



中央研究院物理研究所
INSTITUTE OF PHYSICS, ACADEMIA SINICA

Status report

2025/04/17

ZDC Internal

WAI YUEN CHAN

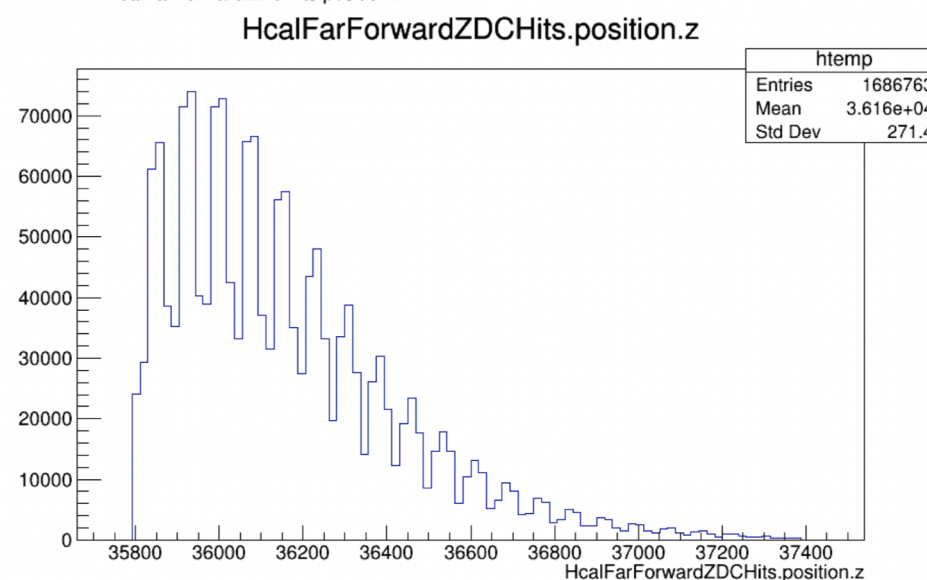
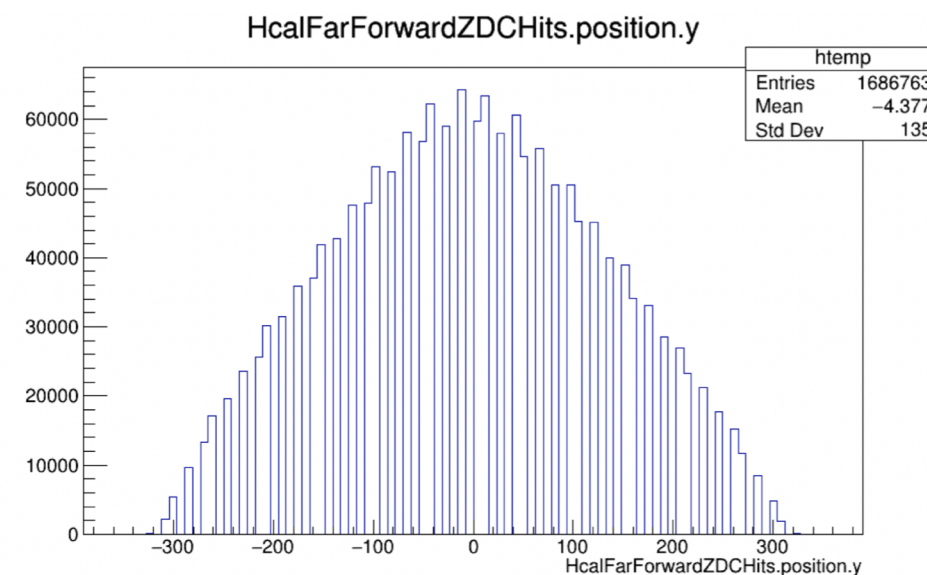
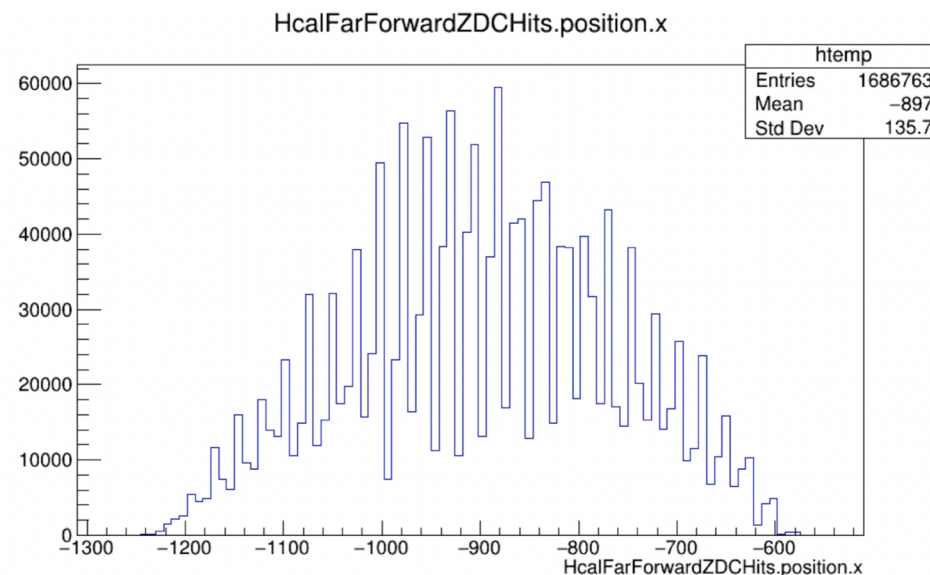
- Sick this week
- But still have some idea on the HCAL Cell ID labeling

- Basic idea is that we extract all the (x,y,z) triplet from all the event, and remove all the repeating values -> Give us a HCAL geometry
- This will give us the cell locations, which is basically the same way as ECAL
- However...

Hit distribution in HCAL (neutron)



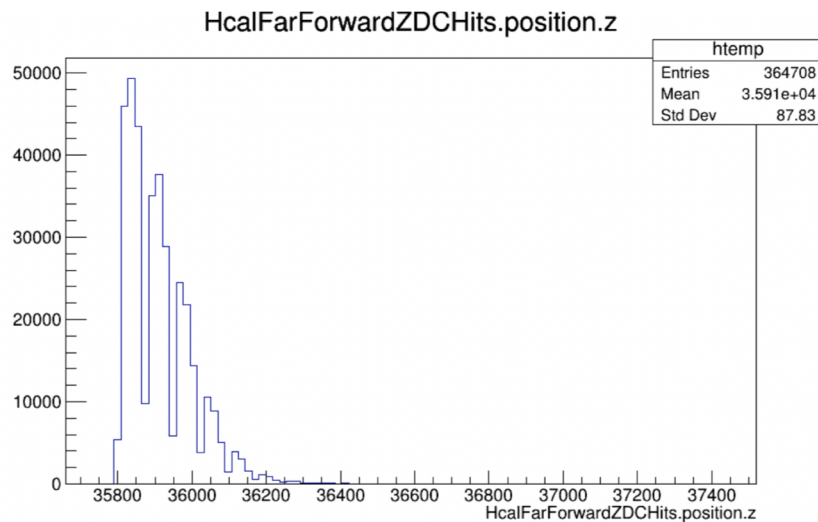
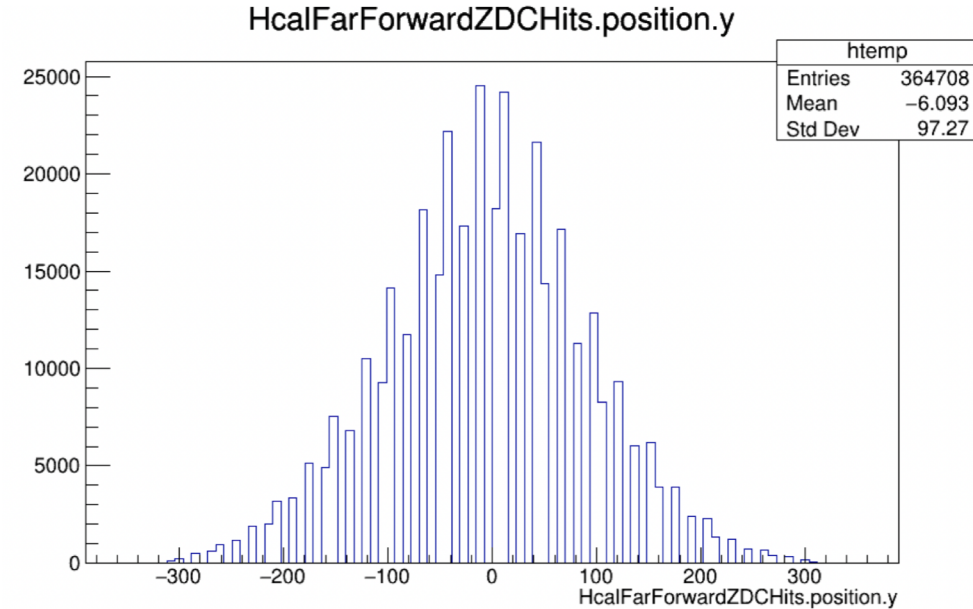
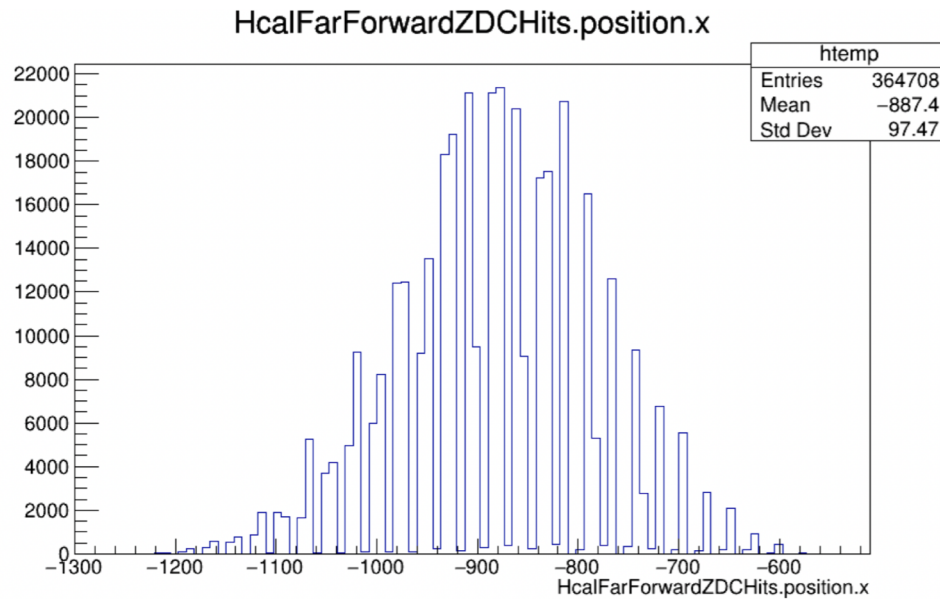
5k neutron, 5-10GeV
 $\theta, \phi, \text{shift} = [20, 180, 0]$



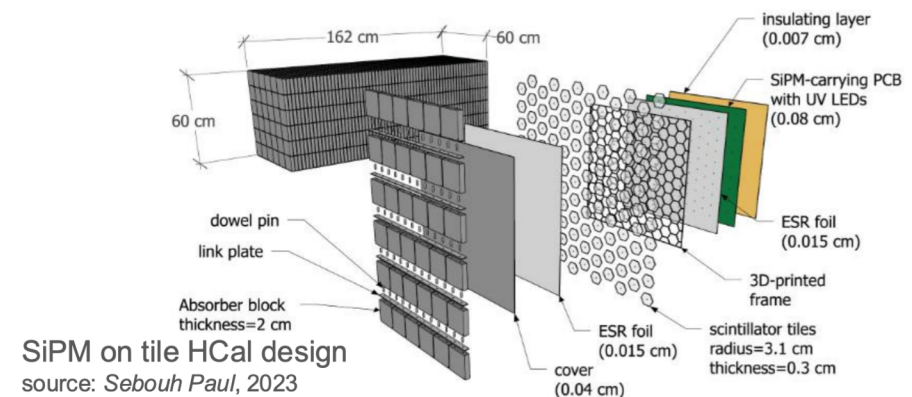
Hit distribution in HCal (gamma)



5k gamma, 5-10GeV
 $\theta, \phi, \text{shift} = [20, 180, 0]$



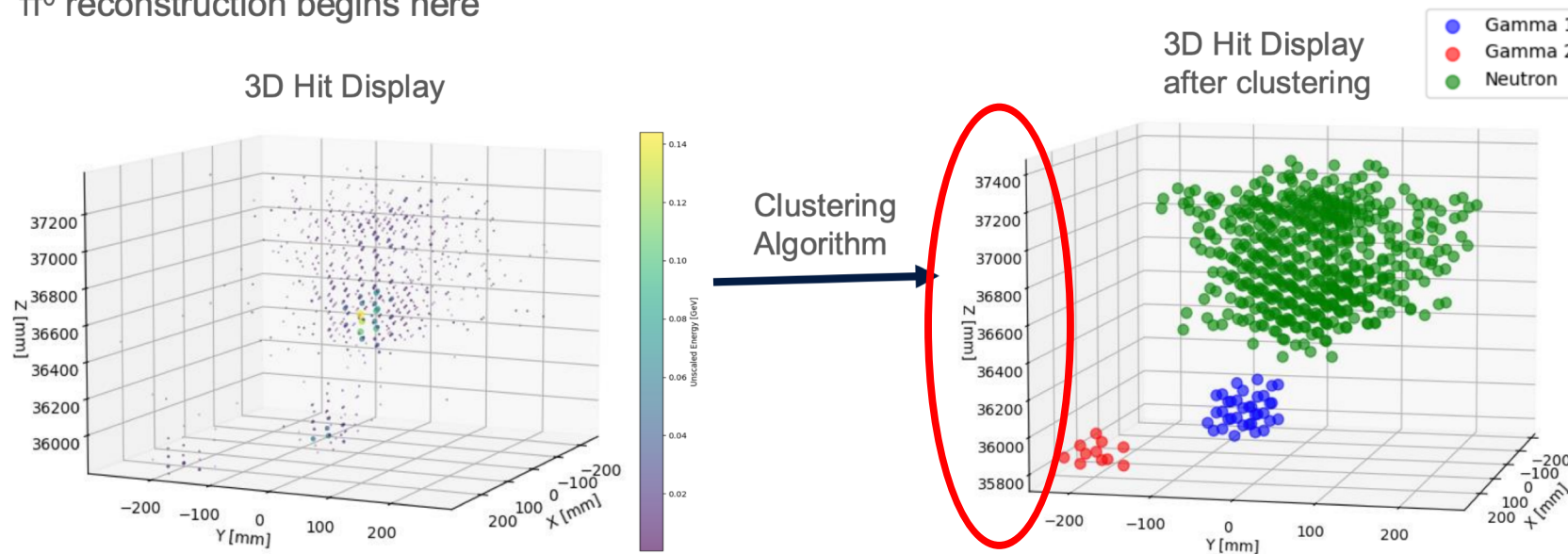
We can extract the x,y for each cell in some sense, but not z.
How do we separate the z (i.e. layers?)



- Checking Alessio report on DNP 2024 as the HCAL geometry has been shown.

First Steps to extracting 4 momentum

- To extract the 4 momentum, hits must be associated with particle tracks
- One approach is clustering:
 - grouping hits based on proximity and energy
 - resulting in clusters of hits that correspond to particle showers
- π^0 reconstruction begins here



UConn

DNP 2024

13

- We can simply read out the x and y position from the gamma sample on HCAL as the cell location but not z .
- We need to know how many layers do we have in z , and the depth per layer.