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Status report

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ZDC Internal

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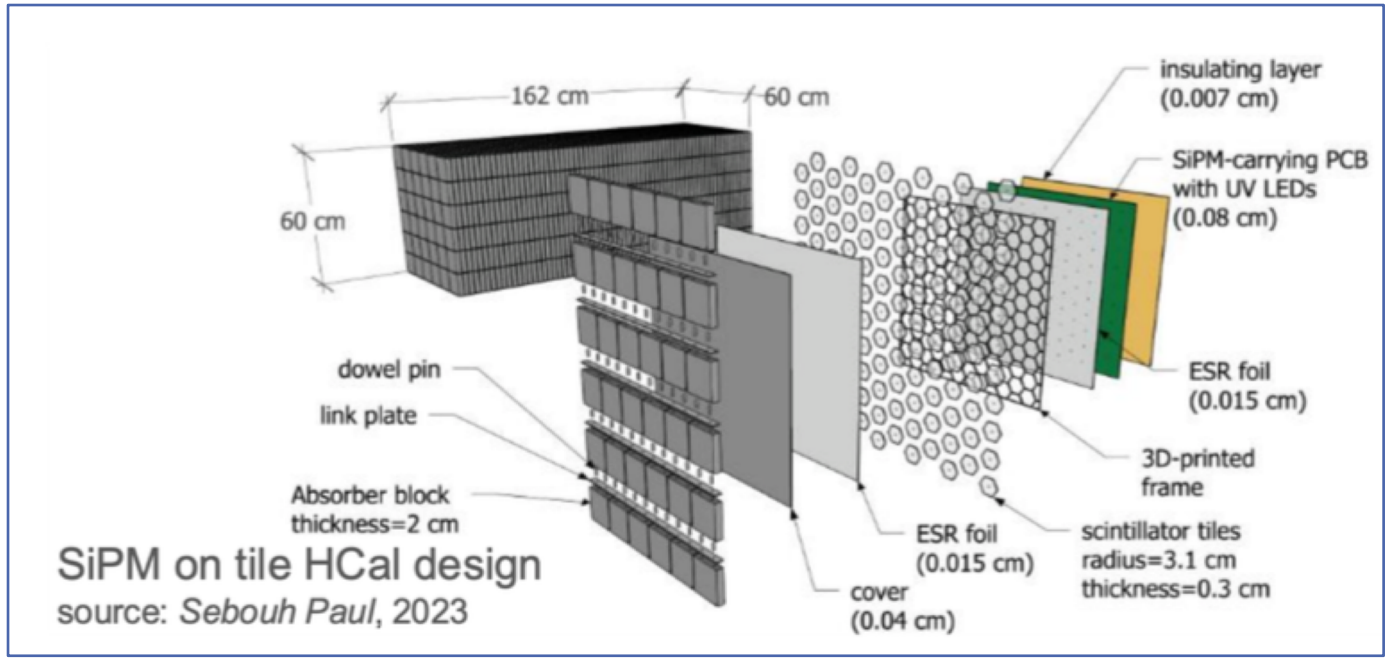
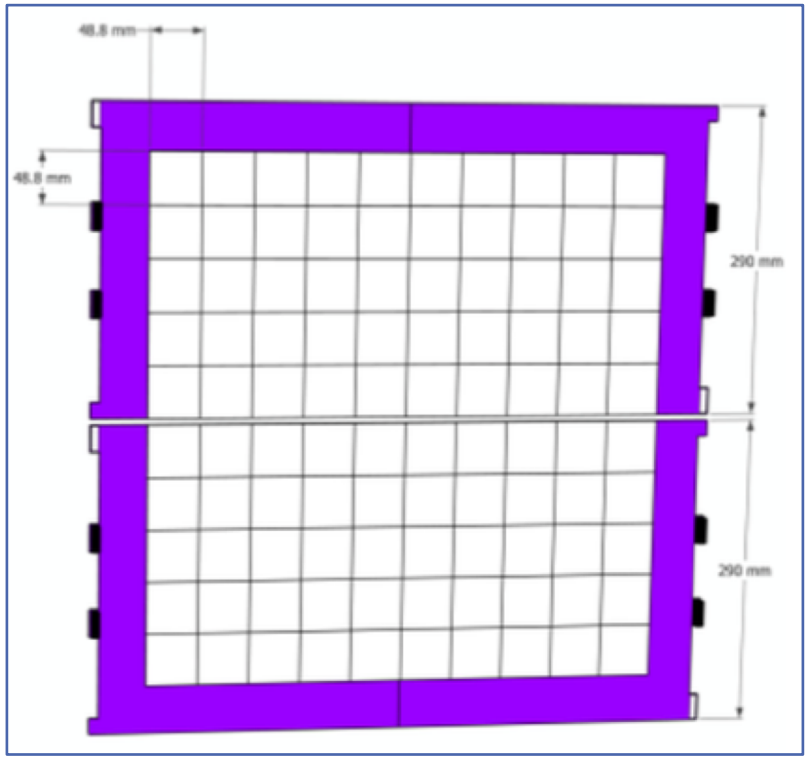
ZDC HCAL: Introduction

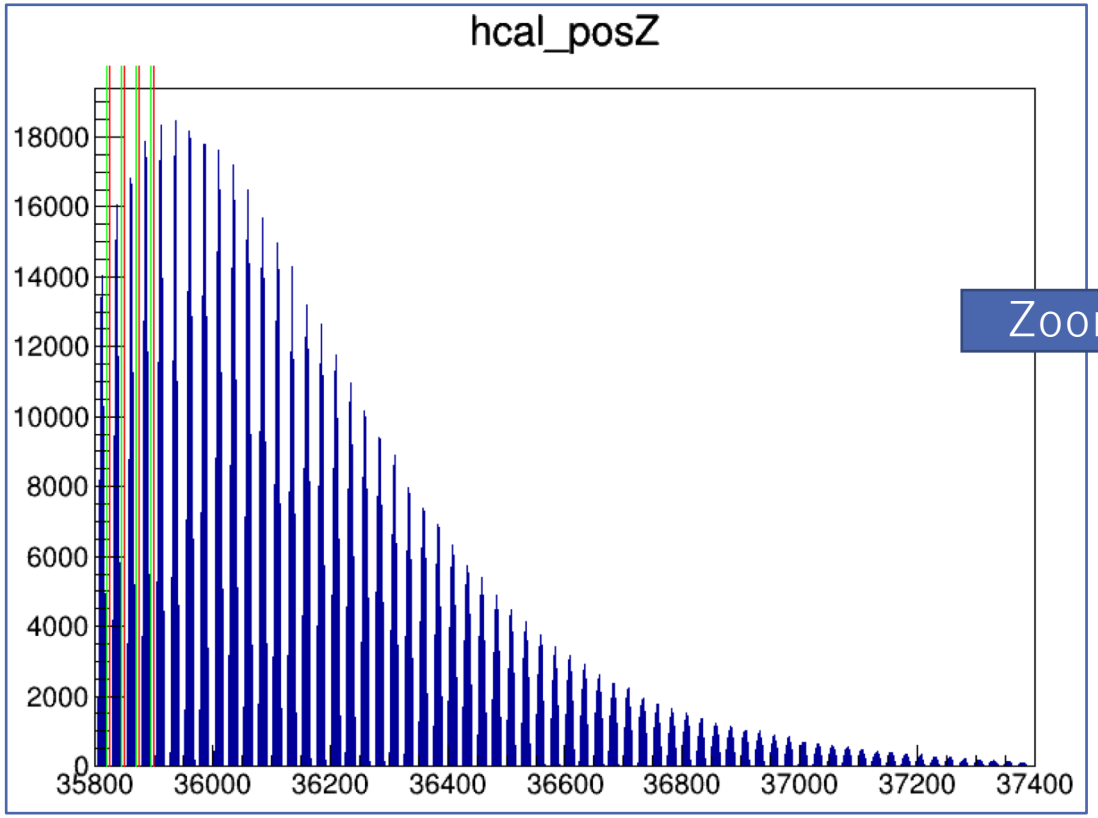
- In order to implement the HCAL info into the ML training, we first have to understand and design how to set up our grid.
- First of all we have a 2cm absorber block + 0.49cm for the rest in each layer.
- Assuming we have 2.5cm for 1 layer, and subtract the 2cm blackplate at the end, we have (162-2)/2.5 = 64 layers.
- In the x-y plane, we use the same grid as PCB (10 x 10).



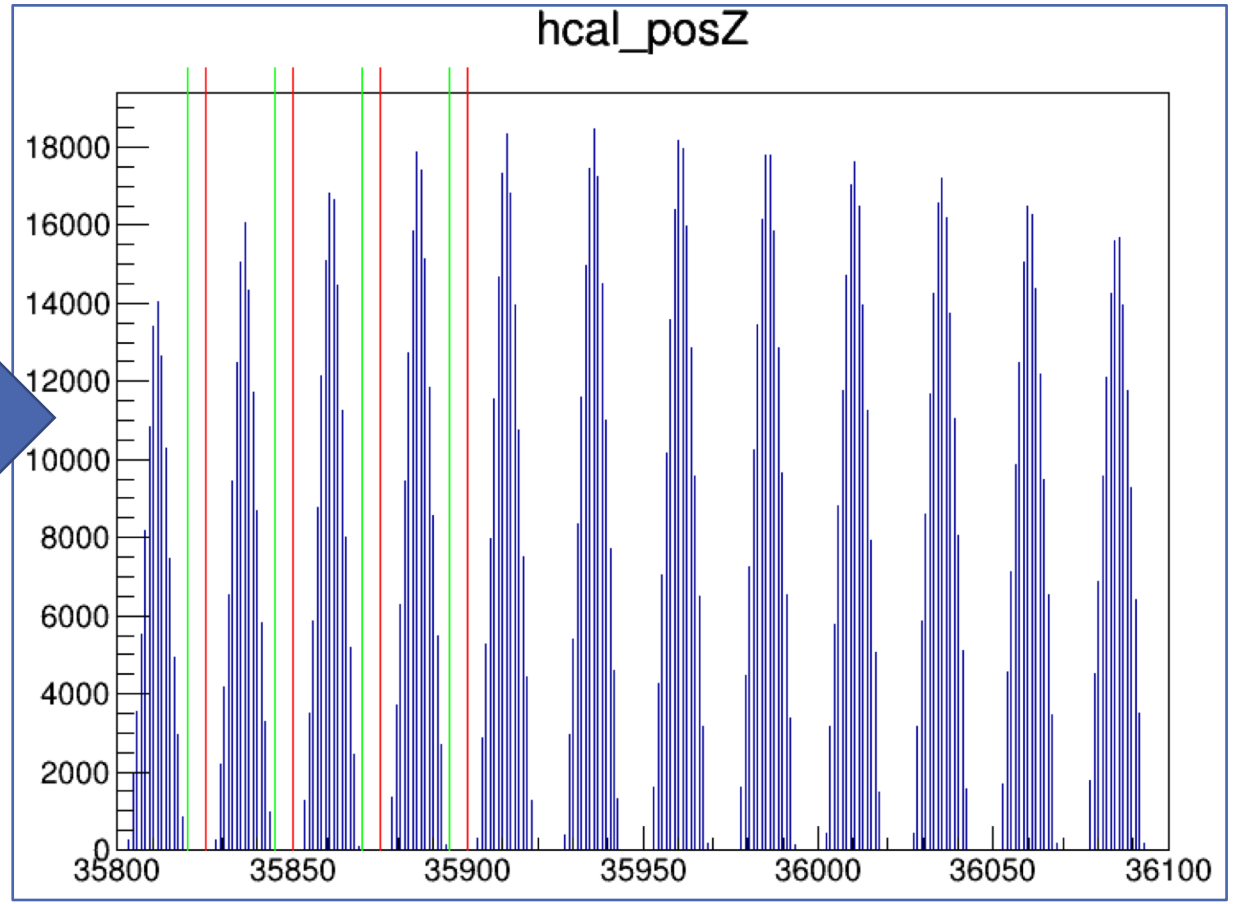


ZDC HCAL: Introduction

- We plot the hit position from the 1M neutron sample.
- The green and red line represent the 2.0cm and 2.5cm mark.
- Therefore we can see that all the hits are simulated in the absorber.
- And we can define 1 layer = 2.5cm.

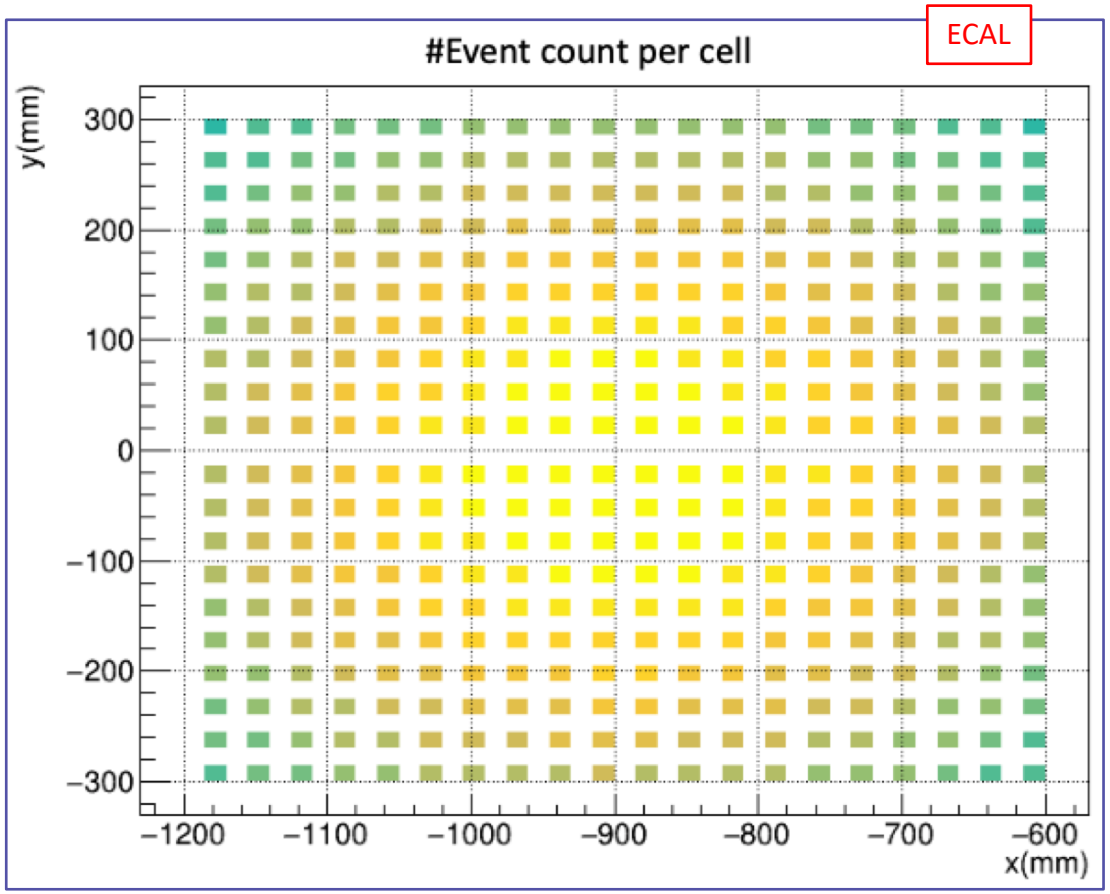


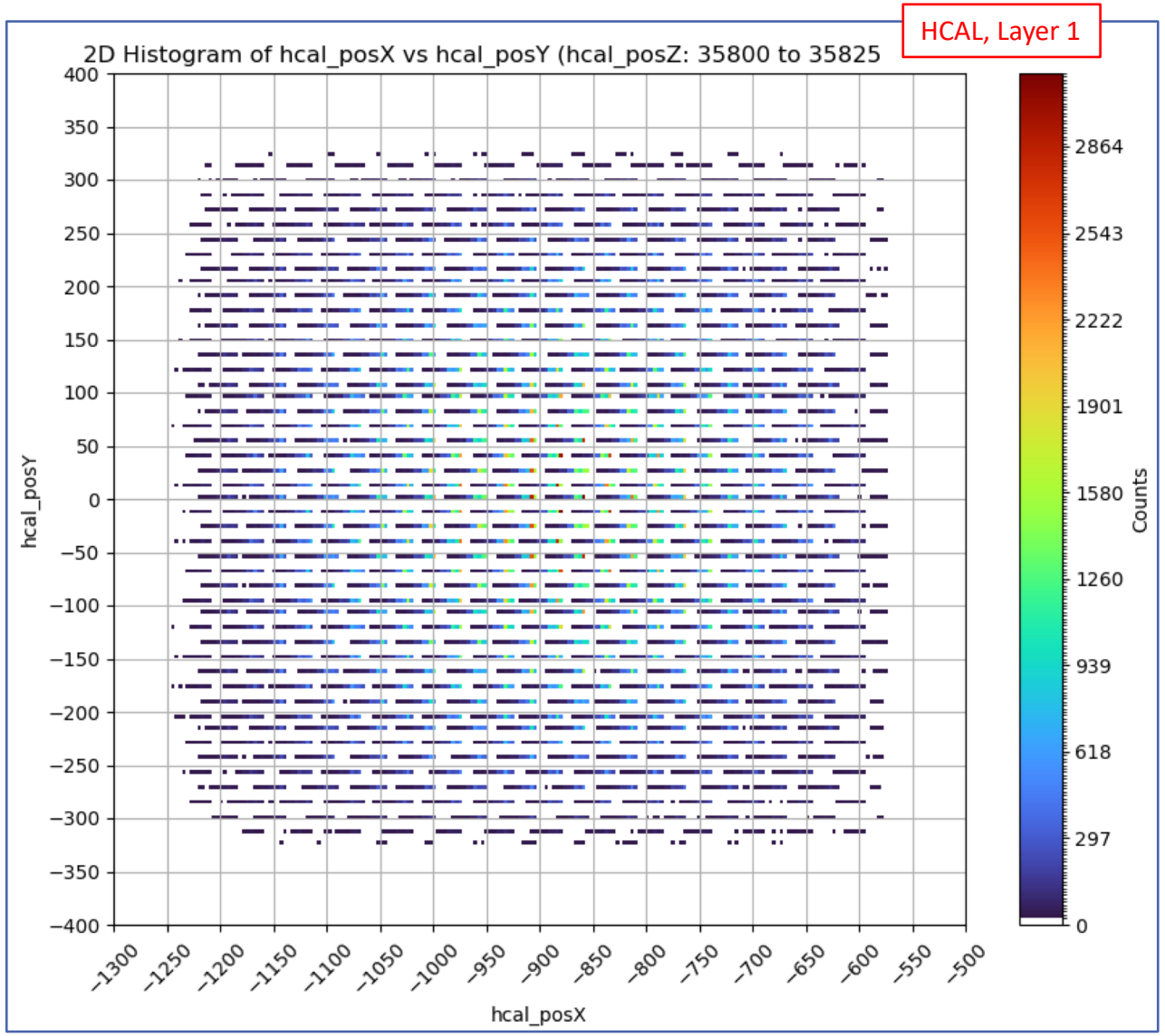
Zoom



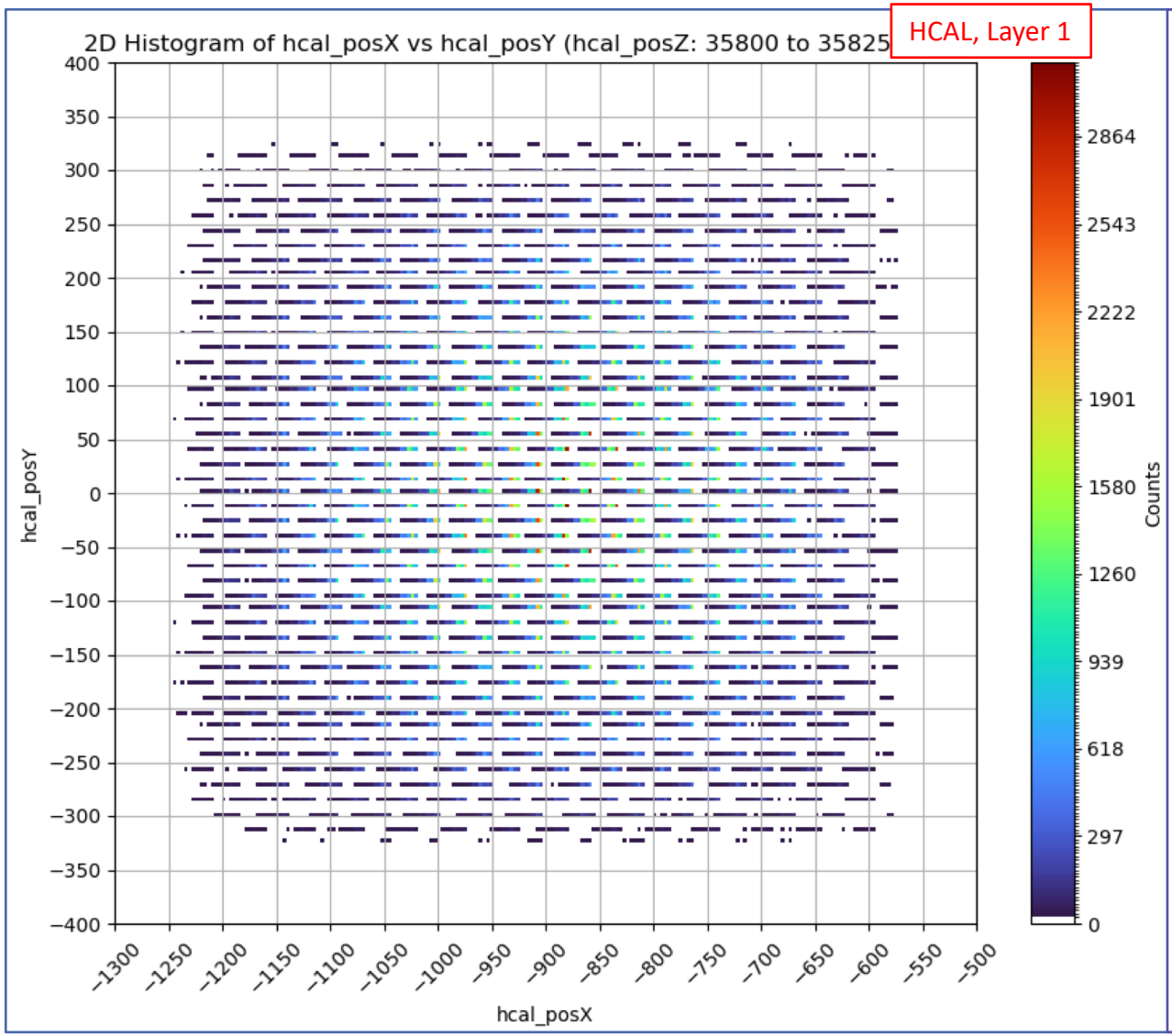
ZDC HCAL: Hits in x-y plane

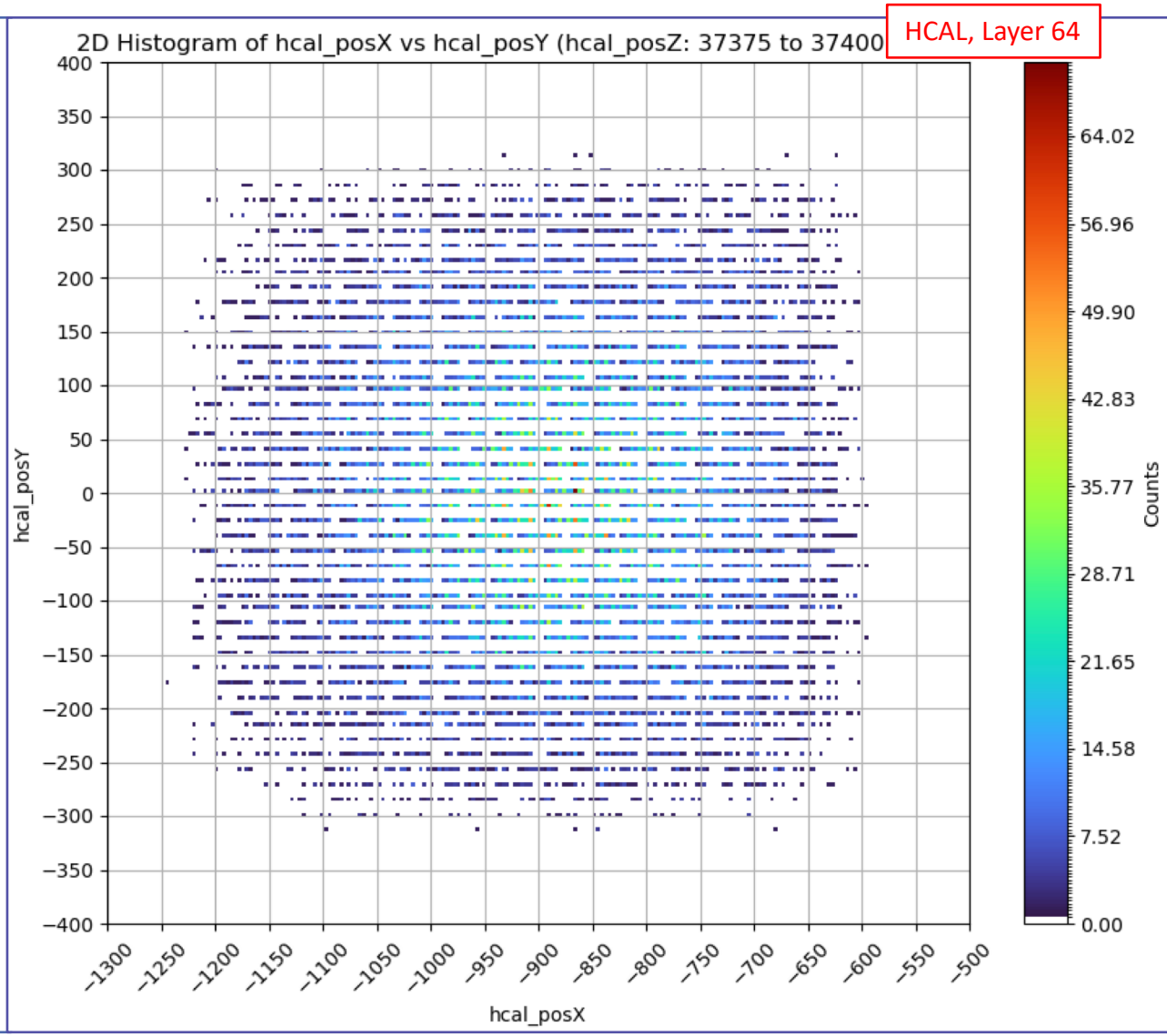
- We first plot all the hits at the first layer.
- Here we can see that the grid size in ECAL cannot capture all the hit in HCAL, we need a little bit larger grid.





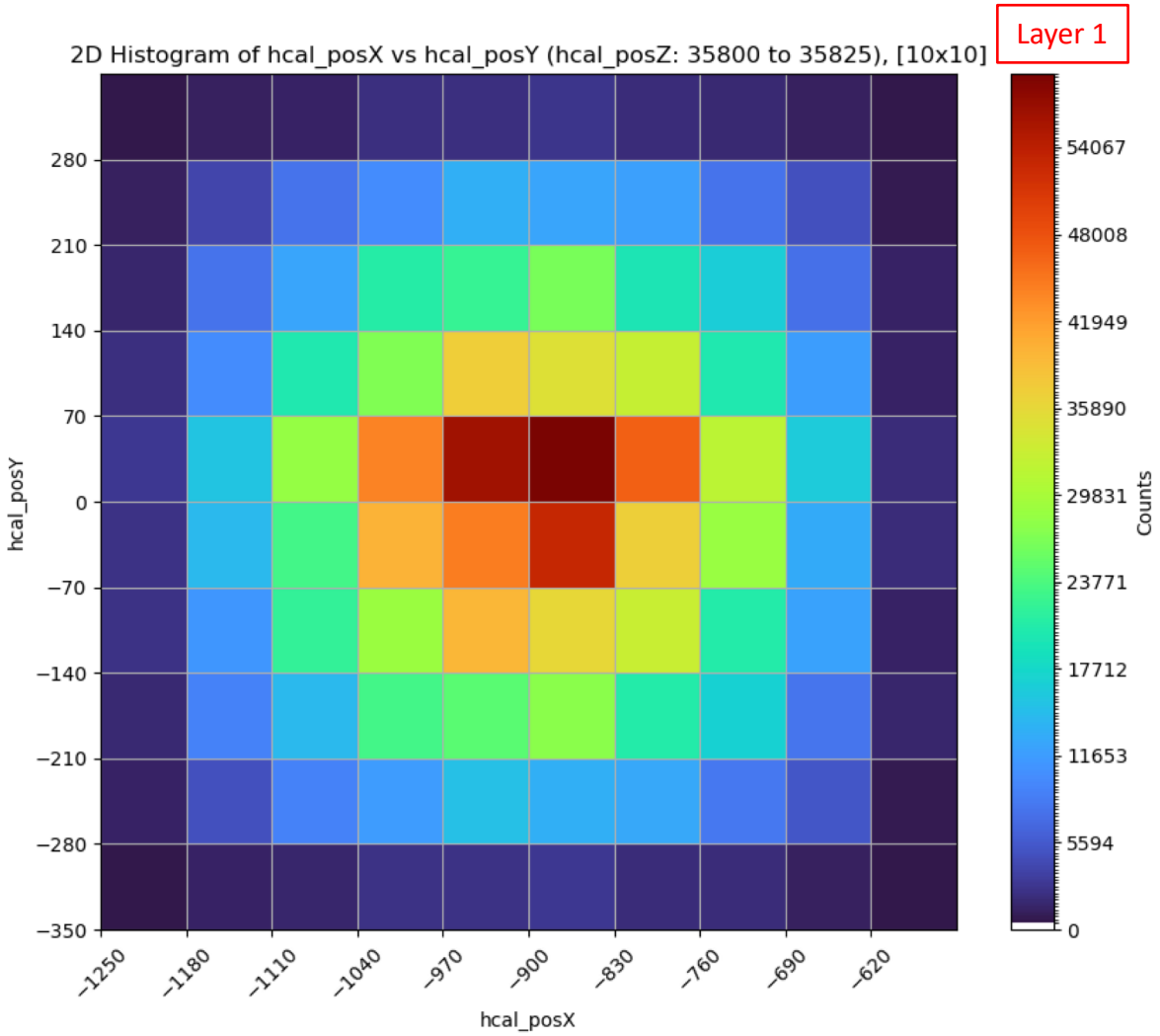
ZDC HCAL: Hits in x-y plane

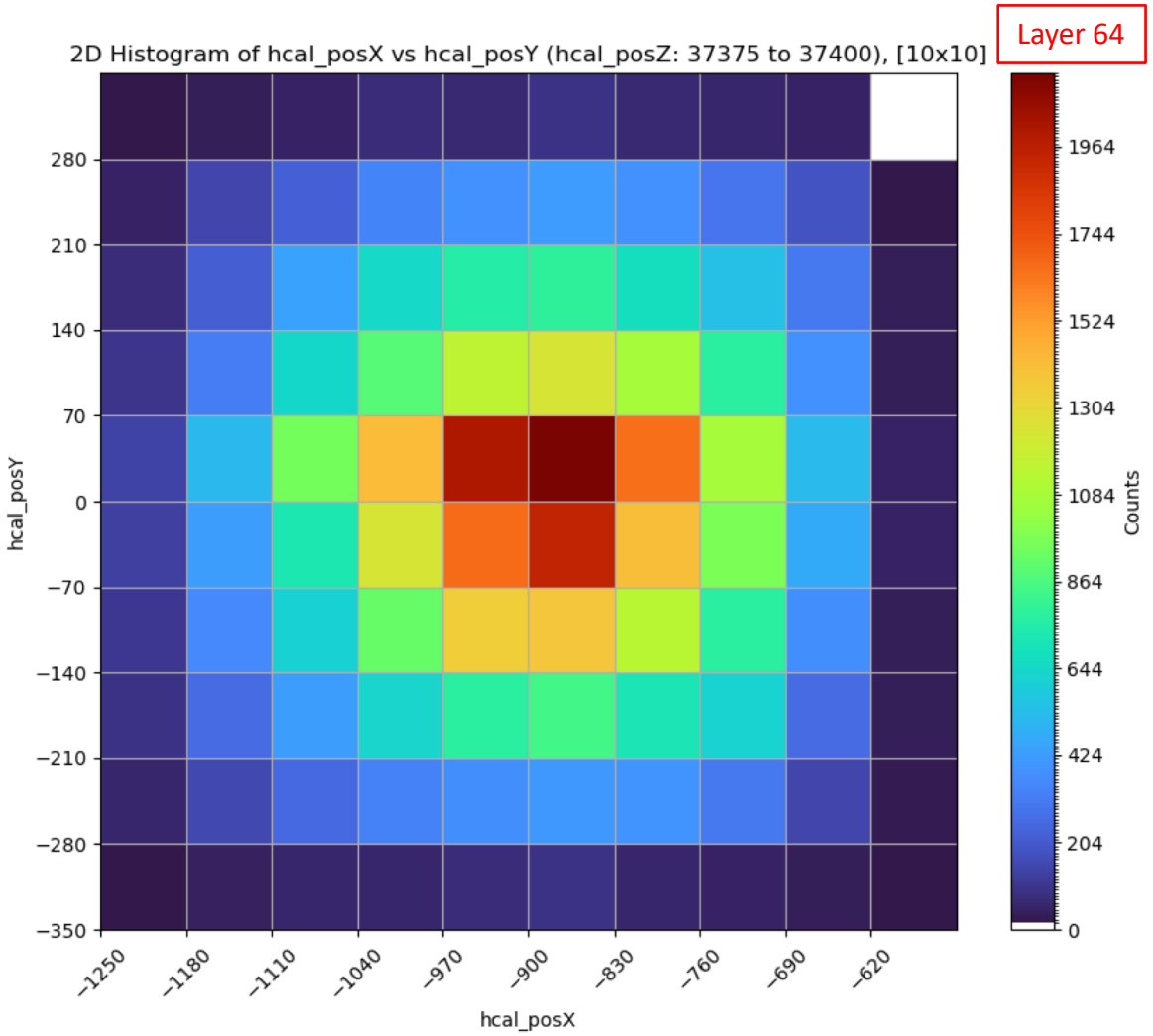




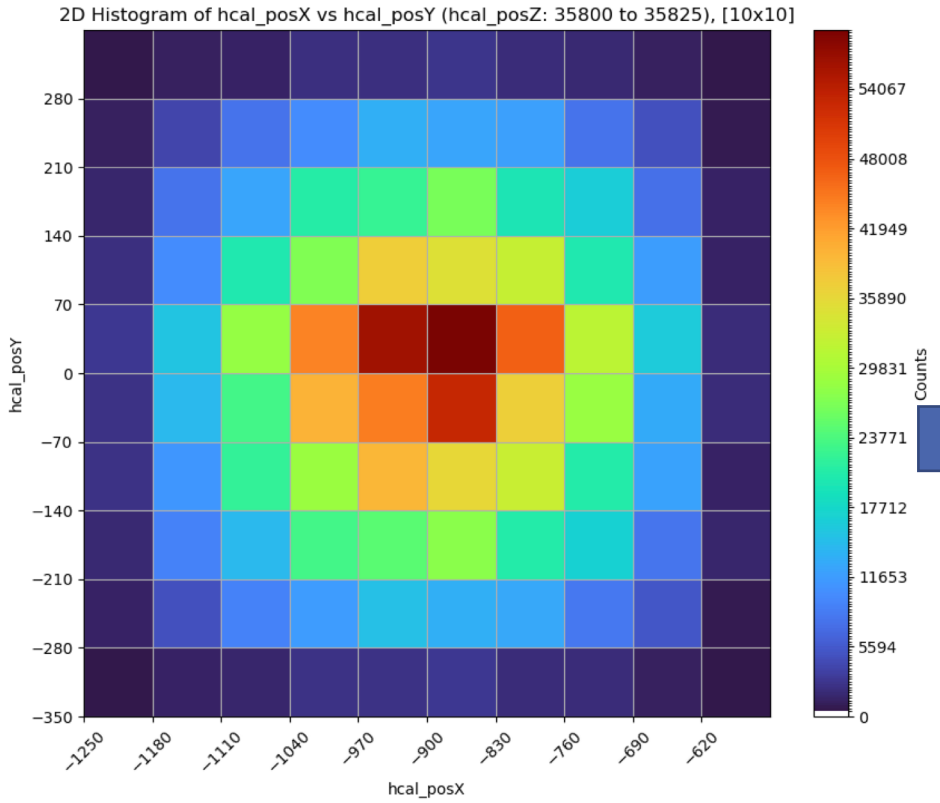
ZDC HCAL: Hits in x-y plane

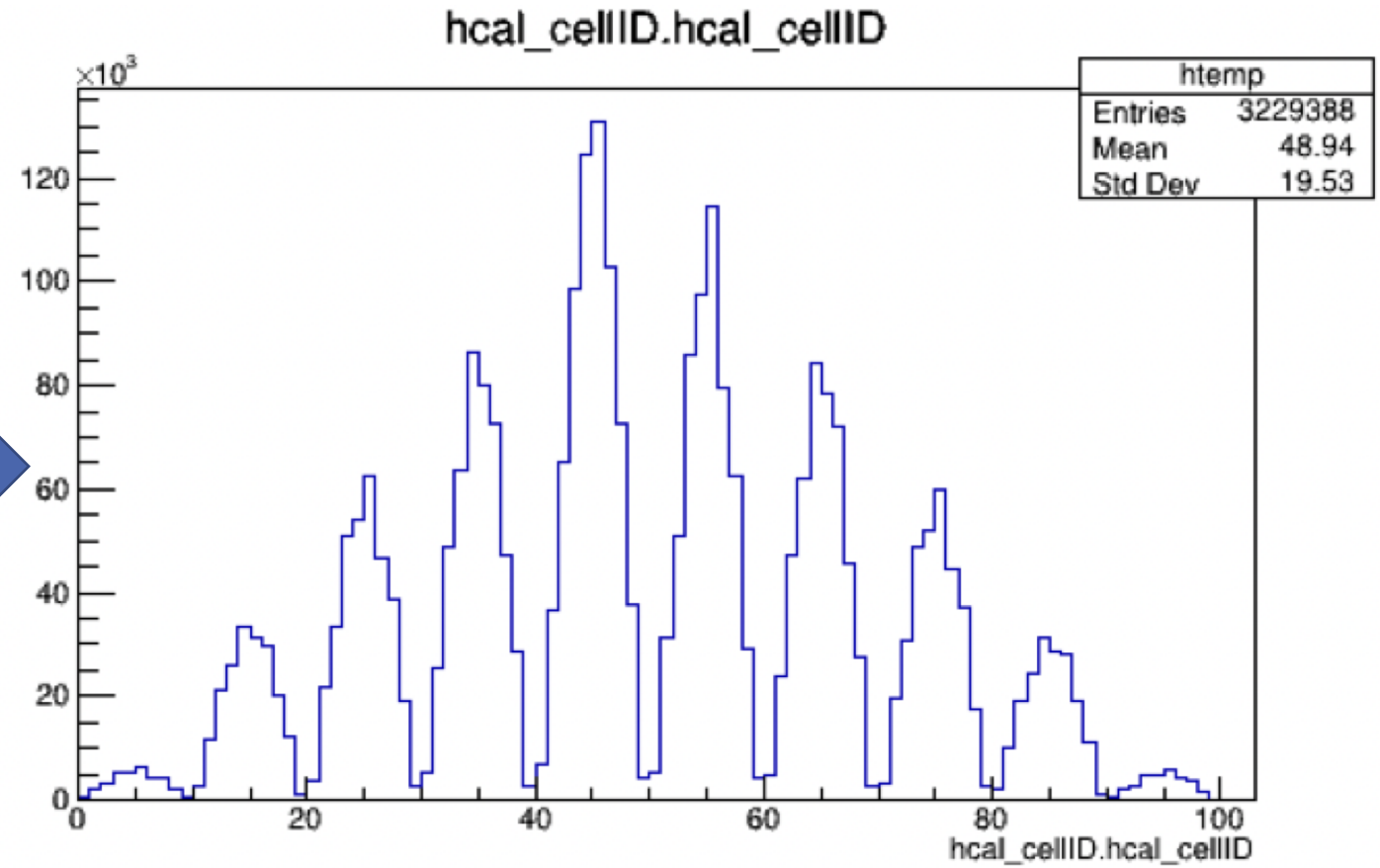
- Here we rebin them into 10x10 grid, which require a cell with 70x70mm.





Re-define the cell ID in the G4 output





- Now we can use this cell ID to match the Energy into the grid as the ML input.
- Then we have to divide them into 64 layers in the data loader (as we don’t do that in the ROOT file).