

Status report

Large width Zvtx distribution

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20241122 INTTworkshop@Koera univ**

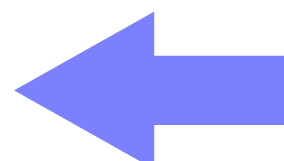
Analysis Plan during INTT workshop

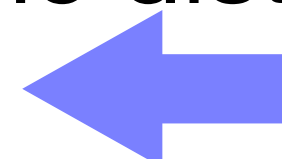
Name : Mahiro Ikemoto
Institution : NWU

- Analysis topic
 - Zvtx distribution analysis
 - Tracking with INTT and EMCal

- Current knowledge/status of this topic

Zvtx determination algorithm is ready

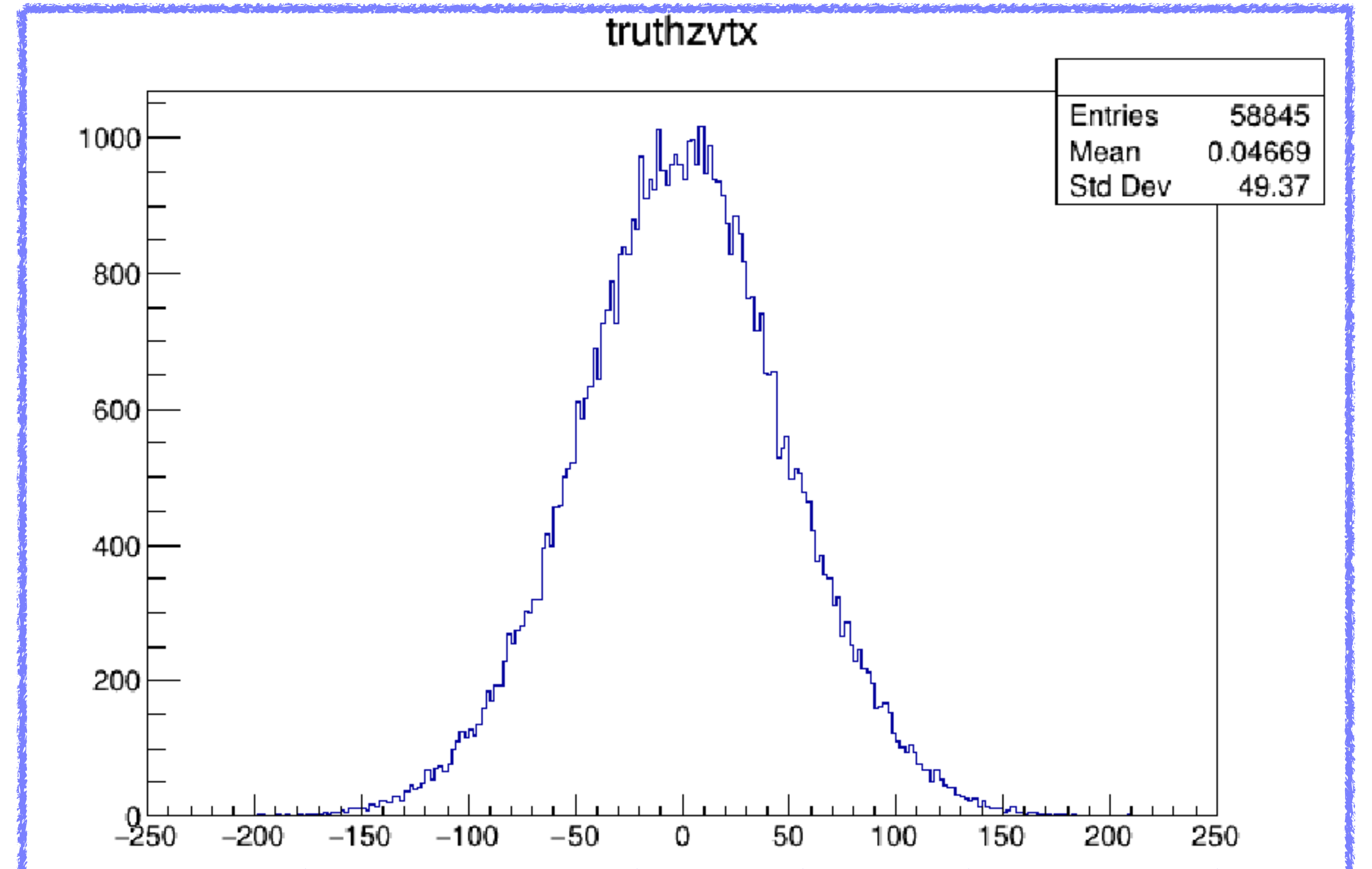
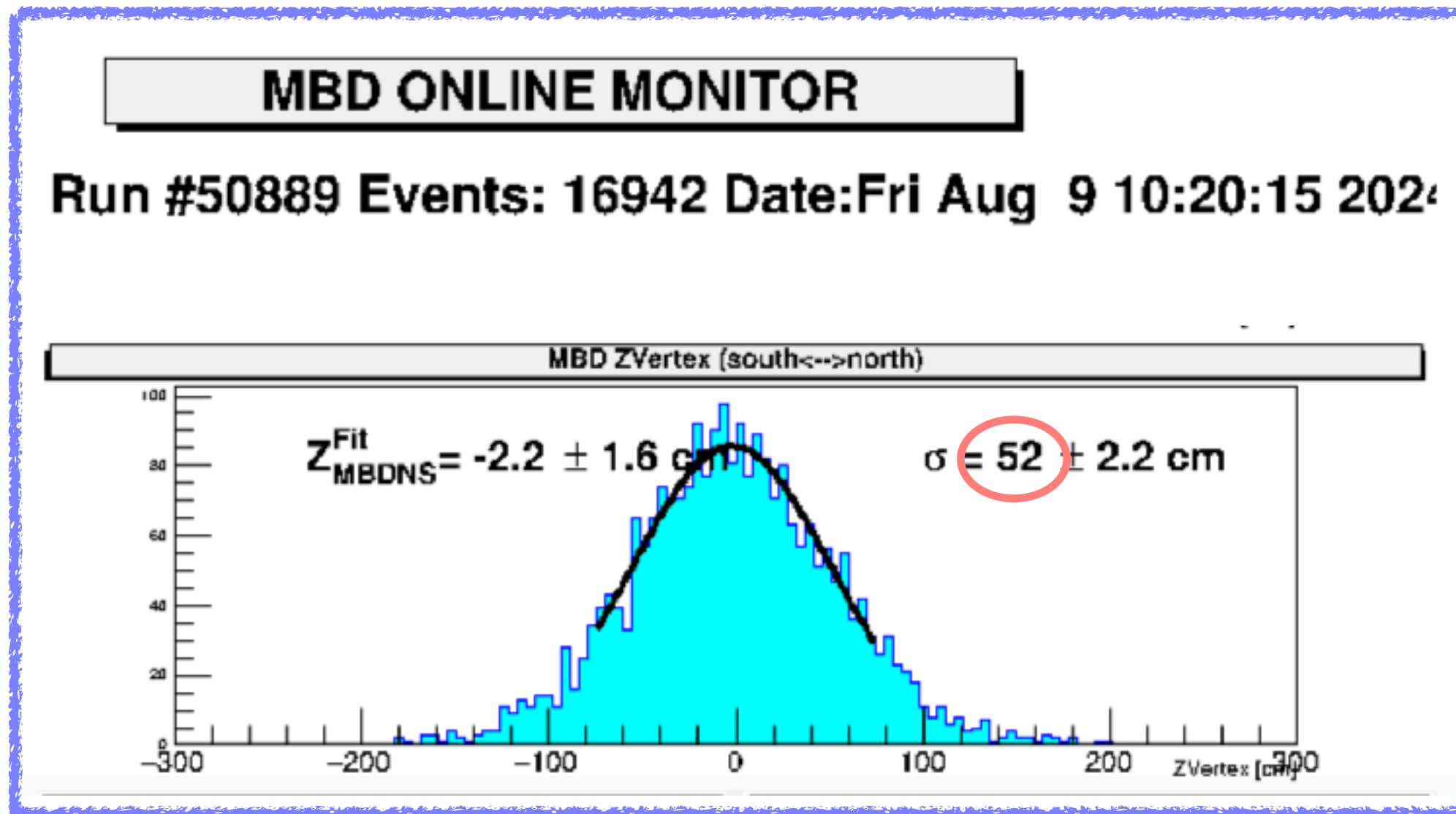
- Goal for the workshop
 1. Check consistency with MBD's and CW's
 2. Estimate the resolution by the magnitude of $|z|$ 
 3. Summarize the code and the analysis results (if possible)

- Milestones to reach to your goal
 1. Make Zvtx distribution for another run (54280?)
 2. Reconstruct the distribution using simulation data with a wide Zvtx distribution and determine the resolution 
 3. Write analysis result for the note

Truth Zvtx distribution of Simulation data

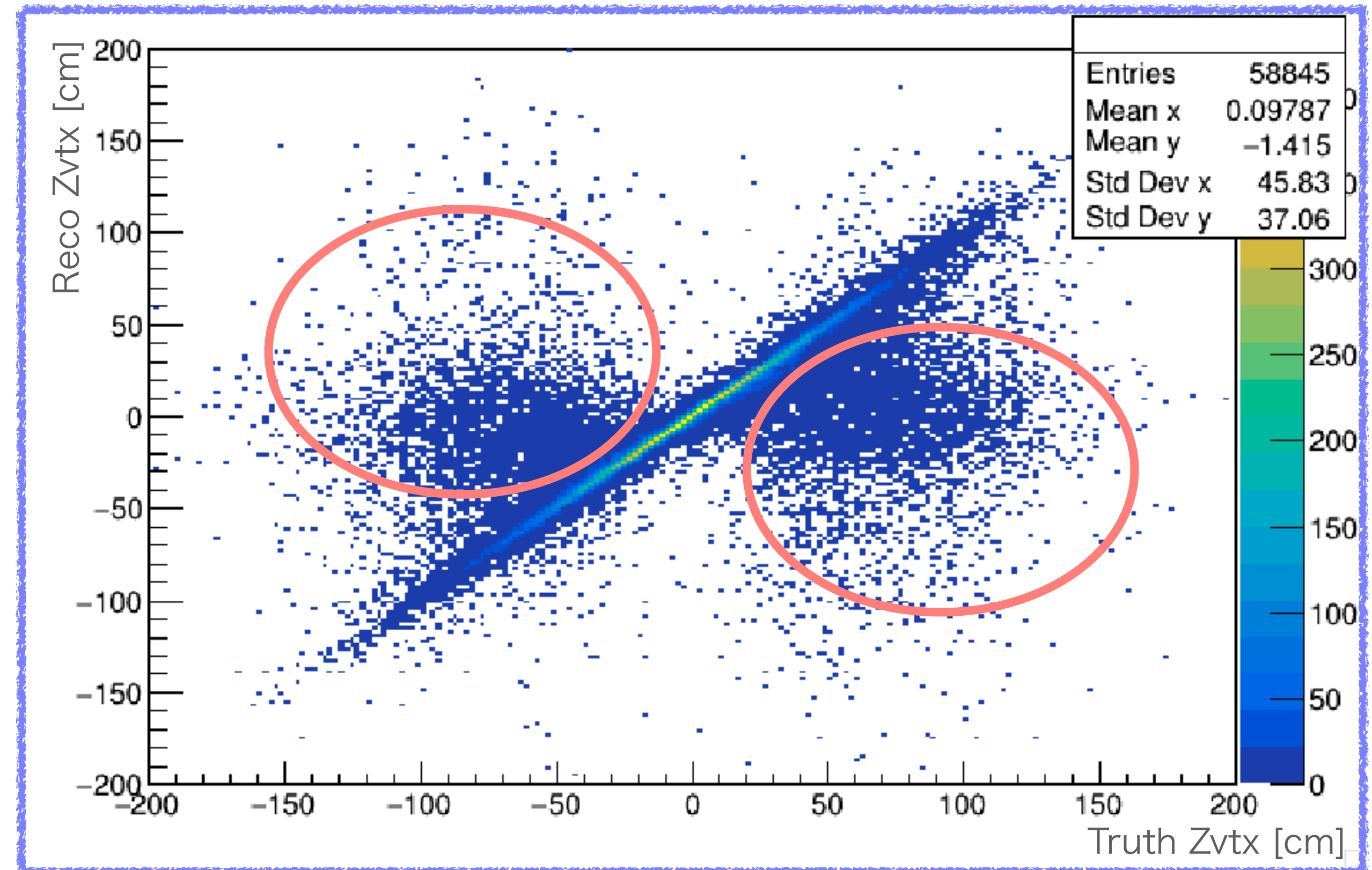
p+p collision, magnetic field(Pythia (8.307)), $\sigma_z = 52$ cm

- $\sigma_z = 52$ cm is from MBD's Zvtx distribution (pp, 0mrad).
- Hinako taught and helped me to make this simulation data. I should be able to make it by only myself...



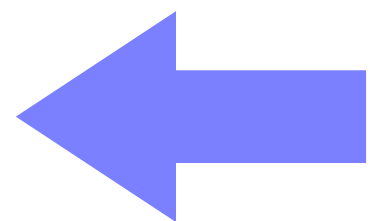
Truth Zvtx VS reconstructed Zvtx

- X axis : truth Zvtx , Y axis : reco Zvtx
- It has a correlation and slope looks like 1. I will do fitting and check it.
- Around 0 looks like well reconstructed. Over $|30|$, some parts are good but Red circle parts are not.
- I will investigate in more detail.



Next to do

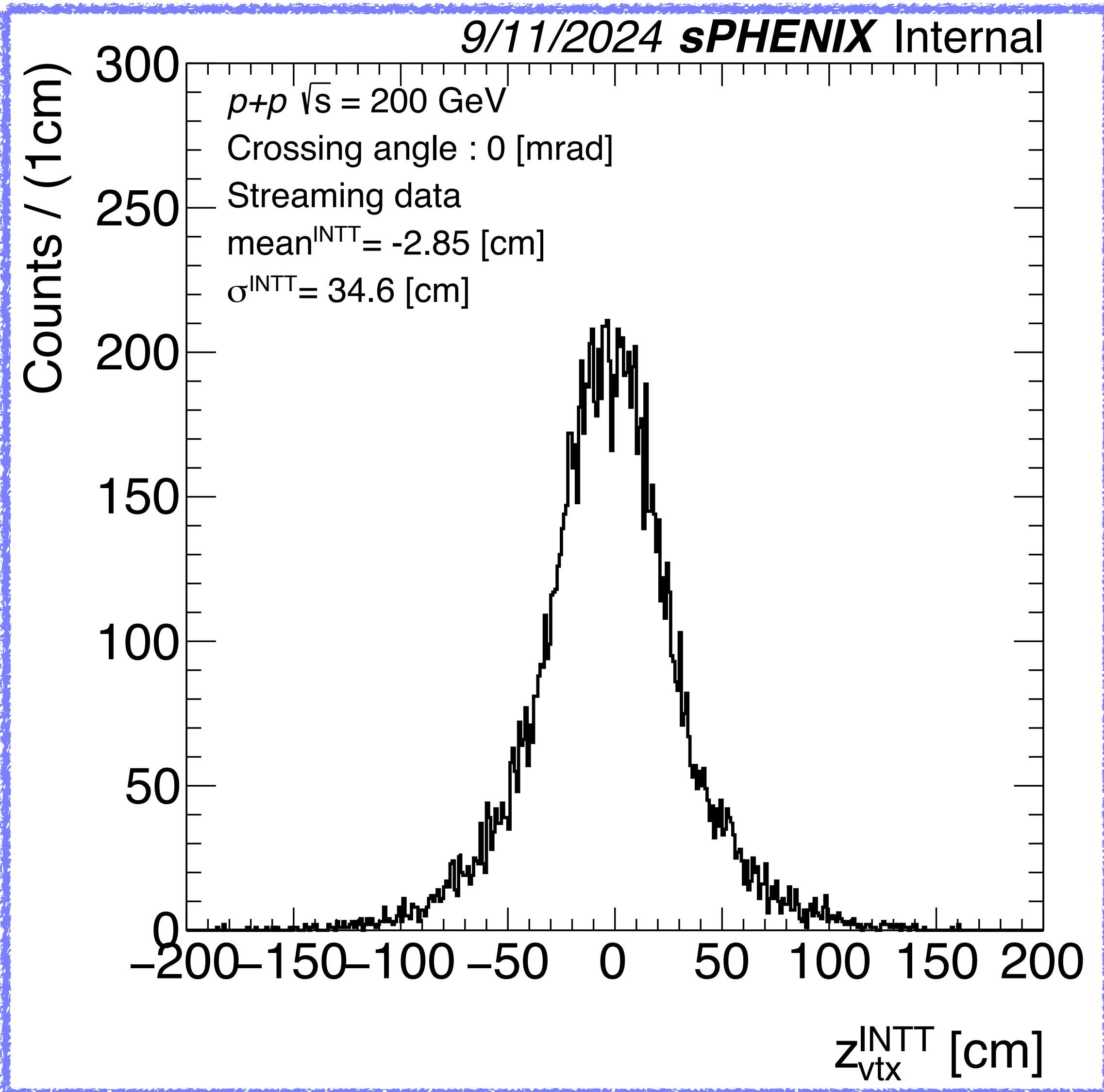
- Investigate in more detail of last plot
- Calculate the resolution by Z position
- Make Zvtx distribution of run52480
- Learn about Tracking
 - How to use EMCAL data
 - Make simulation data (with different momentum, single electron)
 - Try to do Tracking



Really want!!!

Back Up

Plot 1 : Zvertex distribution (0 mrad)



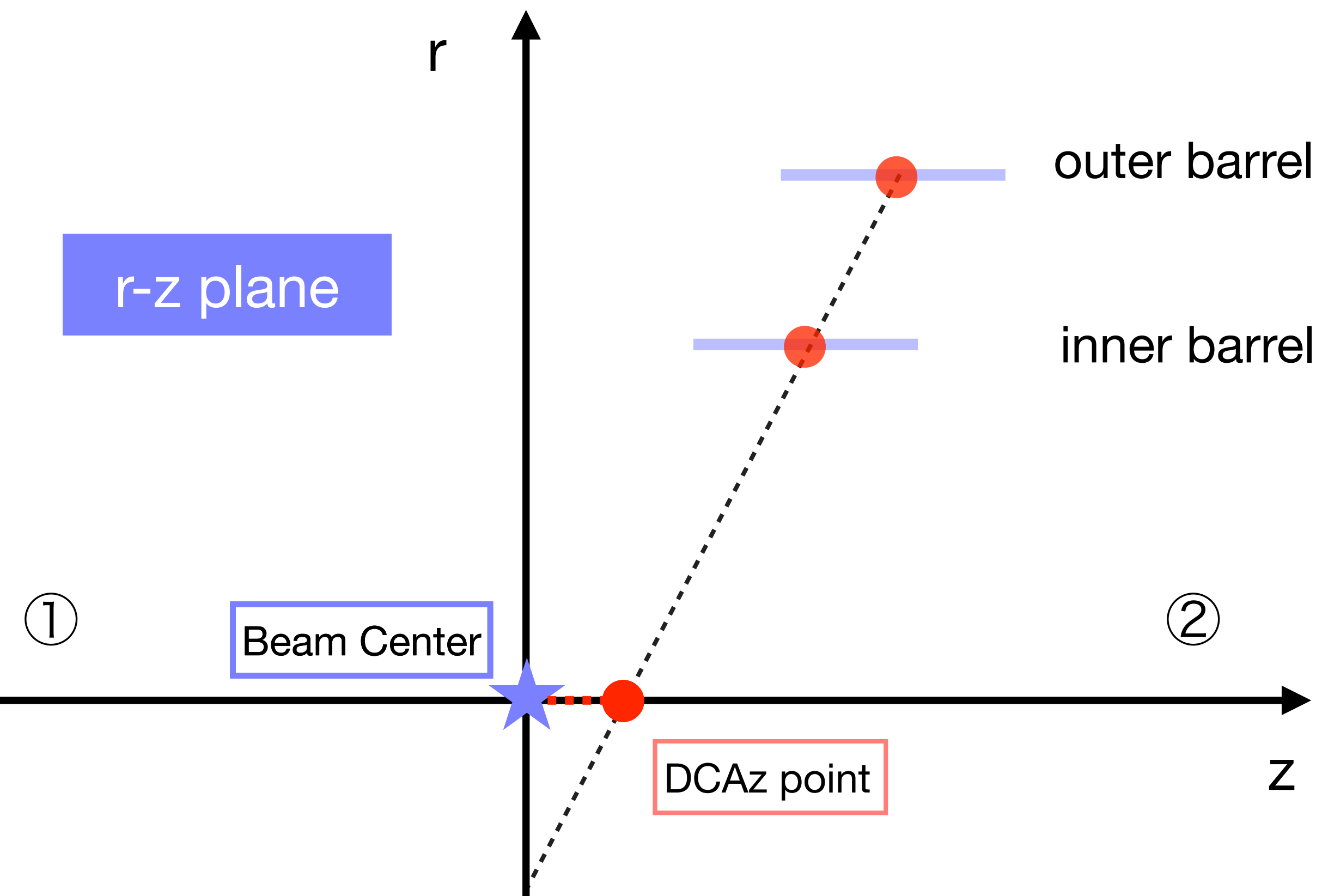
- Only hits associated with 10 FPHX BCOs were selected.
- Each files were created individually and then combined in order to get enough statistics. Each has 10K events and all together have 100k events.

Used Data

Run 50889, p+p collision, Streaming data, 0 [mrad]

Reconstructed method of Zvertex

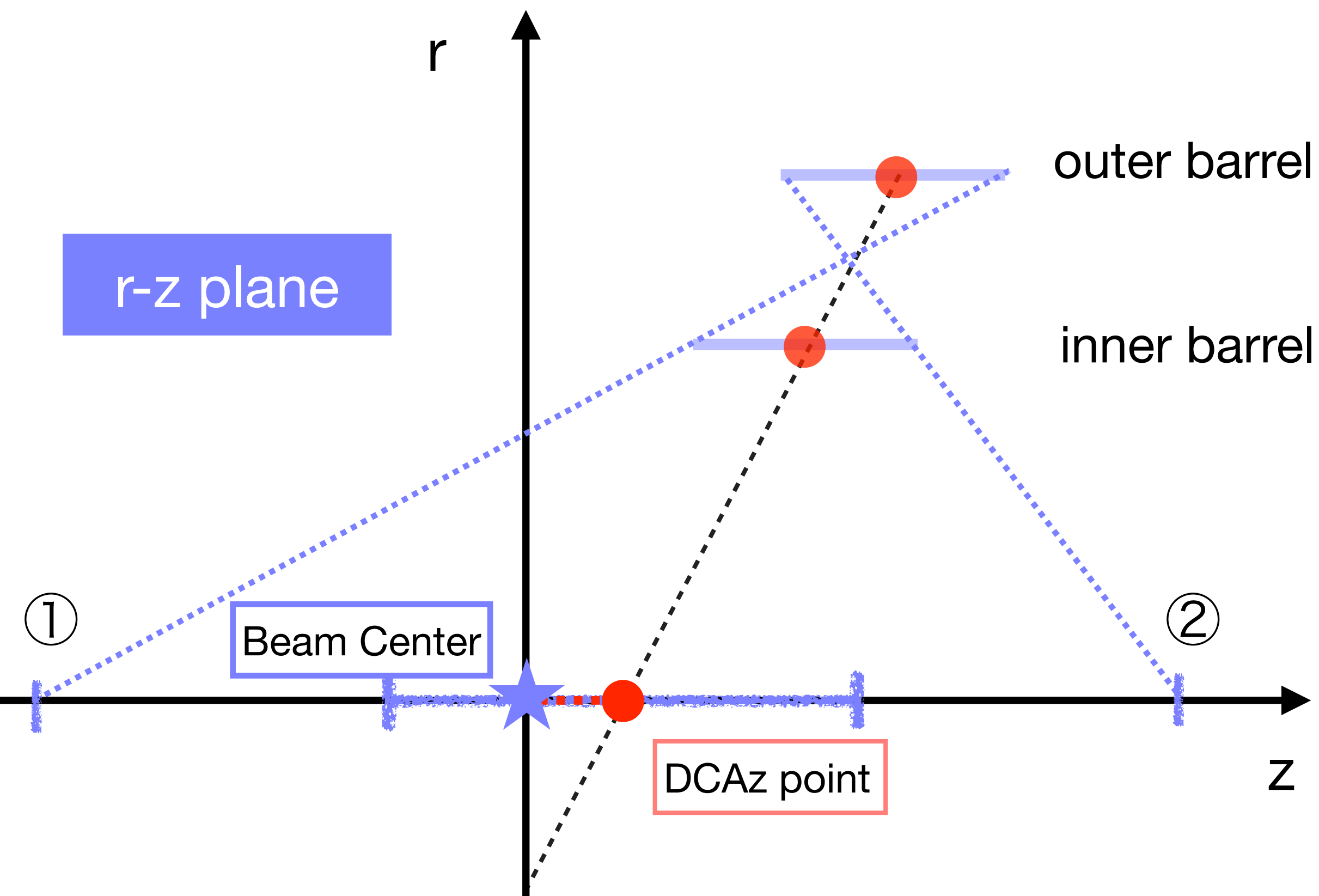
from Cheng-Wei's method



1. Select each cluster on the inner, outer barrel. Connect them with a line.
2. Calculate the distance of closest approach (DCA) of the track to the beam center. DCAz is defined as z component of DCA.

Reconstructed method of Zvertex

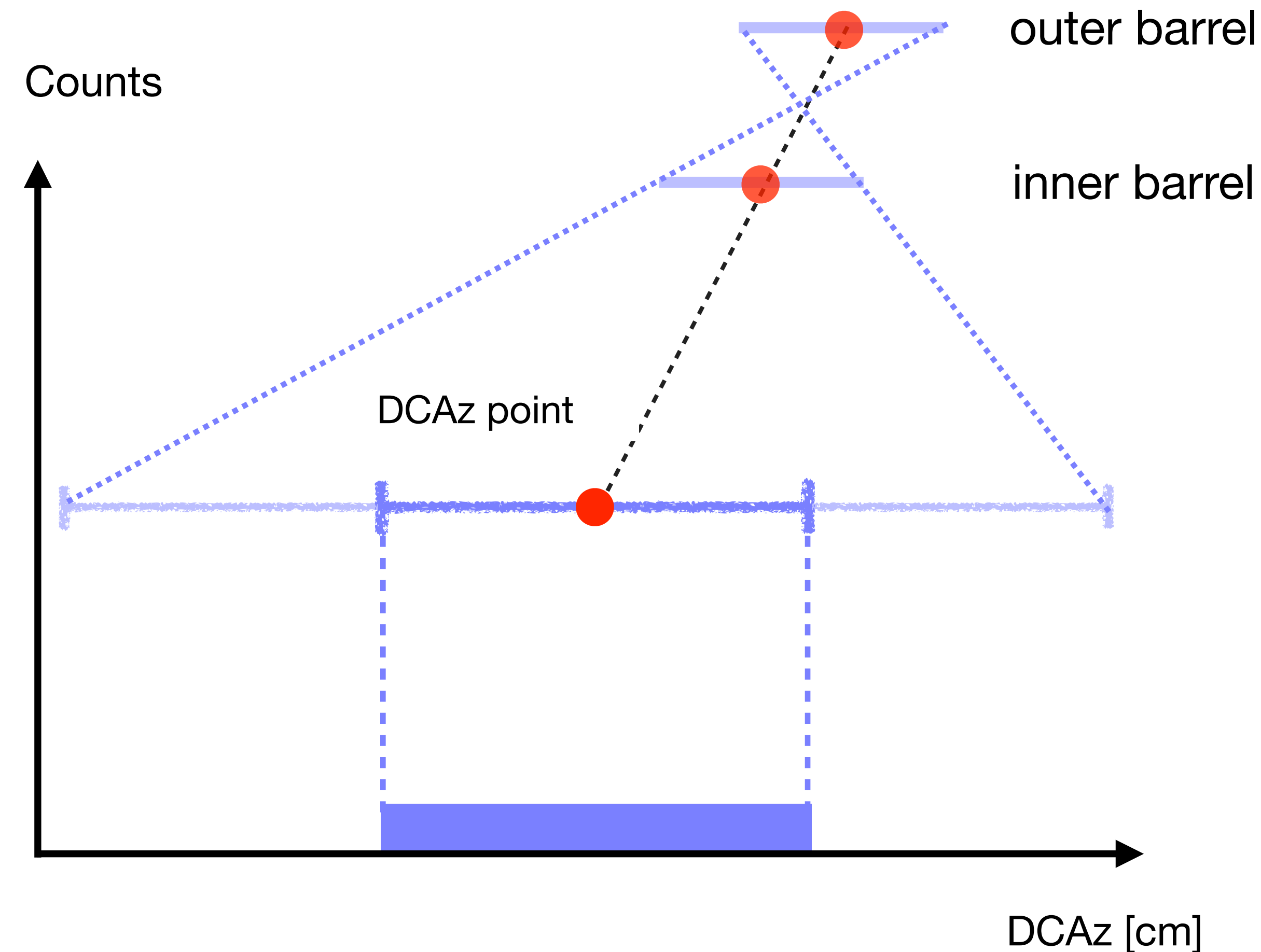
from Cheng-Wei's method



1. Select each cluster on the inner, outer barrel. Connect them with a line.
2. Calculate the distance of closest approach (DCA) of the track to the beam center. DCAz is defined as z component of DCA.
3. Determine the DCAz error range by dividing the width between ① and ② by $\sqrt{12}$.

Reconstructed method of Zvertex

from Cheng-Wei's method



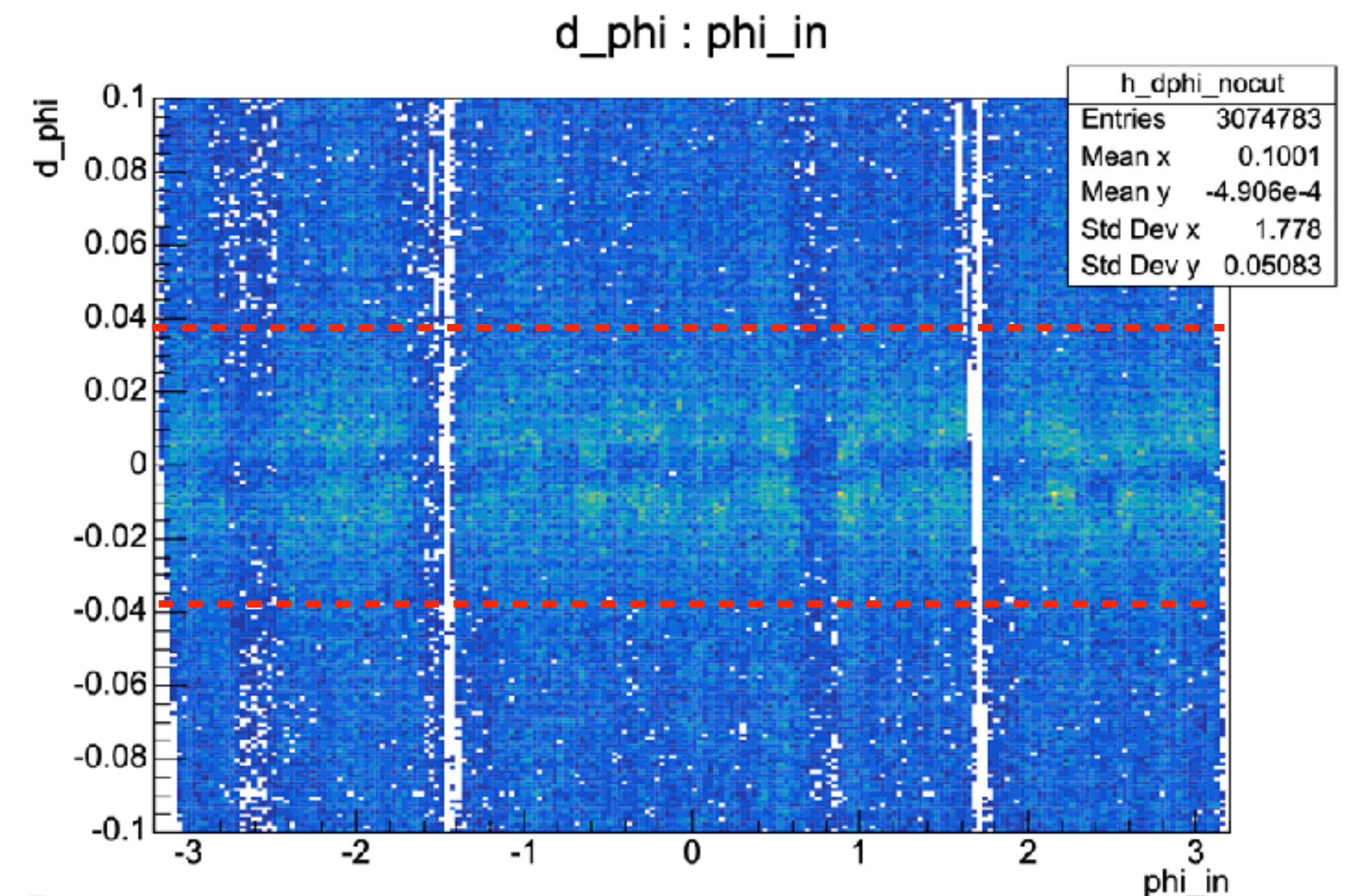
1. Select each cluster on the inner, outer barrel. Connect them with a line.
2. Calculate the distance of closest approach (DCA) of the track to the beam center. DCAz is defined as z component of DCA.
3. Determine the DCAz error range by dividing the width between ① and ② by $\sqrt{12}$.
4. Plot the DCAz points with this range. Calculate the z_{vertex} .

Analysis cut

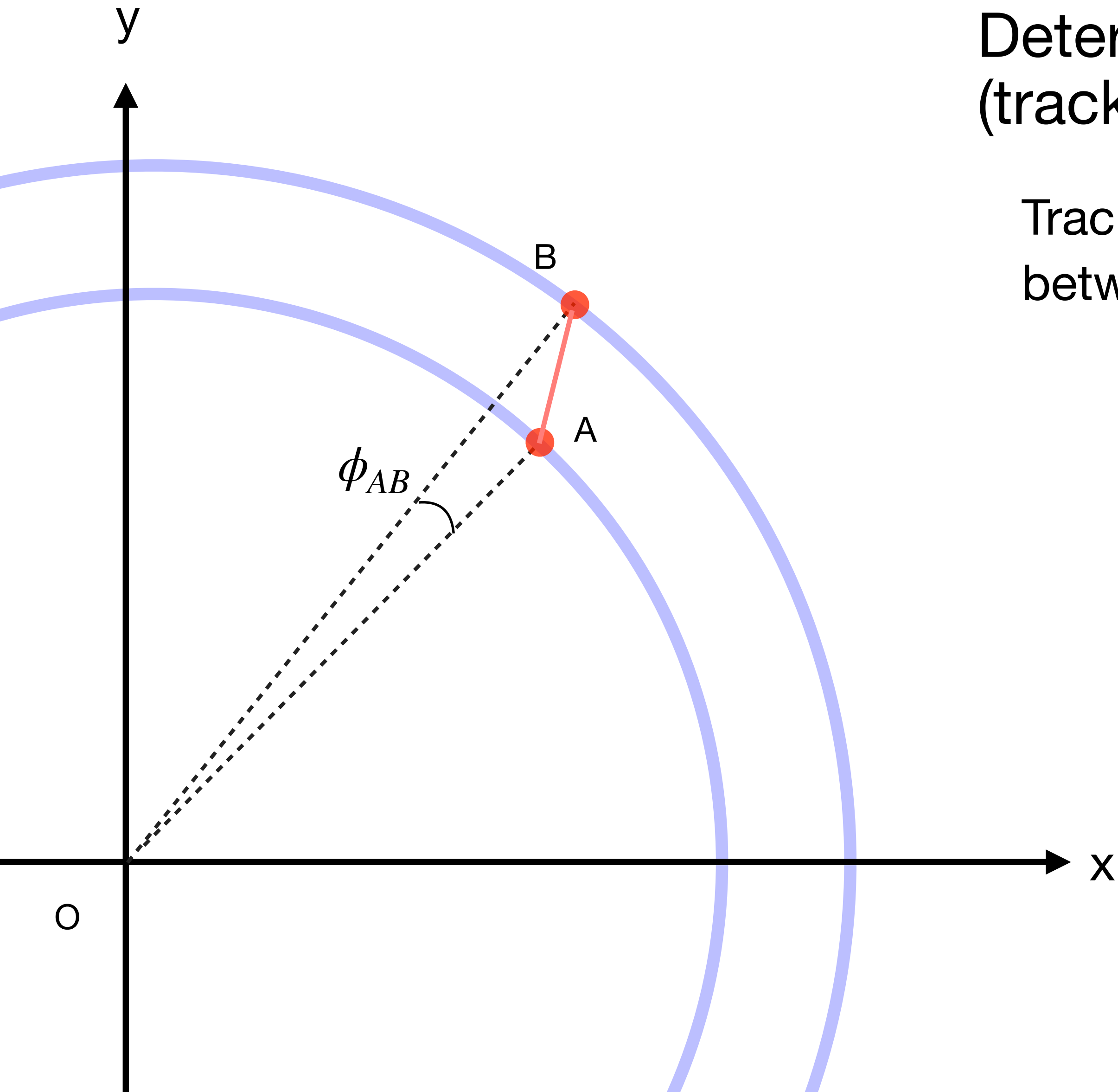
- Hot channel cut
- Delta phi cut

Tracklets are selected for which the angular difference between inner cluster and outer cluster $|\Delta\phi| < 0.04$ [rad].

- Number of tracks < 3
- FPHX BCO cut

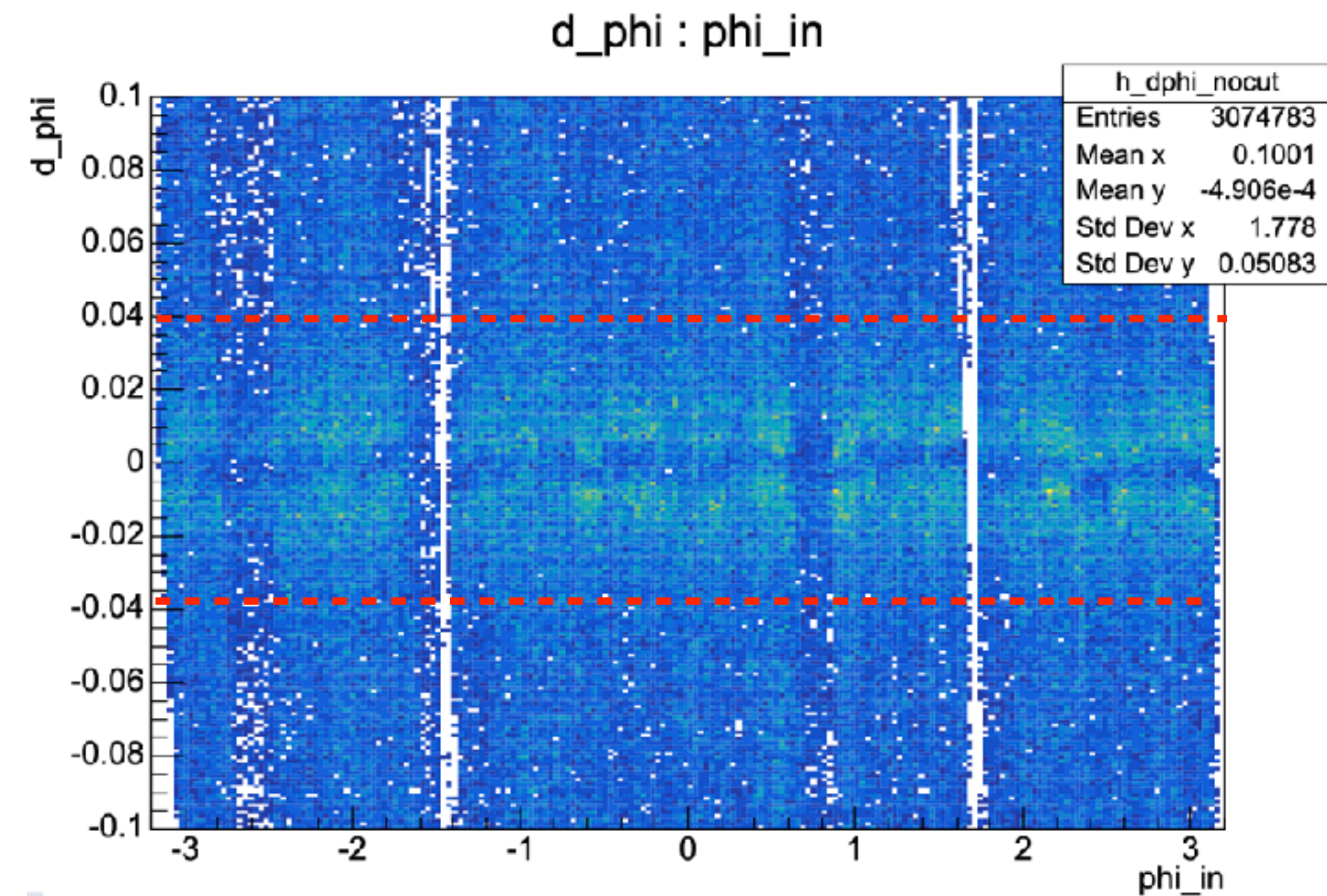


Tracklet



Determine the pair of Cluster A and Cluster B (tracklet) on the x-y plane.

Tracklets are selected for which the angular difference between cluster A and B $|\Delta\phi_{AB}| < 0.04$ [rad].



x axis : angular of cluster A

y axis : angular difference between cluster A and cluster B