Flush report

Mahiro Ikemoto (Nara Women's University)

INTT Analysis workshop 2023.11.16

Self Introduction

Mahiro Ikemoto
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About me

- undergraduate student of NWU
- I’m from Kobe, Japan
- Favorite artist：ARASHI, Mrs. Green Apple

My To-Do List

- Optimization of Z-Vertex determination
  - Make histogram of DCA_Z distribution
- Have a good relation ship with everyone.

Optimization of Z-Vertex determination

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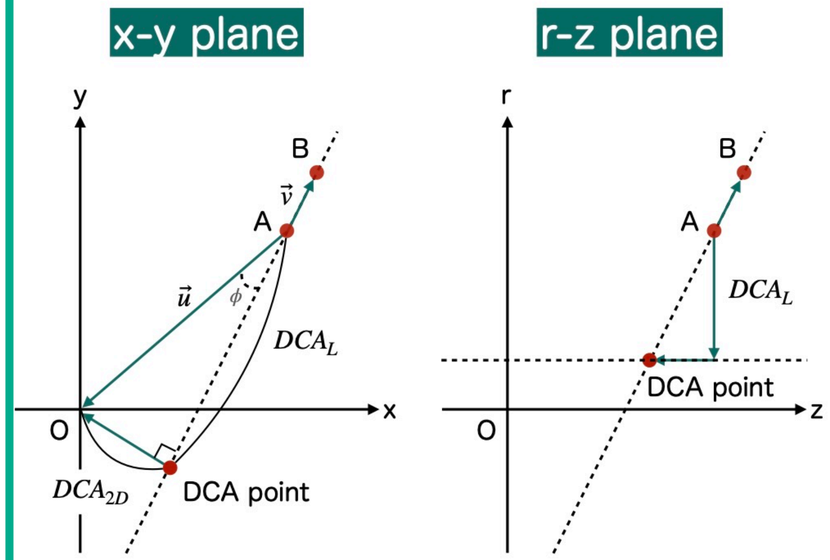
My To-Do List (practice)

- Making histogram of DCA_Z distribution and Comparing
  - Making histogram of DCA_Z distribution ✅
  - Caluculating Z vertex for each event
    – peak ✅
    – mean ✅
    – apply cuts and calculate the mean …etc
  - Subtracting the coordinates of the zvertex from the coordinates of the dcaz distribution to make histogram
  - Comparing each histogram

Making histogram of DCA_Z distribution

- calculating of DCAz position

HOW TO GET THE BEAM SPOT4



Unit vector between A and B : $\vec{v}$

Unit vector between A and O : $\vec{u}$

- To find the beam spot, the distance of closest approach (DCA) between each tracklet and origin was calculated.
- Calculating DCA_{2D} and DCA_L.

$$\mathrm{DCA_{2D}} = \vec{\mathrm{v}} \times \vec{\mathrm{u}} = \vec{\mathrm{u}} \cdot \sin\phi$$

$$\mathrm{DCA_L} = \vec{\mathrm{v}} \cdot \vec{\mathrm{u}} = \vec{\mathrm{u}} \cdot \cos\phi$$

- Using DCA_L, the DCA position of the tracklet can be calculated.

$$DCA_X = DCA_L \times \vec{u}_x + A_x$$

$$DCA_Y = DCA_L \times \vec{u}_y + A_y$$

$$DCA_Z = DCA_L \times \vec{u}_z + A_z$$

- The beam spot is the average of the DCA.

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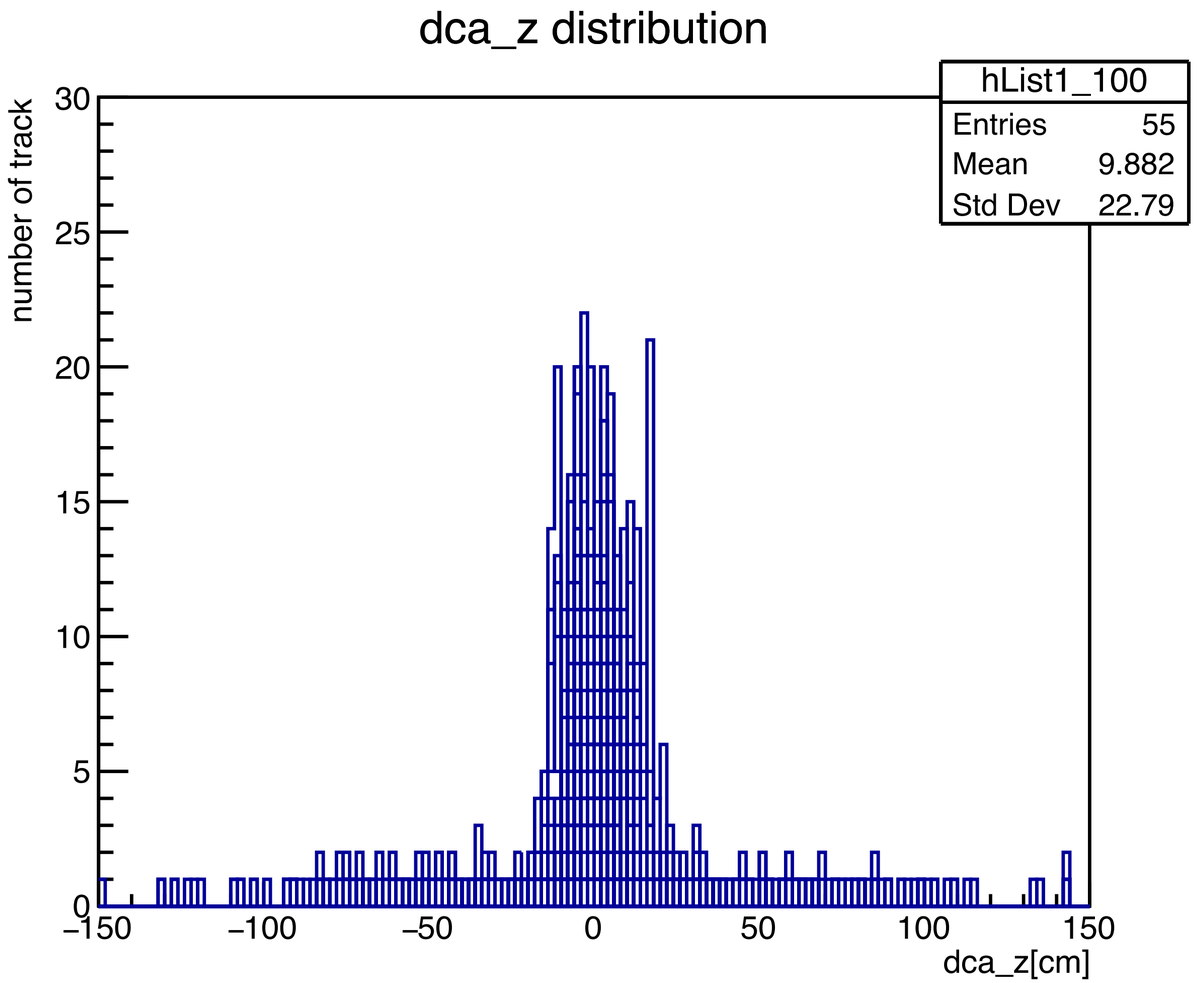
(From Hinako.Tsujibata)

I use Hinako's method to calculate DCAz position.

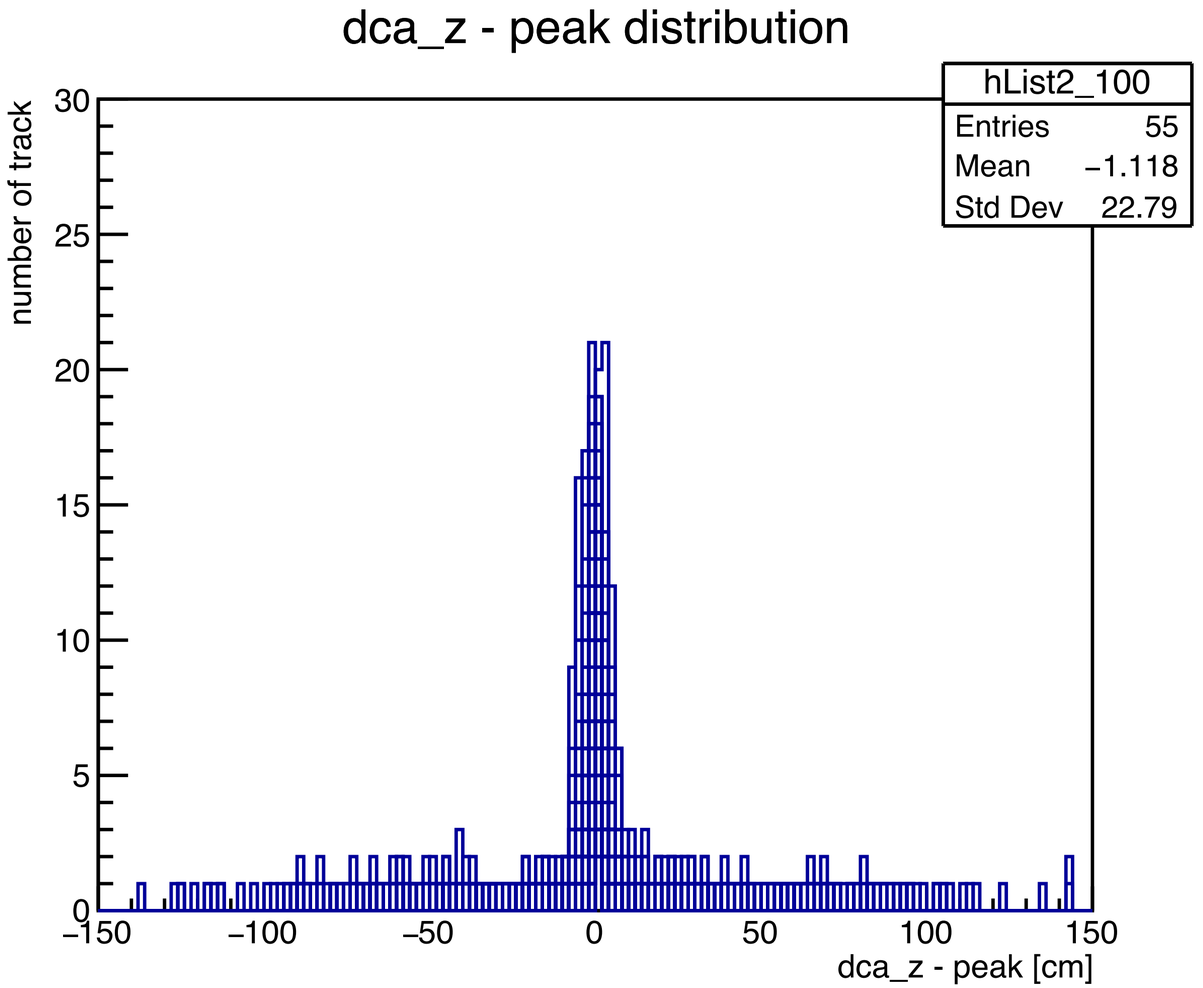
Making histogram of DCA_Z distribution

- X axis : dca_z coordinate[cm]
- Y axis : number of track
- Bin width : 2cm
- This plot is used simulation data. It has 100 events.



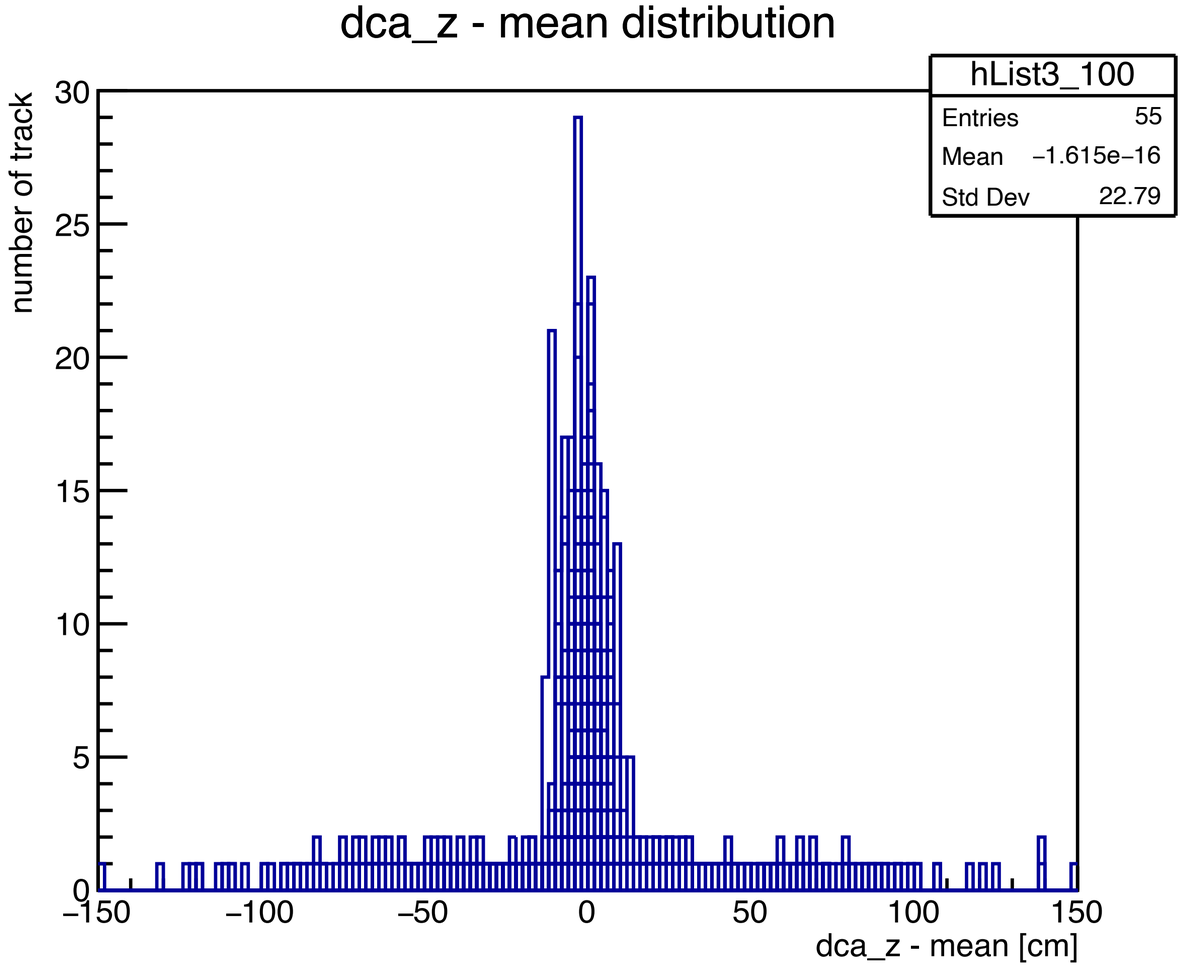
Making histogram of DCA_Z - Z Vertex distribution
- calculating Z vertex … peak

- X axis : dca_z - peak coordinate [cm]
- Y axis : number of track
- Z Vertex is calculated by the peak of each event. To plot the dca_z coordinates minus the peak coordinates.

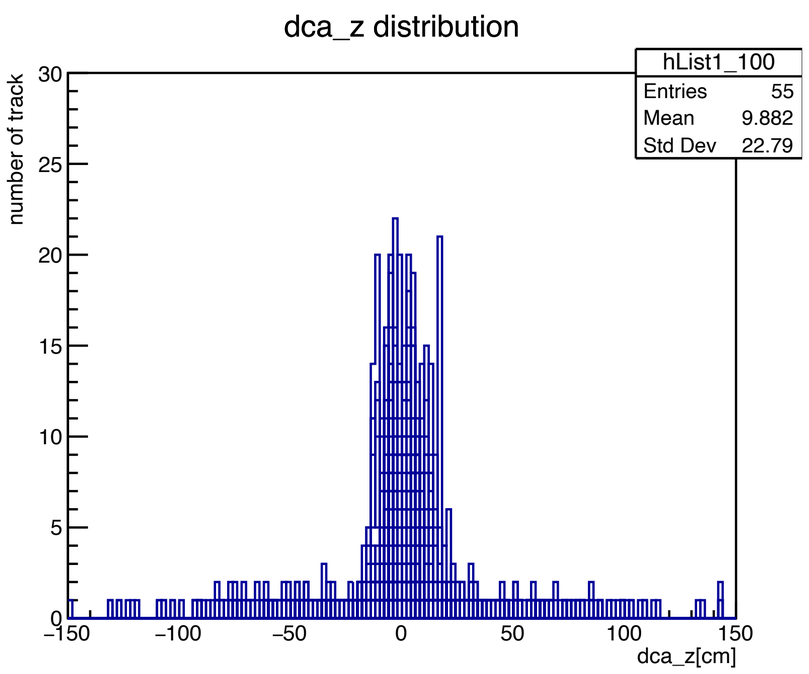


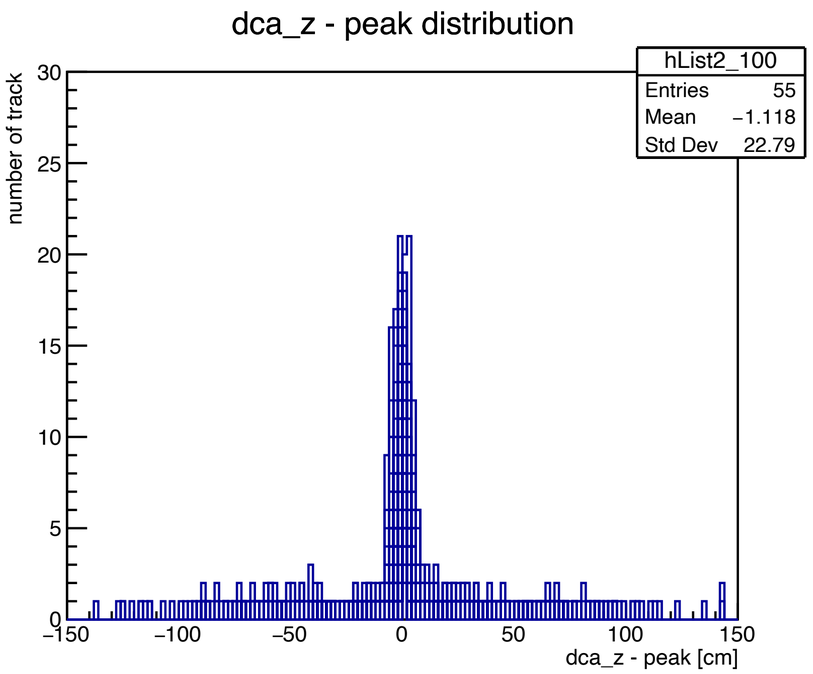
Making histogram of DCA_Z - Z Vertex distribution
- calculating Z vertex …mean

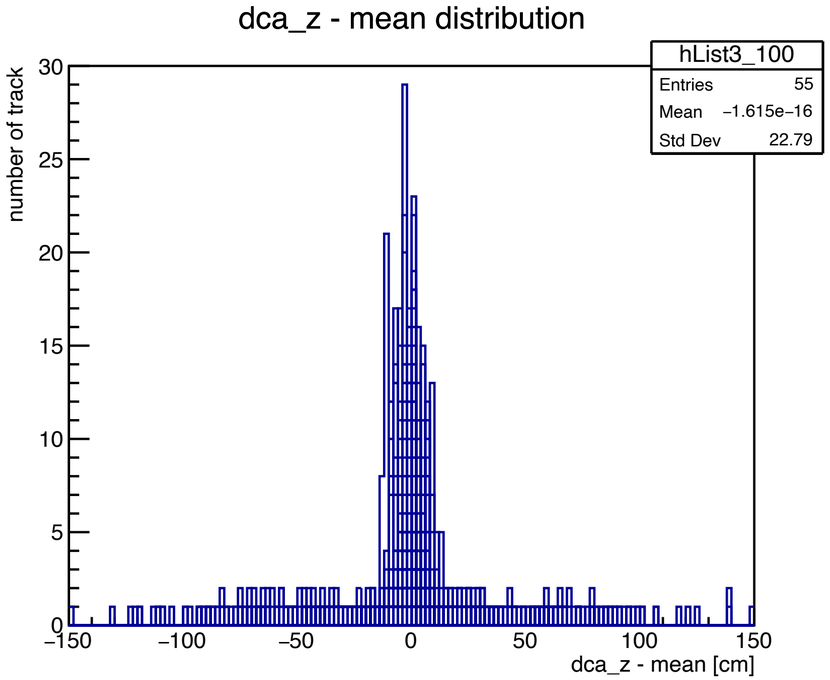
- X axis : dca_z - mean coordinate [cm]
- Y axis : number of track
- Z Vertex is calculated by the mean of each event. It used all values without applying cuts. To plot the dca_z coordinates minus the mean coordinates.



Comparing each histogram







- The 2nd histogram is the most slim
- The 3rd histogram has the bin with the highest number of tracks.
  →I think that a different result would be obtained by applying a cut to calculate the mean.

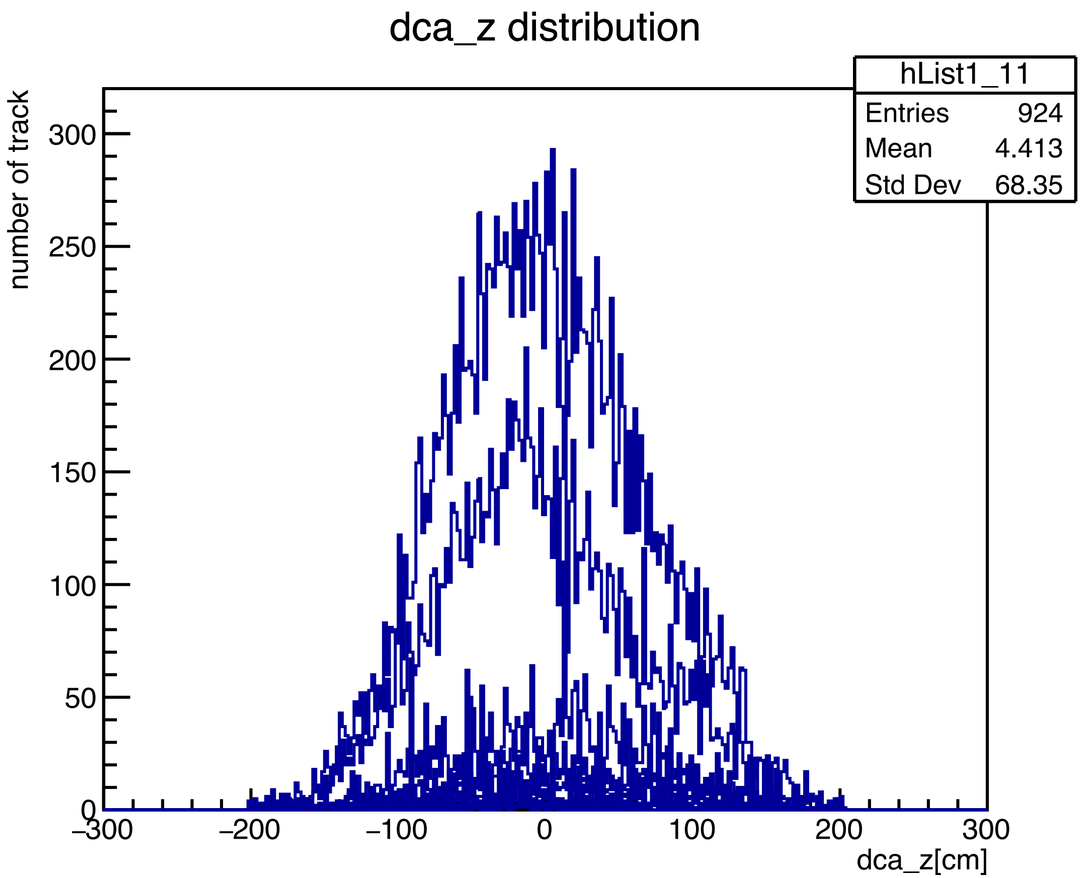
Next My To-Do List

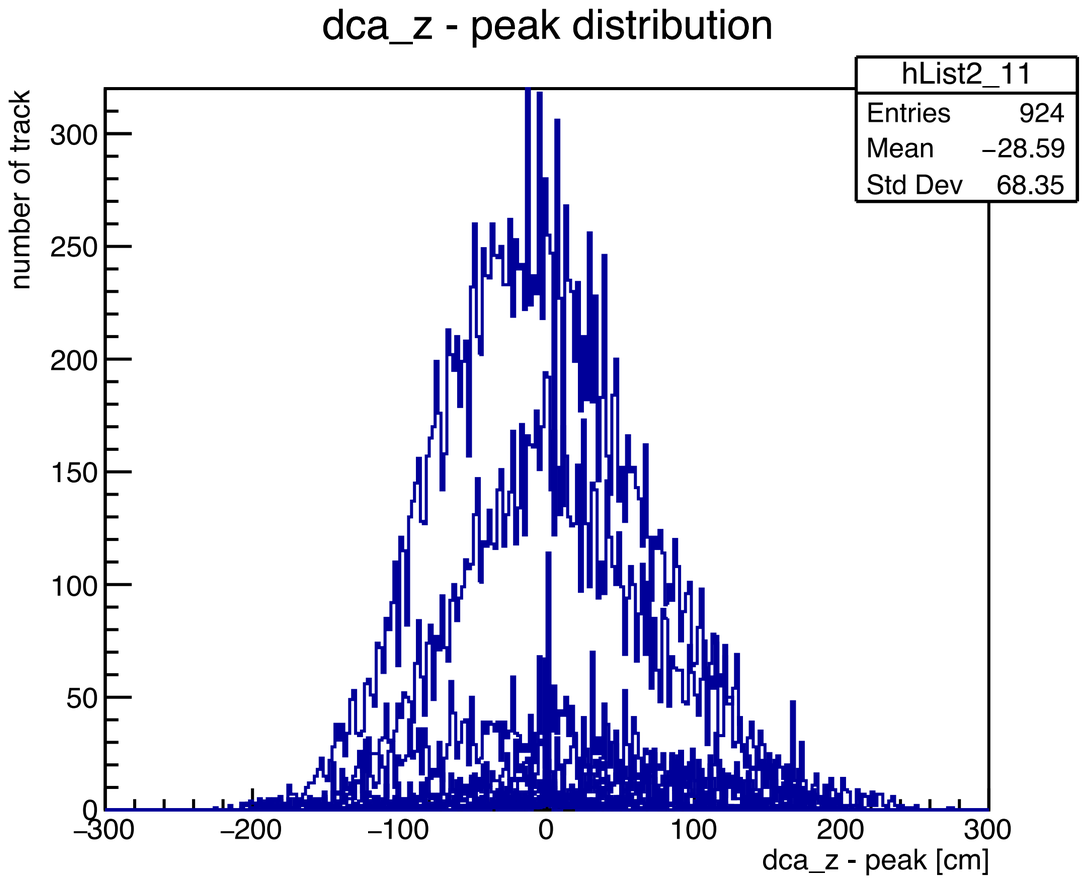
- Making histogram of DCA_Z distribution and Comparing
  - Caluculating Z vertex for each event
    – apply cuts and calculate a mean
  - Subtracting the coordinates of the zvertex from the coordinates of the dcaz distribution to make histogram
  - Comparing each histogram
- Making histogram to use actual data
  - Separating by number of trucks (1~50, 51~100, 101~200…)

Back Up

Histogram of using actual data

- peak (10 envents)





Histogram of using actual data

- mean (10 events)