

Updates on Simulation and Reconstruction in the updated nHCal at epIC

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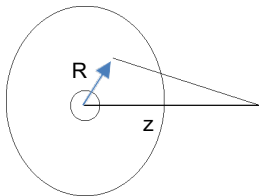
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1. Segmentation cells are extrapolated to cover the entire nHCal.
2. Investigated the reconstructed position of the generated particle, aka center of gravity of the cluster, in single particle events in order to optimise the position resolution.
 - ▶ 1 GeV neutron gun : $\theta = 160^\circ$ and $\phi = 45^\circ$

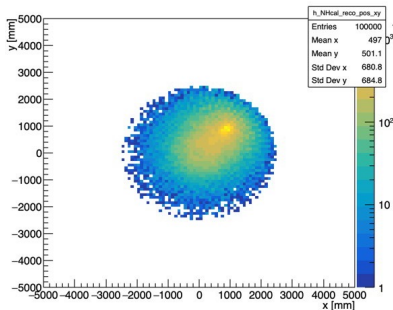




Particle Gun

$Z = -3475$ mm.
 (layer at 1 interaction length)
 $\theta = 160^\circ$ and $\phi = 45^\circ$

Expected X = 894.34 mm.
Expected Y = 894.34 mm.

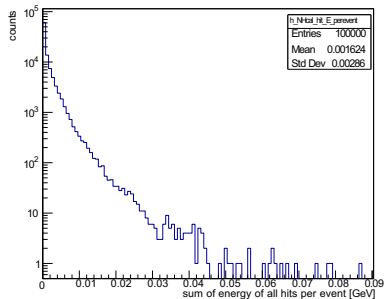
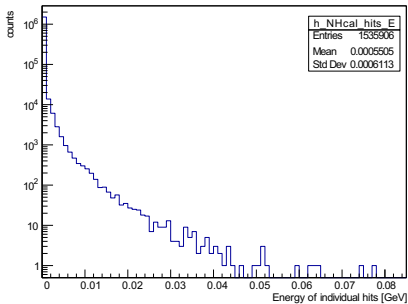


Weighted Average of the
 position of nHCal hits

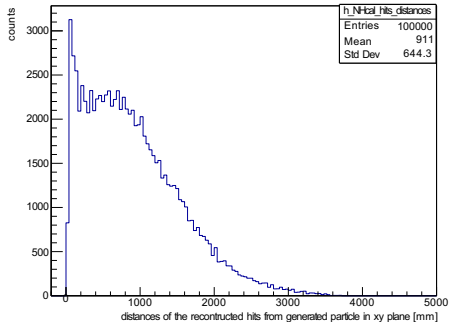
$$\vec{R}(X, Y) = \frac{1}{\sum E_i} \sum E_i \cdot \vec{r}_i(x_i, y_i)$$



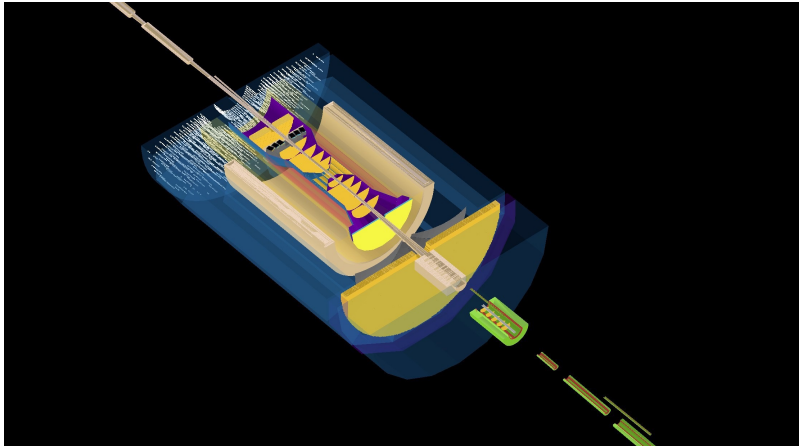
NHcal-hit energy per event



Need to optimize
resolution

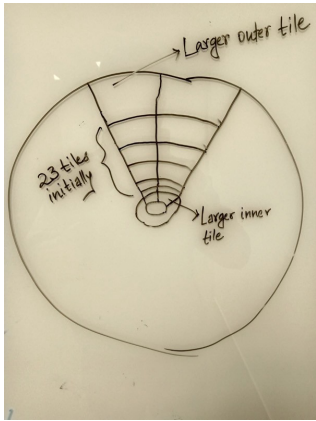


Thank You



BACK UP



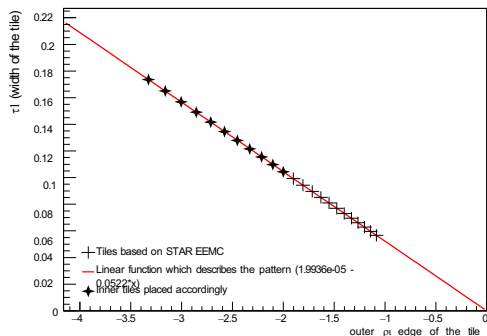




- ▶ Let's find out what pattern is followed by the outer η edges and the η widths.
- ▶ Plot a graph of η width vs. outer η edges and fit it.
- ▶ A linear fit works reasonably well.
- ▶ We get the η width of the tile with outer η edge = -2 and so on.



Solution



Current bins in R are defined as follows:

```
[HcalEndcapN_rmin 13.7021*cm 16.609*cm 19.9431*cm 23.7336*cm  
28.0062*cm 32.7836*cm 38.0859*cm 43.9297*cm 50.3297*cm  
57.2972*cm 64.8401*cm 72.966*cm 81.6805*cm 90.9878*cm  
100.89*cm 111.395*cm 122.516*cm 134.229*cm 146.58*cm  
159.546*cm 173.155*cm 187.424*cm 202.377*cm 218.019*cm  
234.353*cm 251.444*cm HcalEndcapN_rmax ]
```

