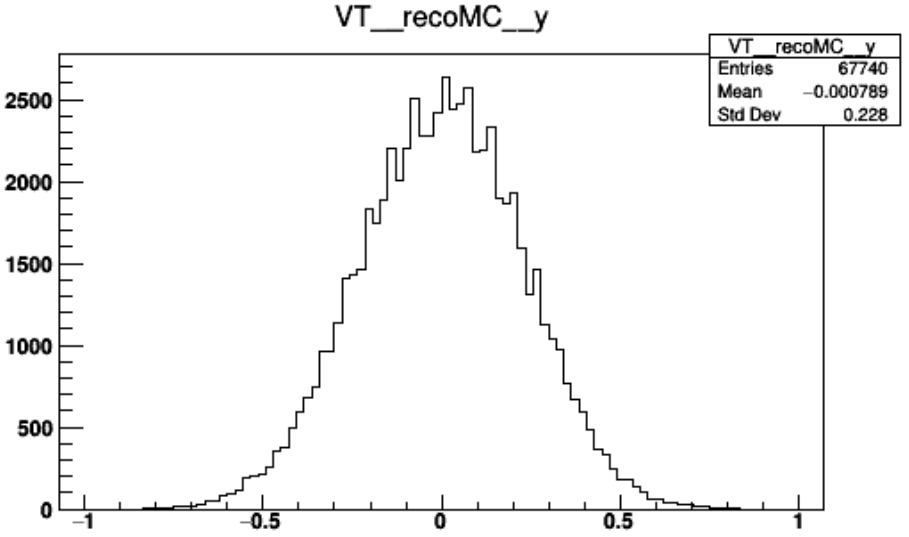


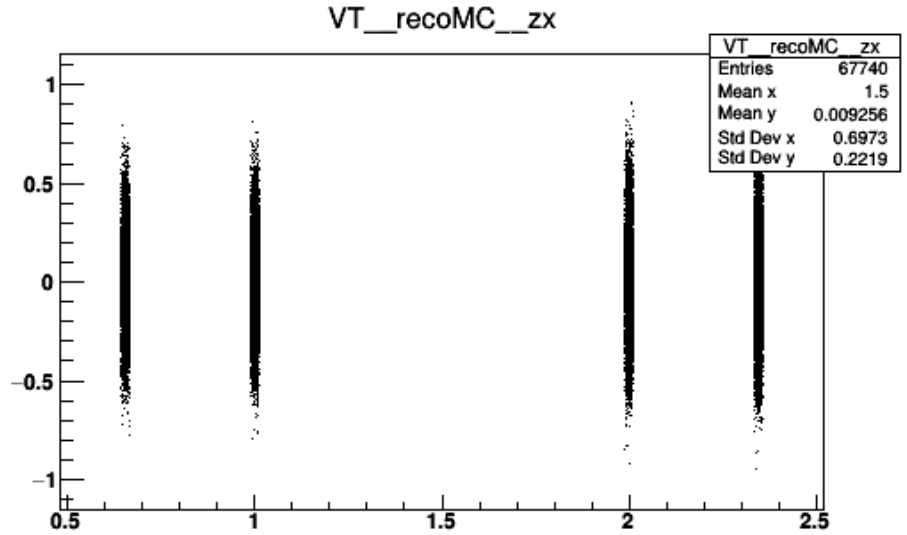


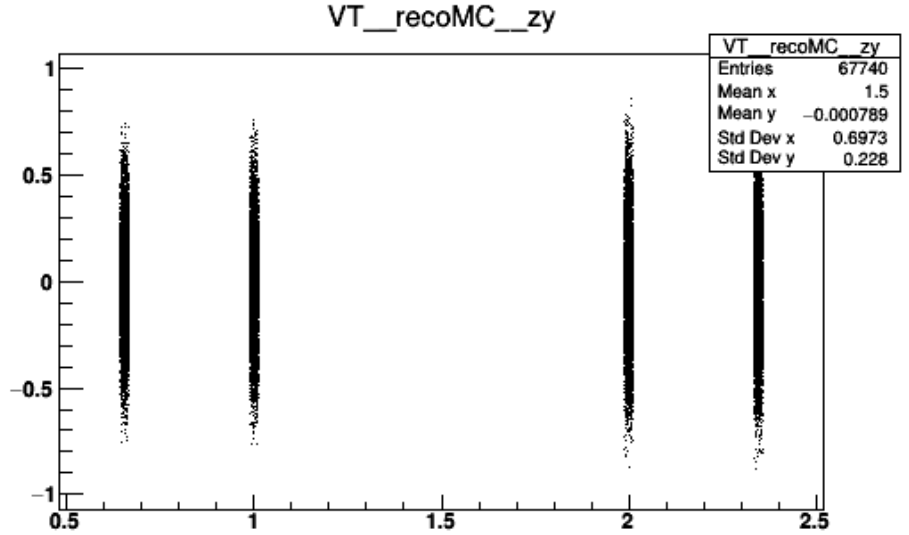


Geometry Monitoring









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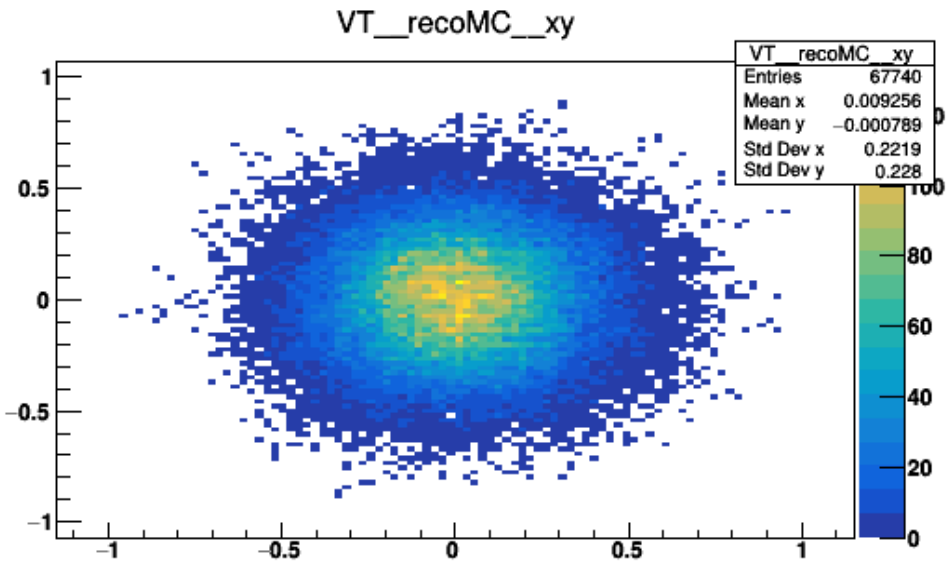
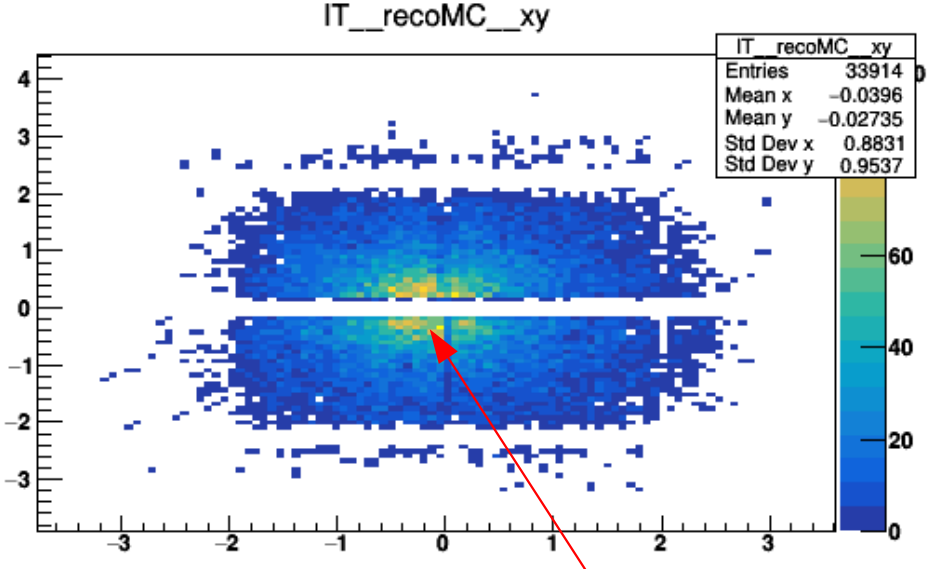
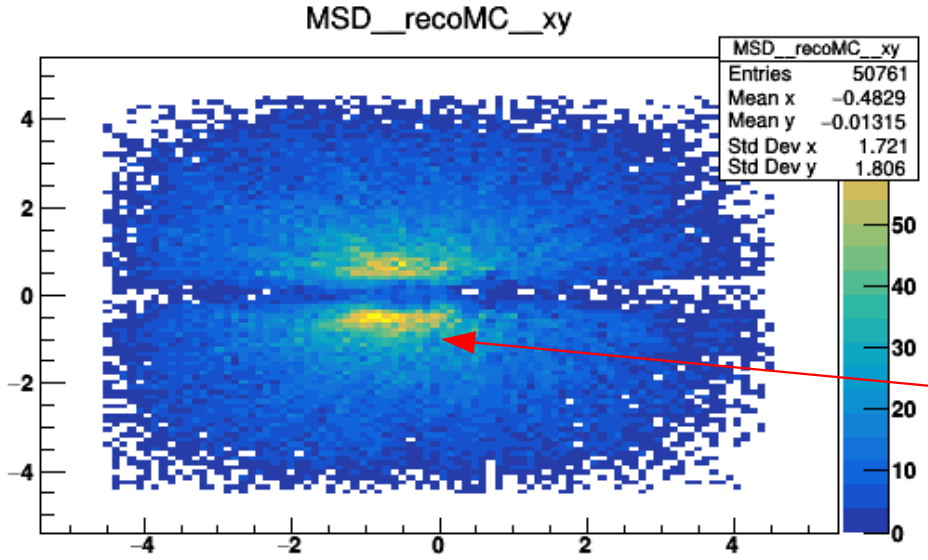






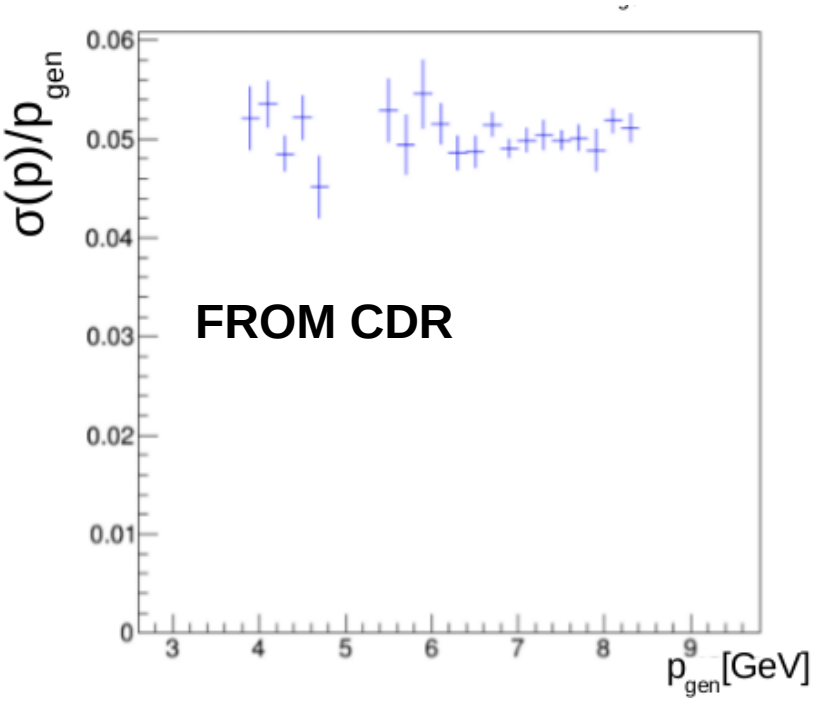
Running on V13.1.1

- IT geometry hole already known

- Shift in x visible already showed by Roberto and not negligible for MSD

Preliminary study on multitracking

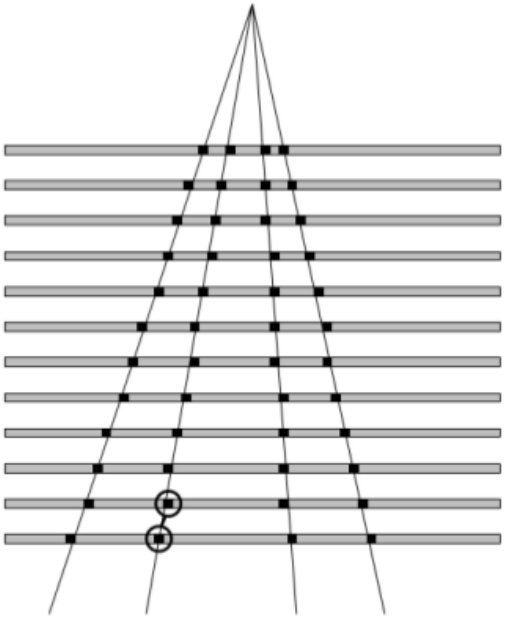
- Present results:
  - Given using true infos on Hit list
  - Fragment type given in input
- Optimal condition for Kalman to fit and Reco the fragment momentum
- Efficiency of reconstruction is ~ 1 for each fragment

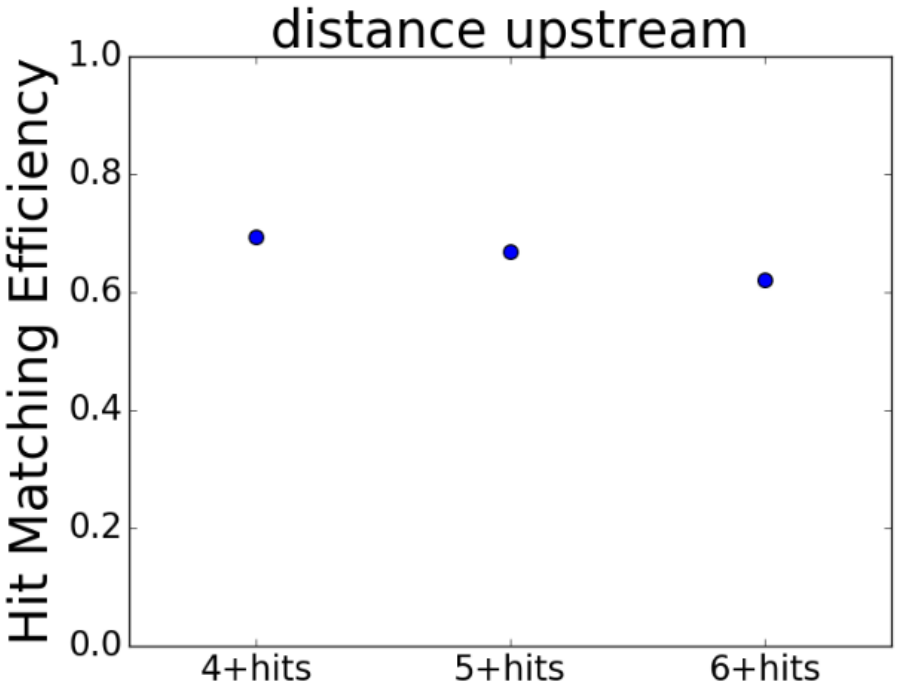


- This is not realistic and could be done only with MC, while an efficient way to deal with multytracking and assignment of "true" hit list for each fragment track has to be developed

Minimum distance method:

Riccardo Ridolfi master thesis





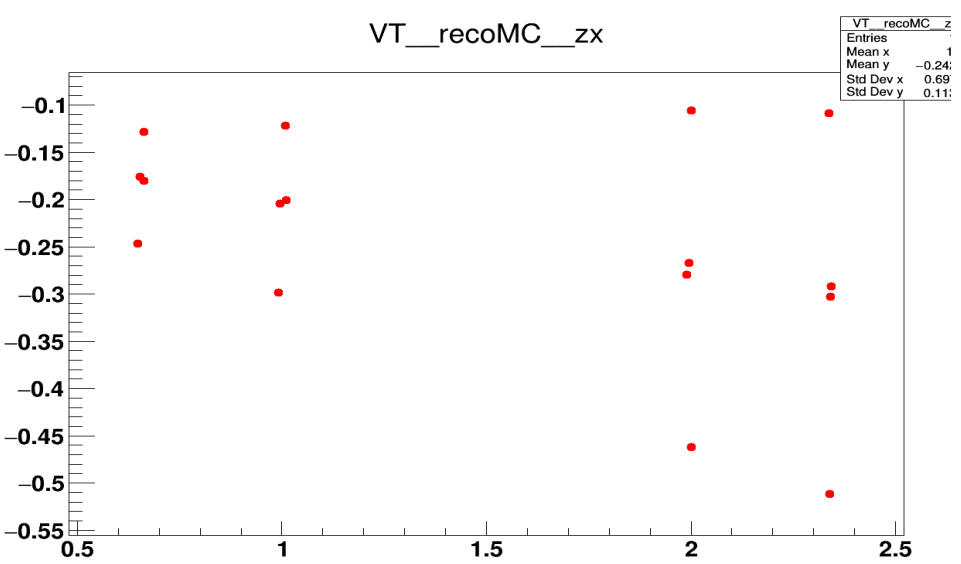
- Efficiency of match the true track list of hits using minimum distance method is already ~70 % using 4 hits

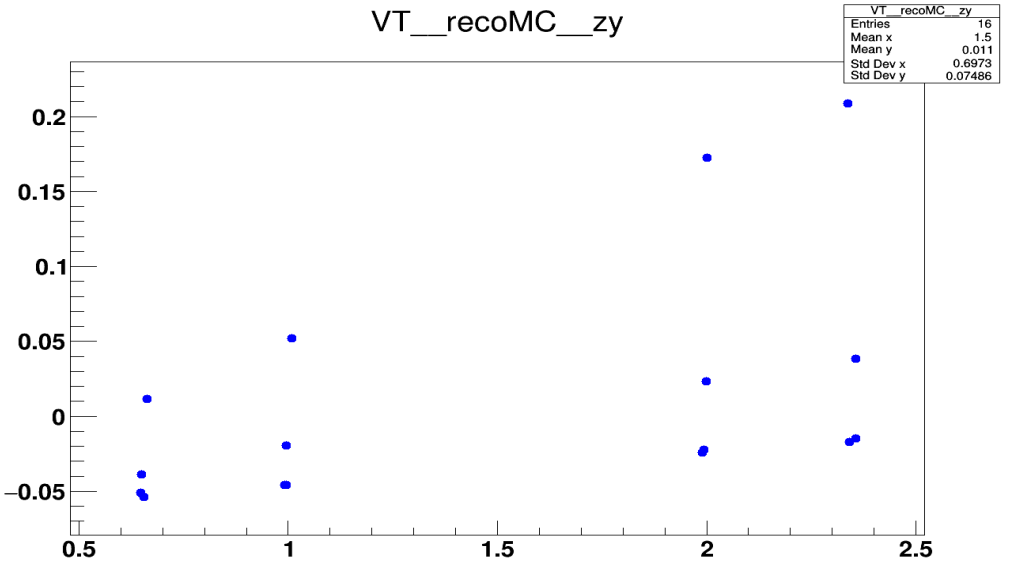
Chi_2 method:

USING ONLY VT RECO HIT (V13.1.1)

- BASIC IDEA: Magnetic field in the VT region will not deflect the trajectory so much from a straight line → Fit the combination of the hits in each event to disentangle the true ones by mean of CrHI2 result

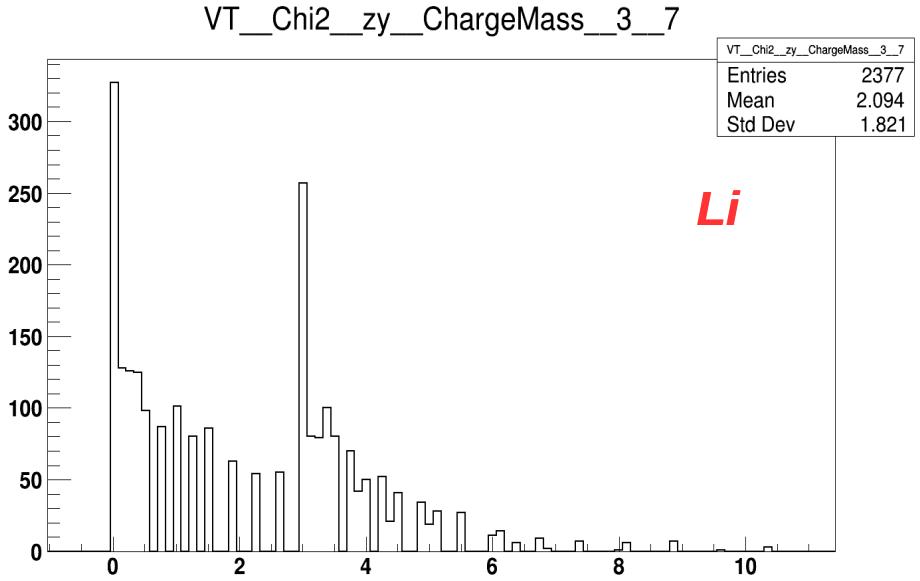
Event with 4 tracks ZX and ZY planes:

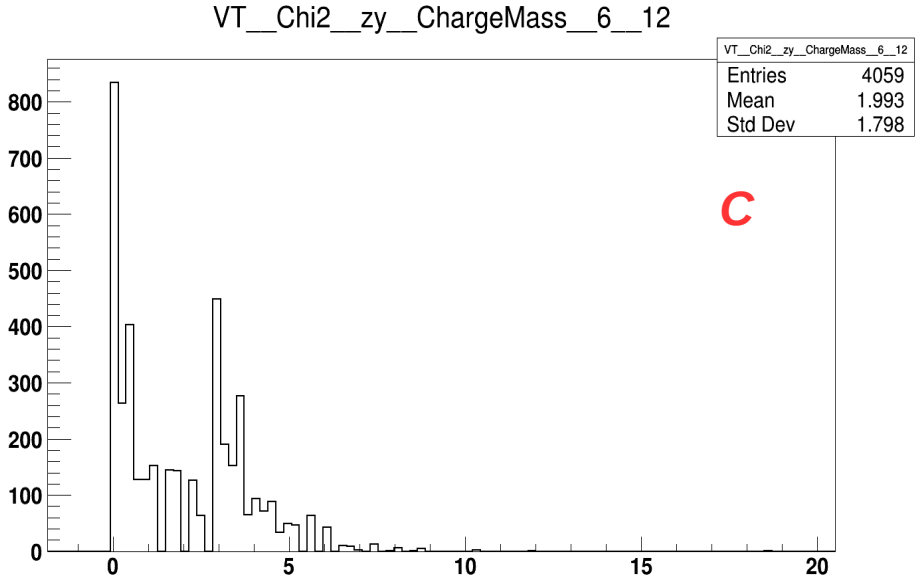


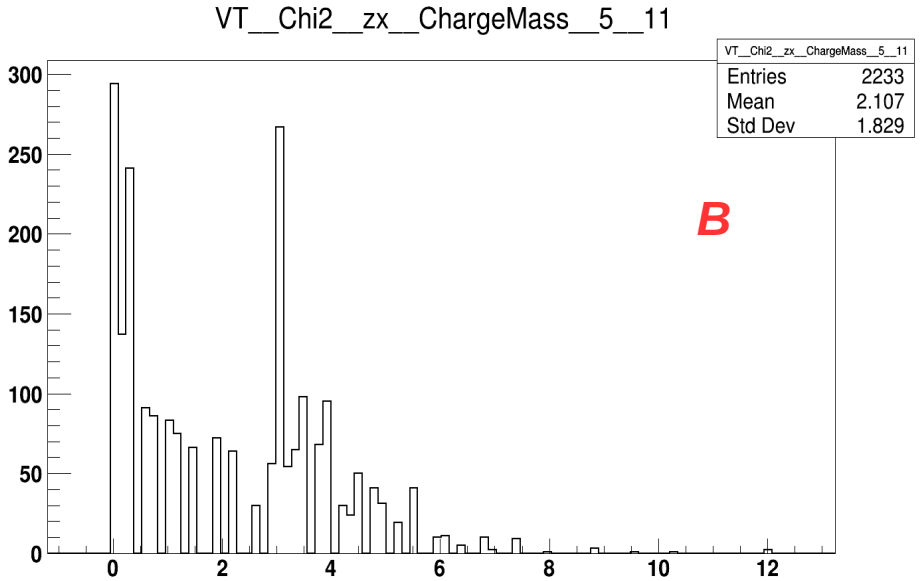


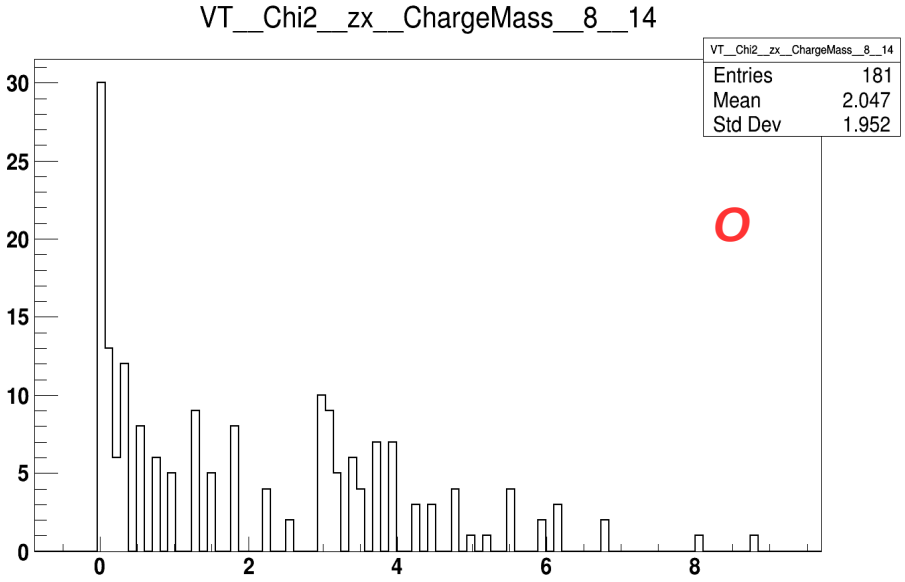
- Selecting tracks with 9 hits (Efficiency ~88 %), take th 4 hits in the VT, make all combination and look at the CHI2 of the fit with a line for the ZX and ZY planes

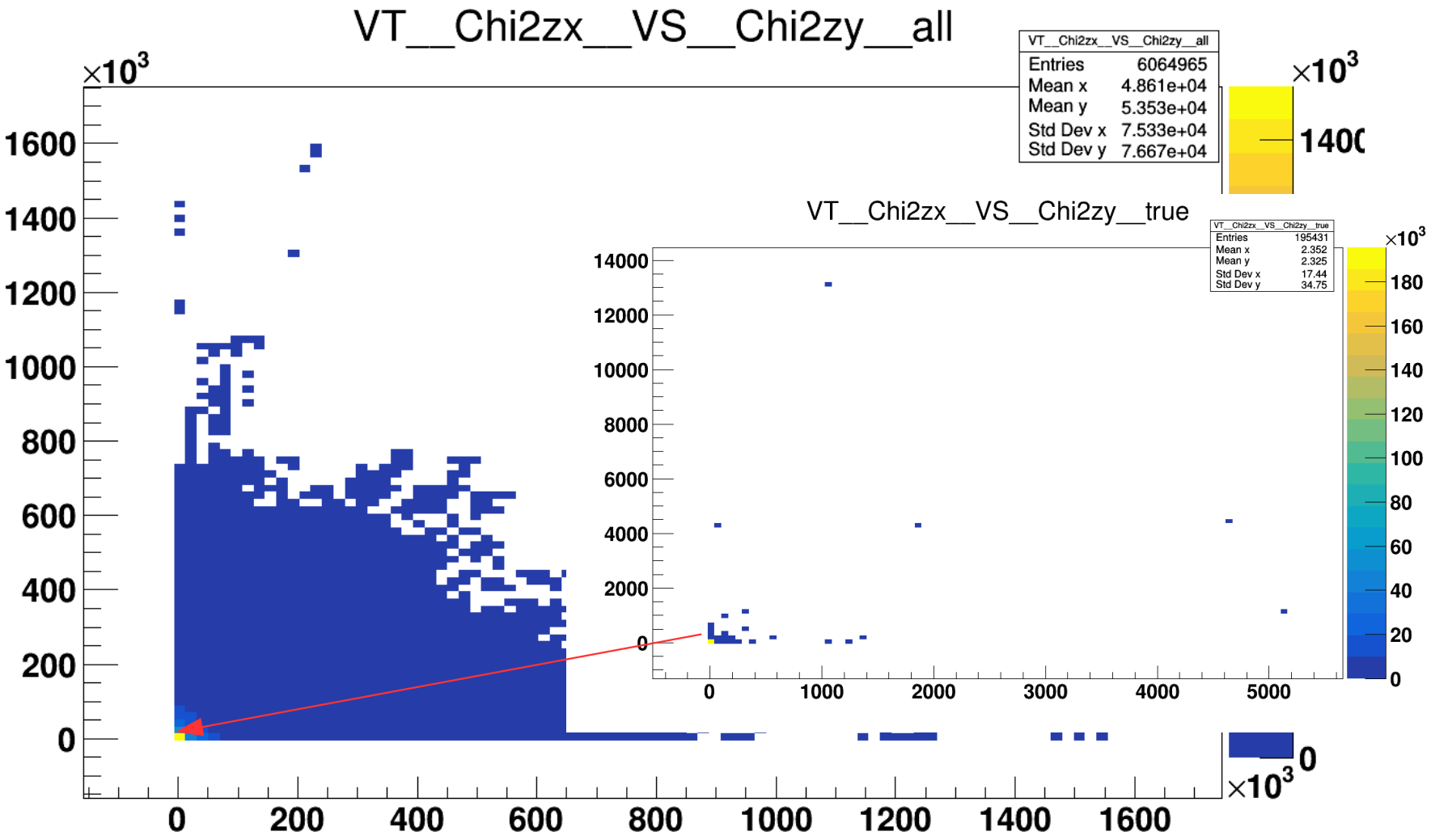
CHI2 Values for different fragments









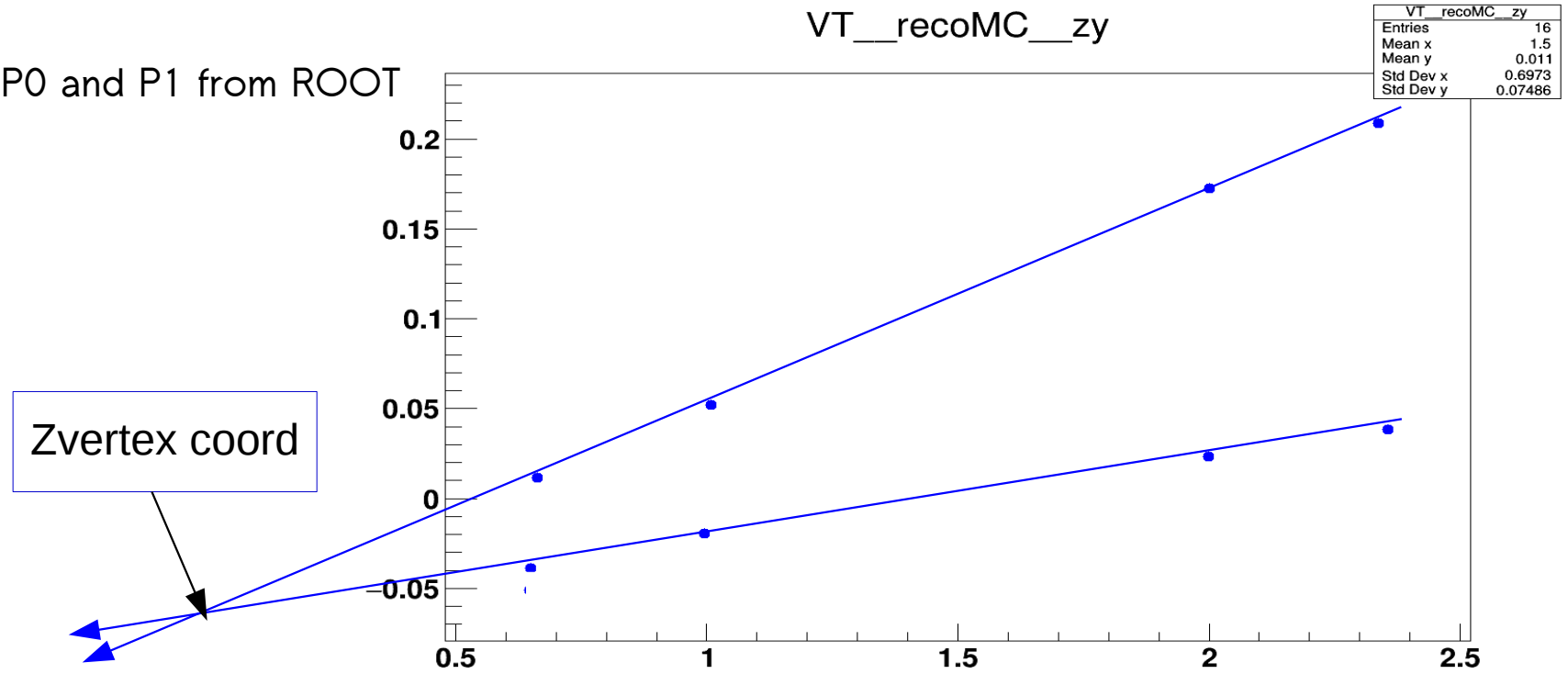


- Apart few cases Values of the TRUE combination CHI2 is confined in the good CHI2 region
- Cutting on CHI2_ZX < 5 and CHI2_ZY < 10 or viceversa the efficiency of selecting the true combination is ~99 % compared to ~75% of the minimum distance method

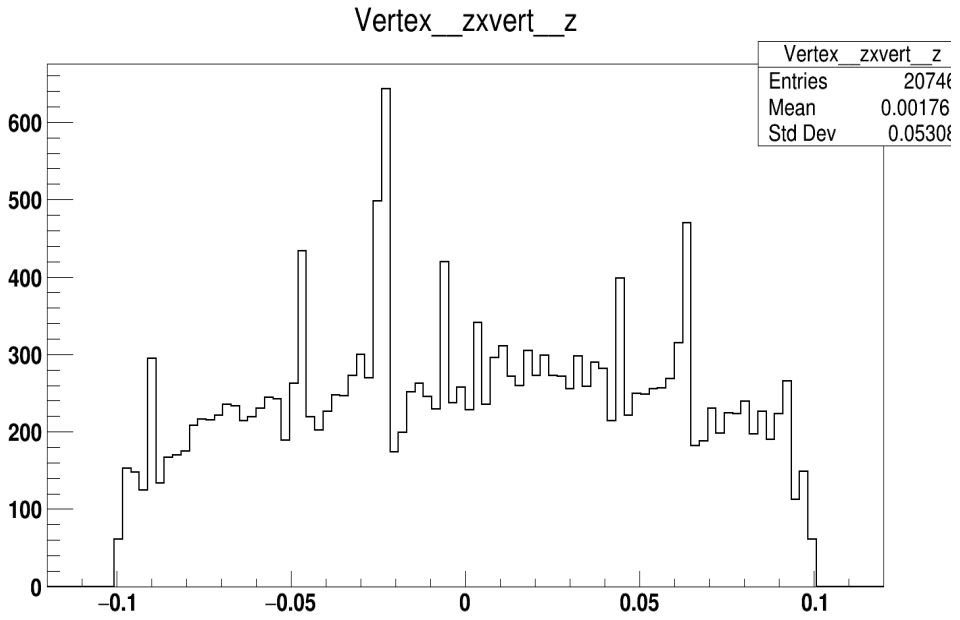
Vertexing with simply intersection of the lines from fit

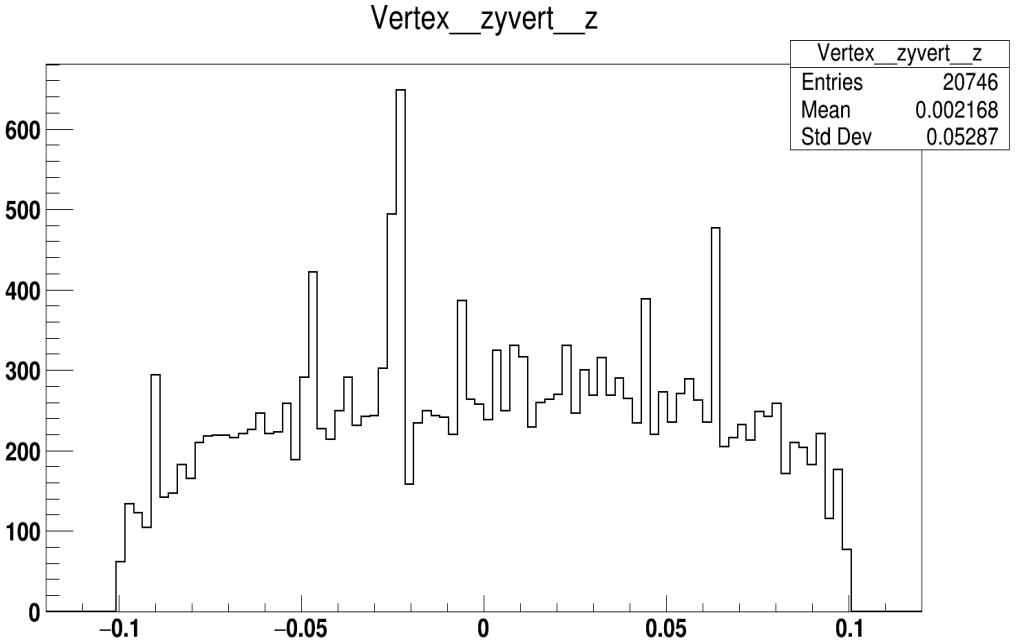
- Selecting events with only 2 tracks, look at the Z coordinate distribution of the intersect of the two lines after fit, in the two planes:

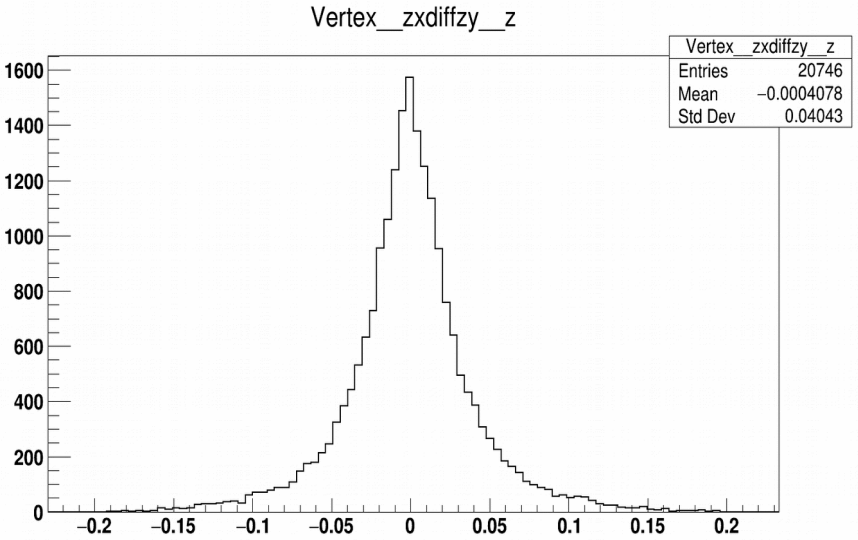
- Using P0 and P1 from ROOT fit



- Same thing in the ZX plane







- In the plots only cases where the |Z| < 0.1 (TARGET)
- There are cases where the intersect is outside (NO SENSE)
- The distribution look quite similar BUT
- The difference in between the two Z is sometimes of the order of TARGET dimension → Need more investigation!

Summary and next steps

- Control plots for reco monitoring in SHOE
  - To be updated using last simulation version (V14)

- Preliminary multitracking study
  - CHI_2 method seems to be promising for VT (eff ~99%)
    - To be checked with V14 and using reclusterd hit
  - First vertexing attempt
    - Need to be investigate in deep...