Z-alignment

Hidemitsu Asano

analysis setup

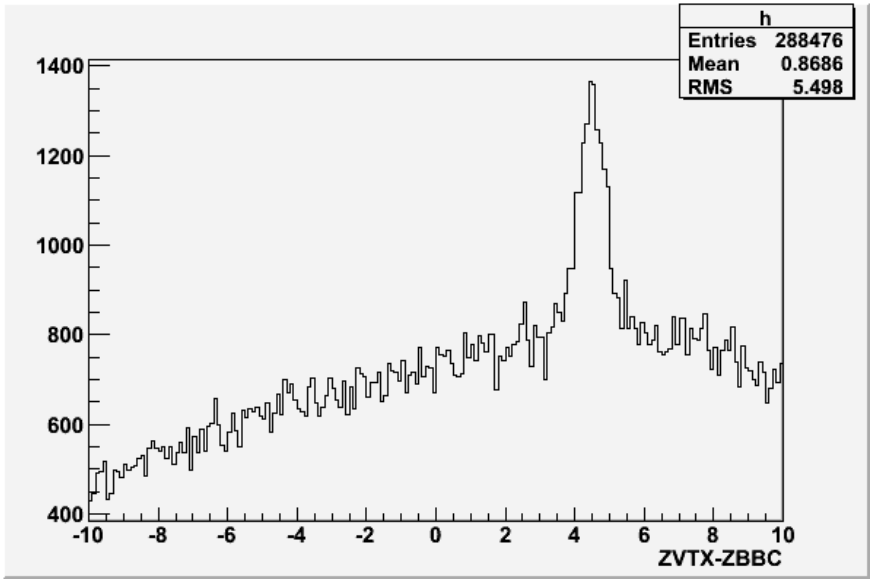
- run 349369

-10 <zvtx<10

no bbc charge cut

- During run11 , we noticed mean of bbcz and Z- VTX(z-vertex measured by VTX) had a large difference (~4.5cm)

- VTX group asked BBC experts to move bbcz mean position, because VTX lost BBC narrow trigger events around 10 %.



unit:cm

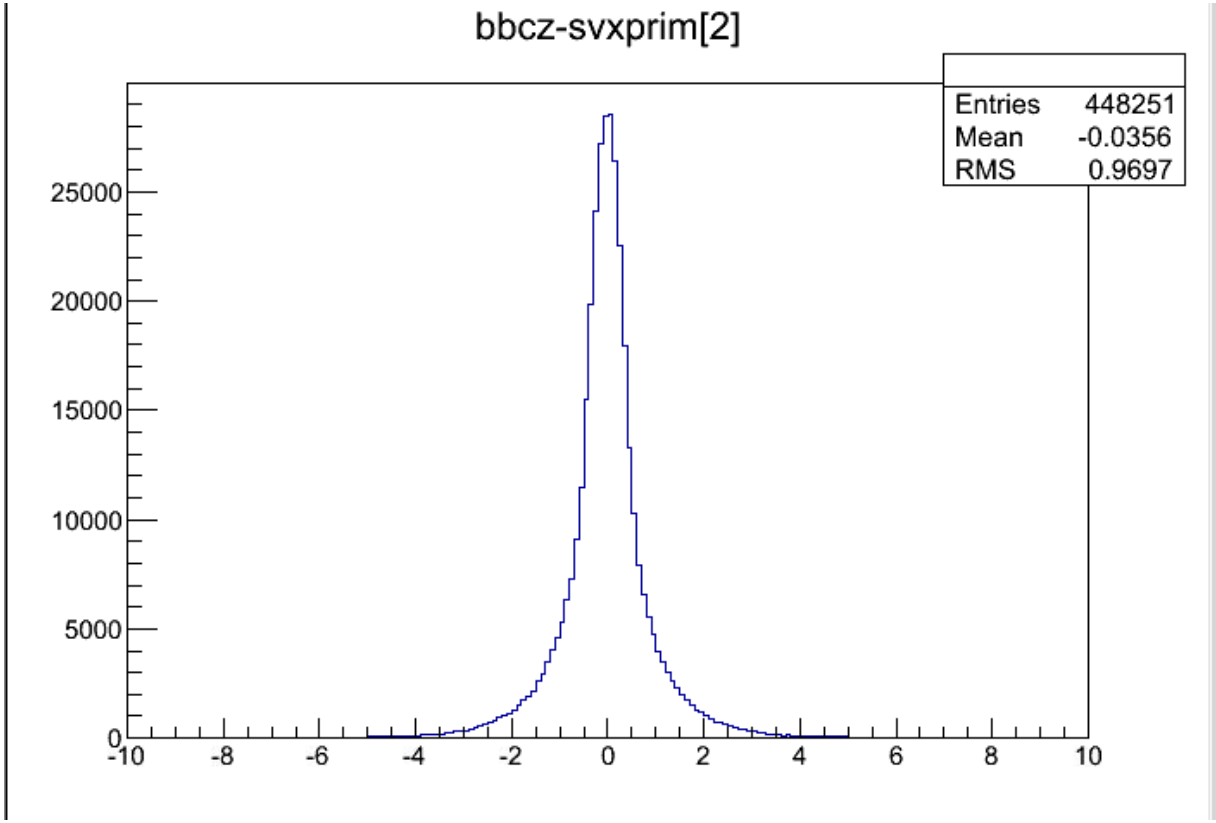
After June 7th 2011, bbcz mean is roughly adjusted to Z-VTX (next slide)

bbcz – svx primary (Z)

RUN# 349369
Au+Au 200 GeV
date : Jun,18th 2011

This is a difference btw bbcz and primary z_vertex position calculated by VTX.

bbcz mean is in good agreement with VTX_Z after Jun. 7th



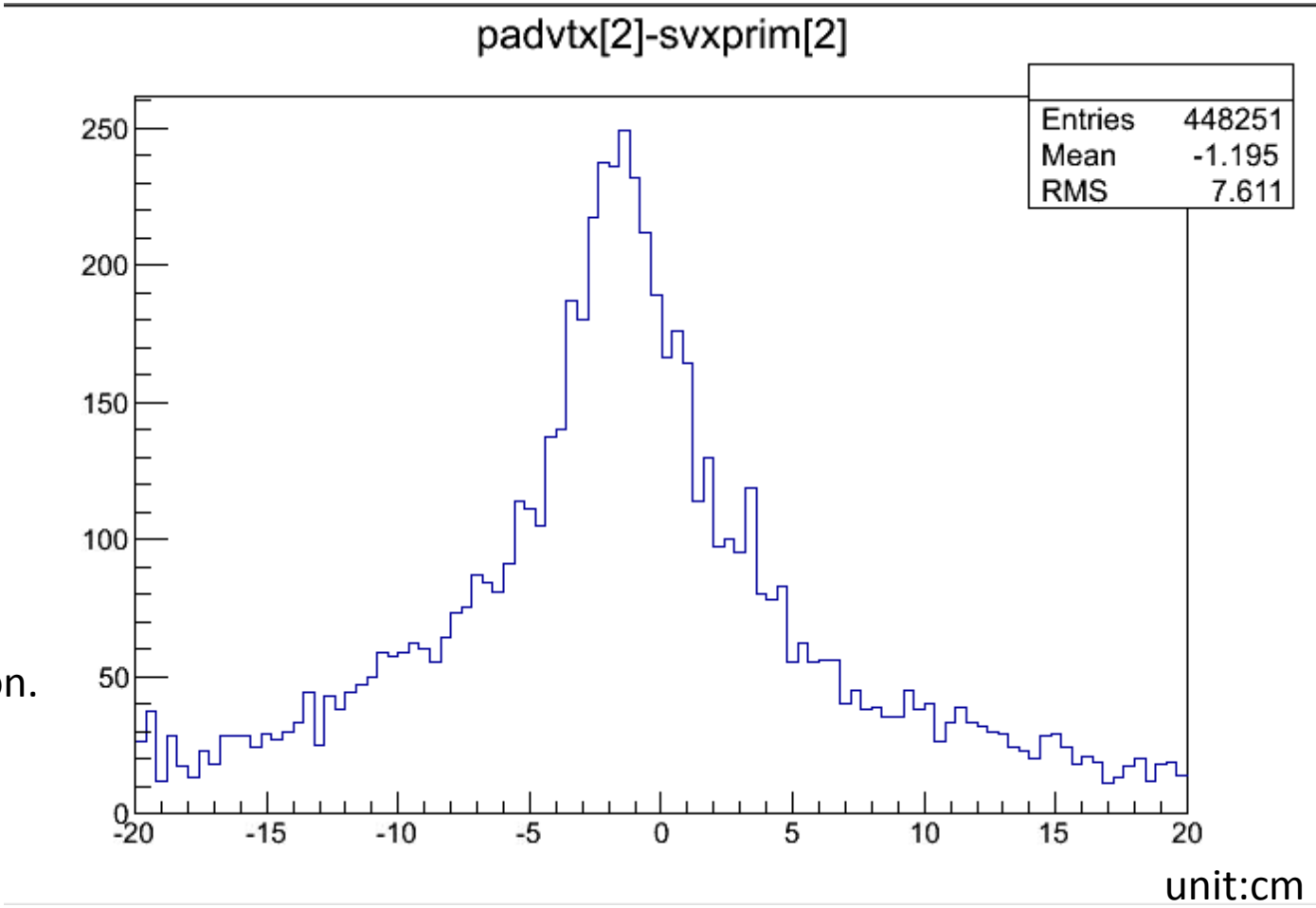
unit:cm

padvtx[2]-svx primary z

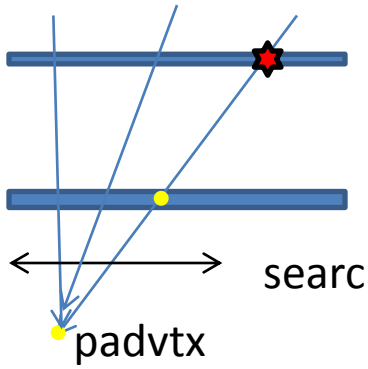
but,in the same run,

Z_vertex calculated from pad chamber is off from VTX_Z (~1 cm)

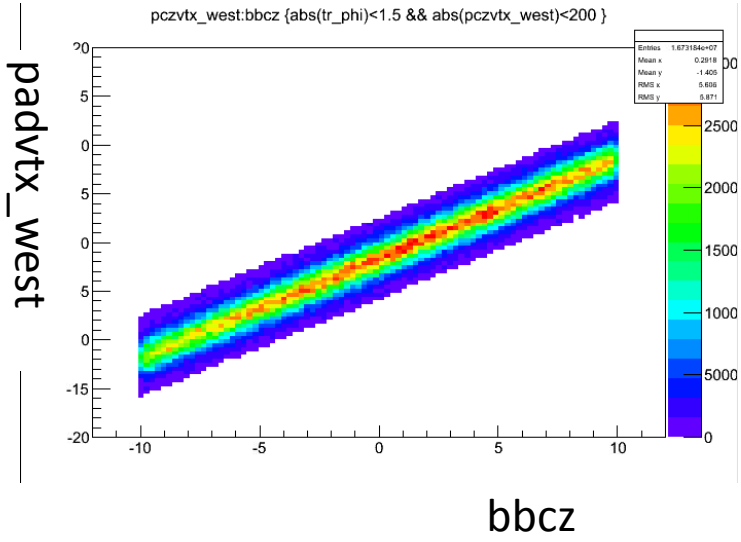
There is a discrepancy between pad chamber coordinate and VTX coordinate in z-direction.

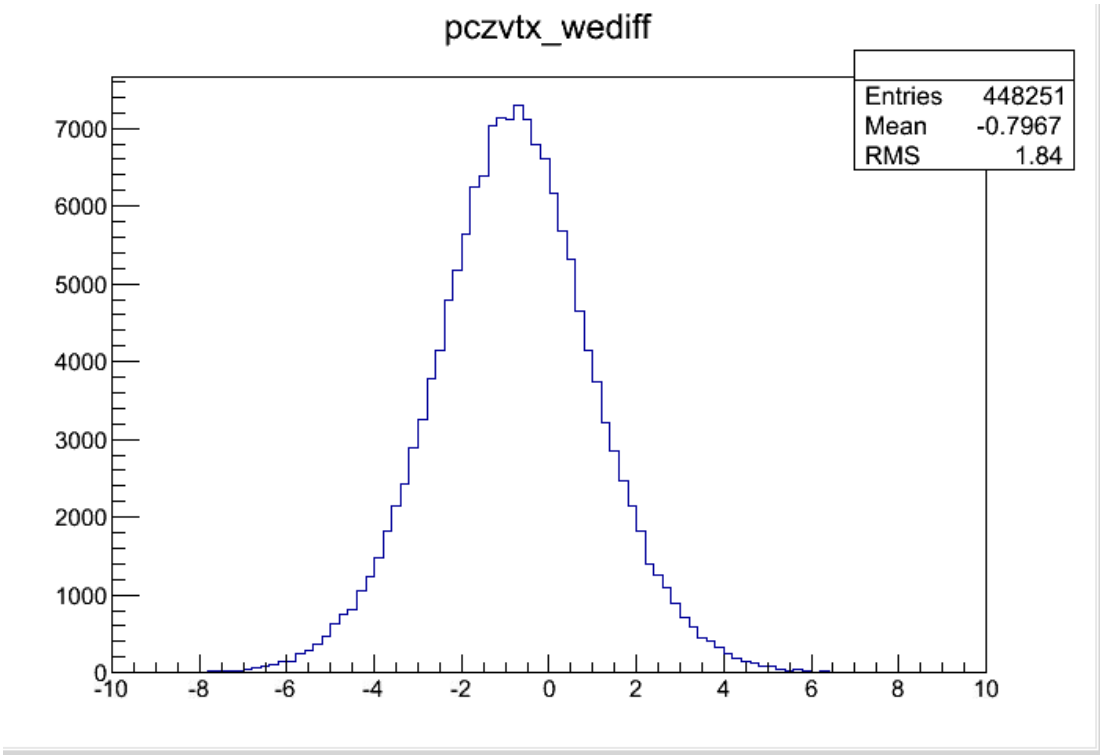


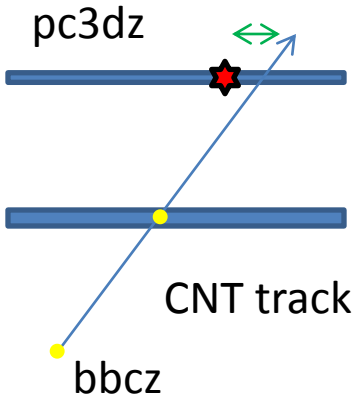
padvtx is obtained from vtxout



1.select pc1,3 clusters associated with CNT track
2. straight line projection to (x,y)=(0,0)
3. cut z_vertex far from bbcz (>4cm)
4. calculate mean of zvtx from 3. on east and west arm individually event by event.







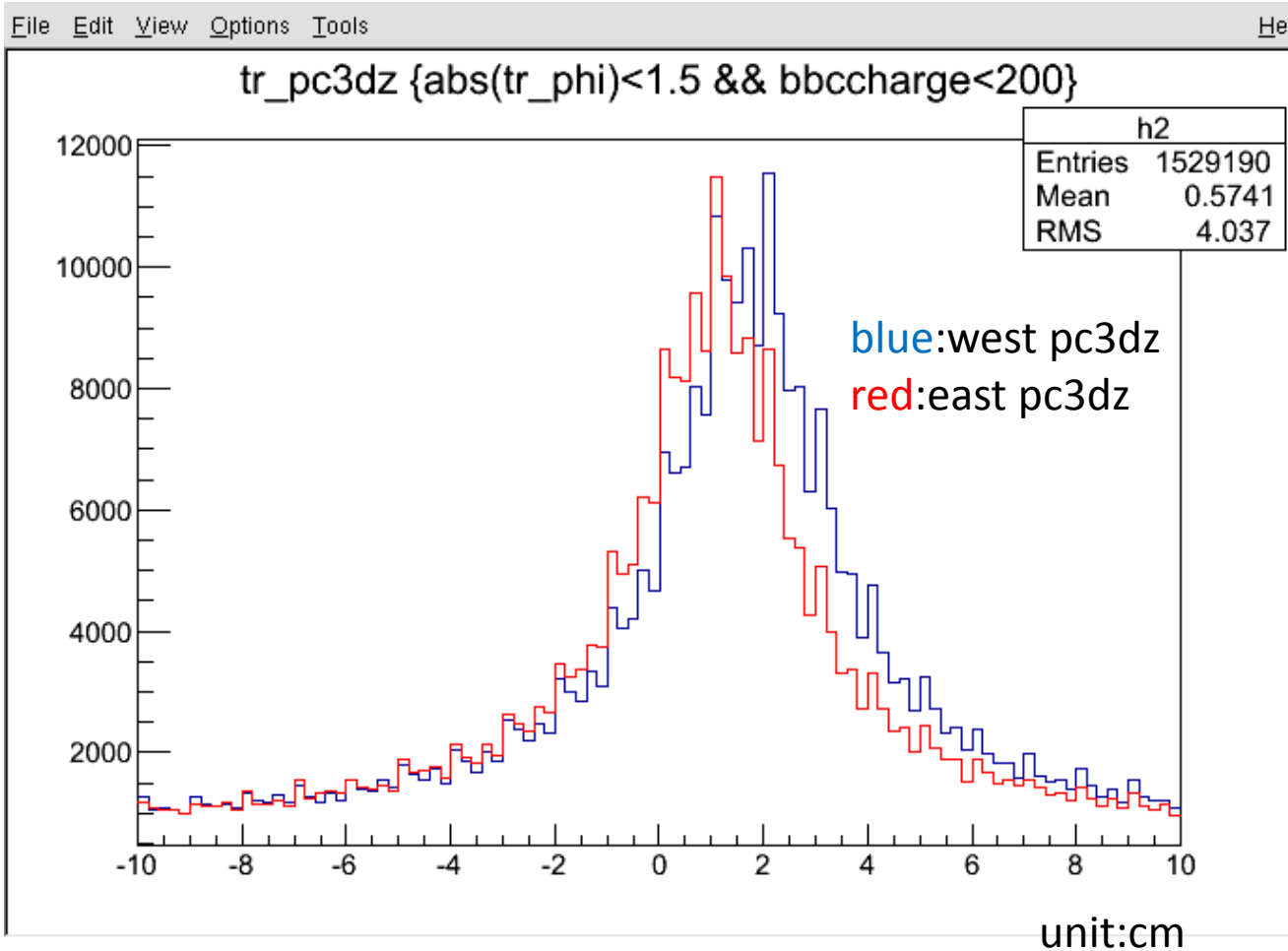
2.4m

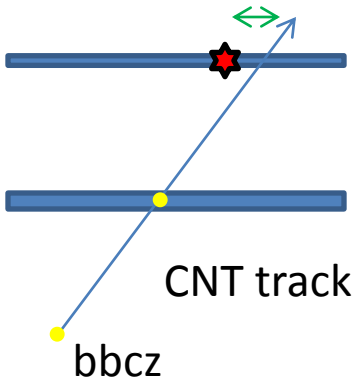
2.5m

pc3dz=
(cluster position – CNT projected point)

There is also a discrepancy btw EAST arm and WEST arm.

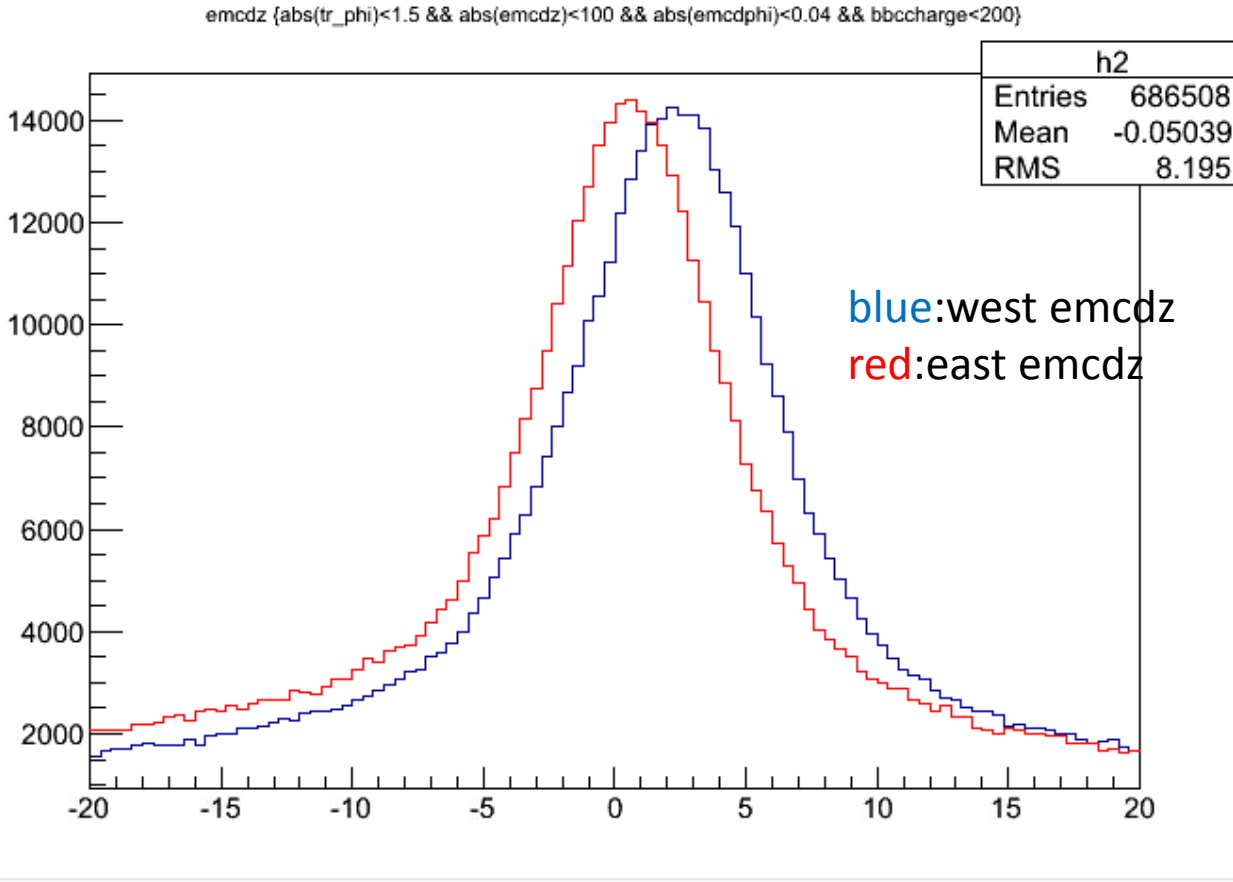
This plot is pc3dz for west arm only(blue) and pc3dz for east arm only (red).
(bbc charge <200 cut is applied.)
The difference is ~1cm.



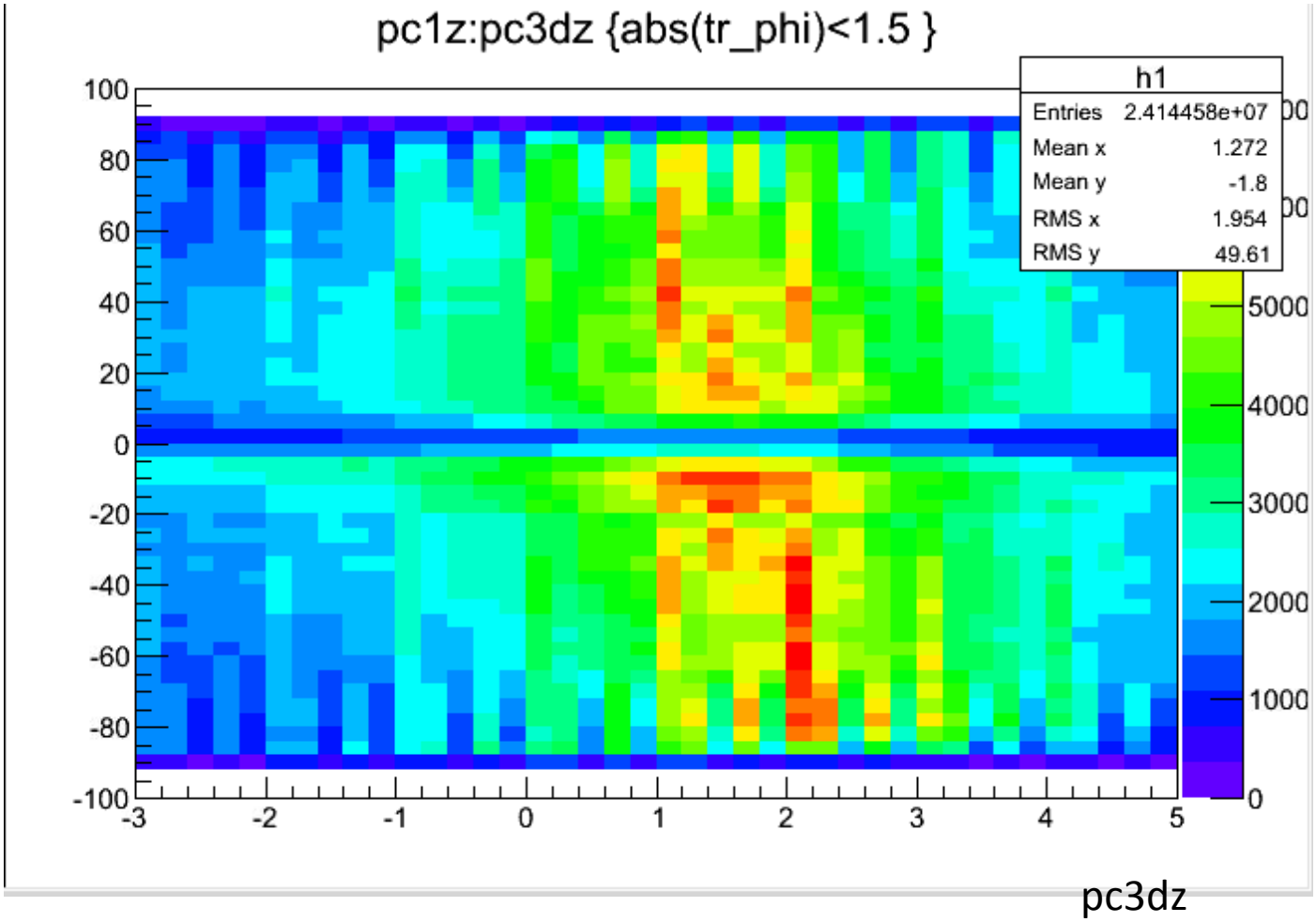


There is another evidence of EAST-WEST discrepancy.

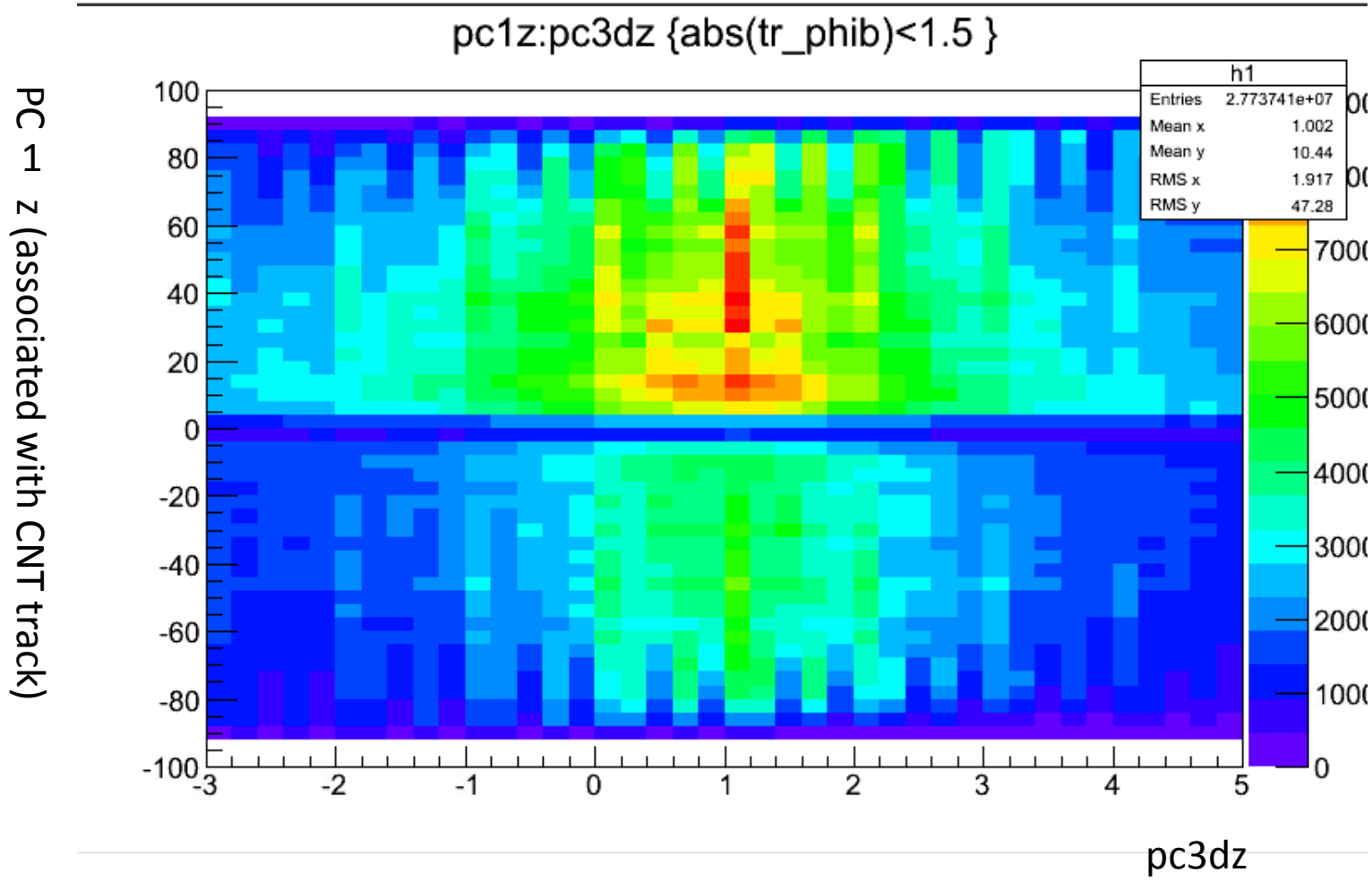
This plot is emcdz for west arm only(blue) and emcdz for east arm only (red). The difference is ~2,3cm.



pc1z vs pc3 dz (west)

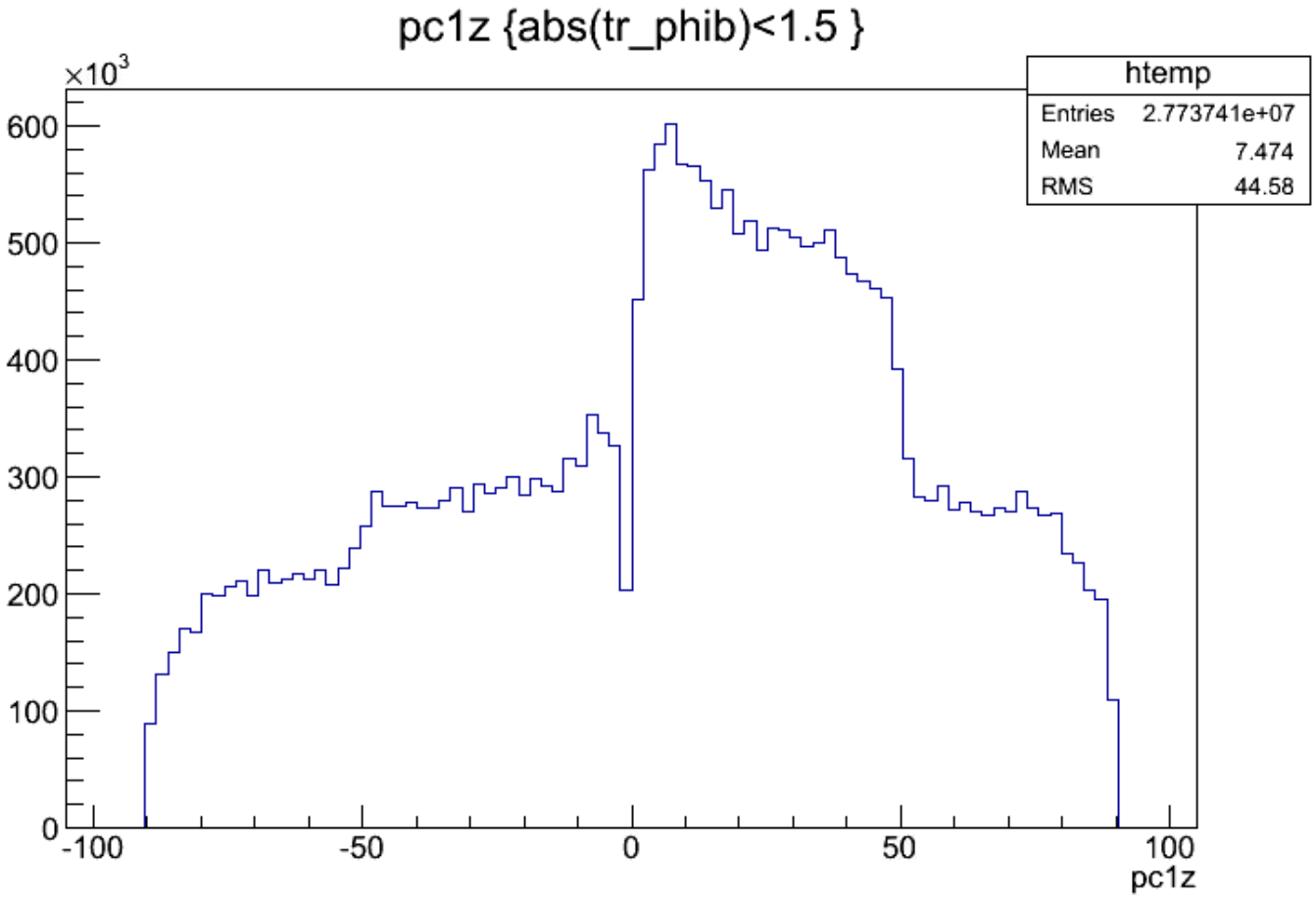


pc1z vs pc3 dz (east)



????

pc1 z (east)


pc1z {abs(tr_phib)<1.5 }
htemp
Entries 2.773741e+07
Mean 7.474
RMS 44.58
×10^3
600
500
400
300
200
100
0
-100
-50
0
50
100
pc1z

??????

Summary and outlook

- Our original plan is to align VTX ladders in the central arm coordinate. In x-y plane, all ladders are aligned in DCH coordinate.
- In z direction, there is a large (~1cm) discrepancy between VTX coordinate and central arm coordinate , and between west arm and east arm also.
- We don’t think actual location of VTX is off around 1cm from the center of central magnet.
- We need to match central arm coordinate system and VTX coordinate system for the alignment and global tracking .
- We will discuss with central arm detector experts about this coordinate problem.

- ところで VTX のアライメントどうしよう？

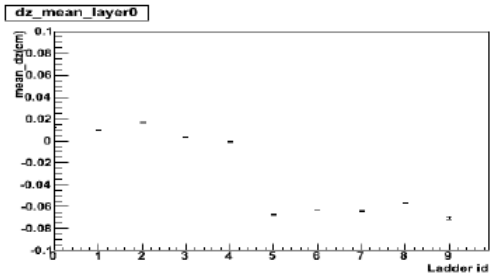
(1mm以下のスケールで)

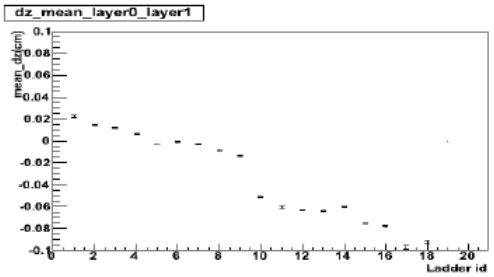
Lei さんのスライドより

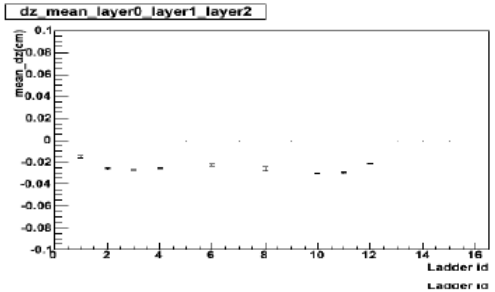
- dz=DC track projection in z direction - z position of VTX hit + vertex_z (measured by VTX)

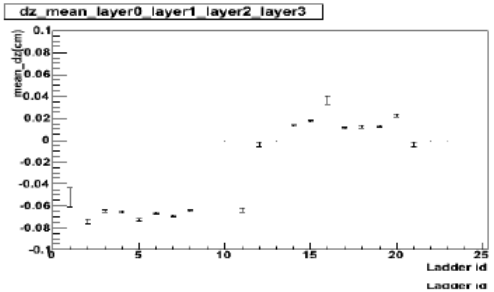
Mean of dz

- mean of dz as a function of ladder id for vtx B0,B1,B2,B3
- Mean of dz is not centered at 0 (200-600μm away) because external alignment in z direction is not done yet. Maya is working on this part.







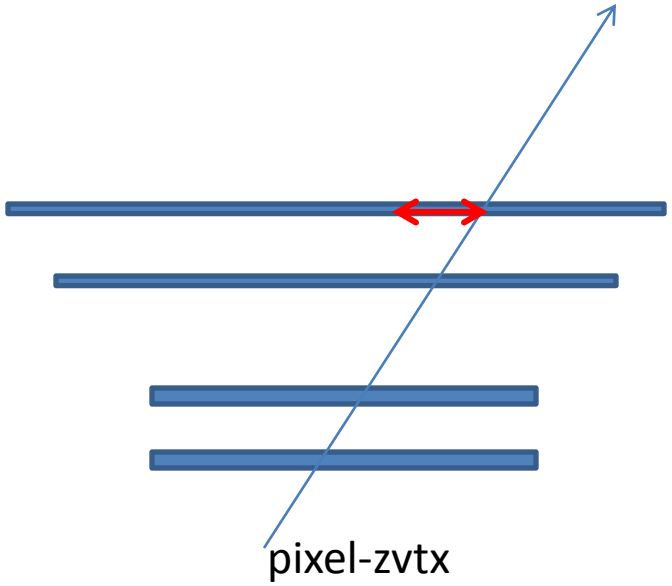


vtx west east gap

今CNTを使うとカオスになりはしまいか？

idea 1. internal にどうにかする

- pixel のsurveyを信じて、stripを動かしてみる。
  (ただしVTXwest-VTXeastはあると想定)



variables

- (central arm west – central arm east) Z offset
- (central arm west - svx west)Z offset
- (svx west – svx east)Z offset
- ladder by ladder z position in svx coordinate. (written in svxPISA.par ,should not be changed by access)