Binning Study in MdcHoughFinder

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purpers

- Find a reasonable bin number in 2D reconstruction of MdcHoughFinder

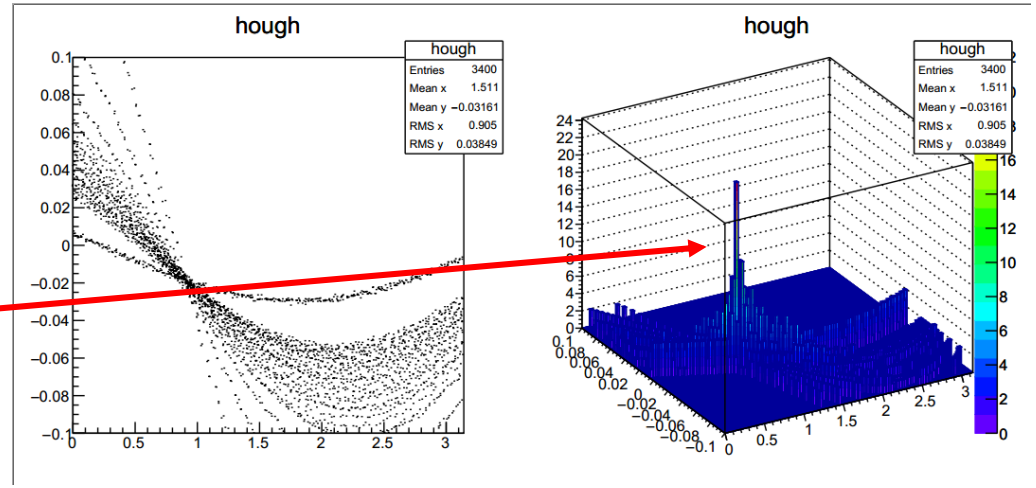
1. make sure the peak of Hough map contain as many hits as possible
2. from the reconstructed 2D track we can get as many hits as possible by some small enough cuts of different layers.

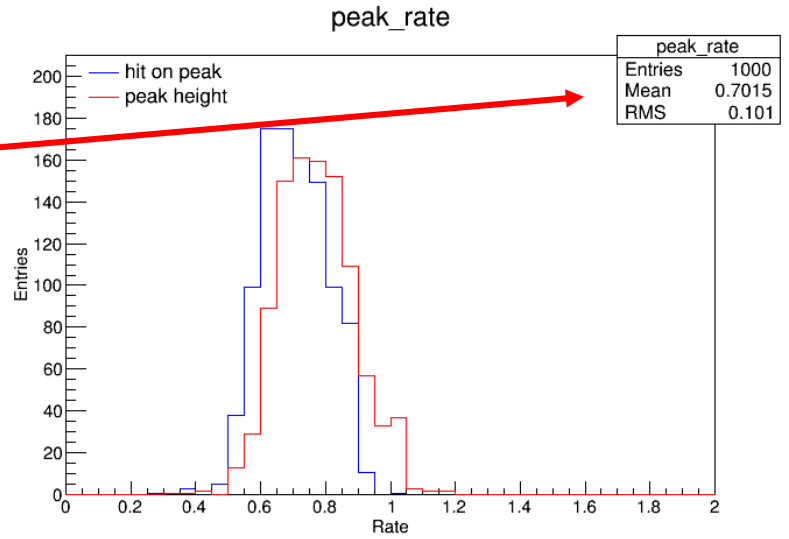
Hit rate of the peak(axial layer and X-cluster)

- Sample: single track event of fix transverse momentum 150MeV
- Hit rate is

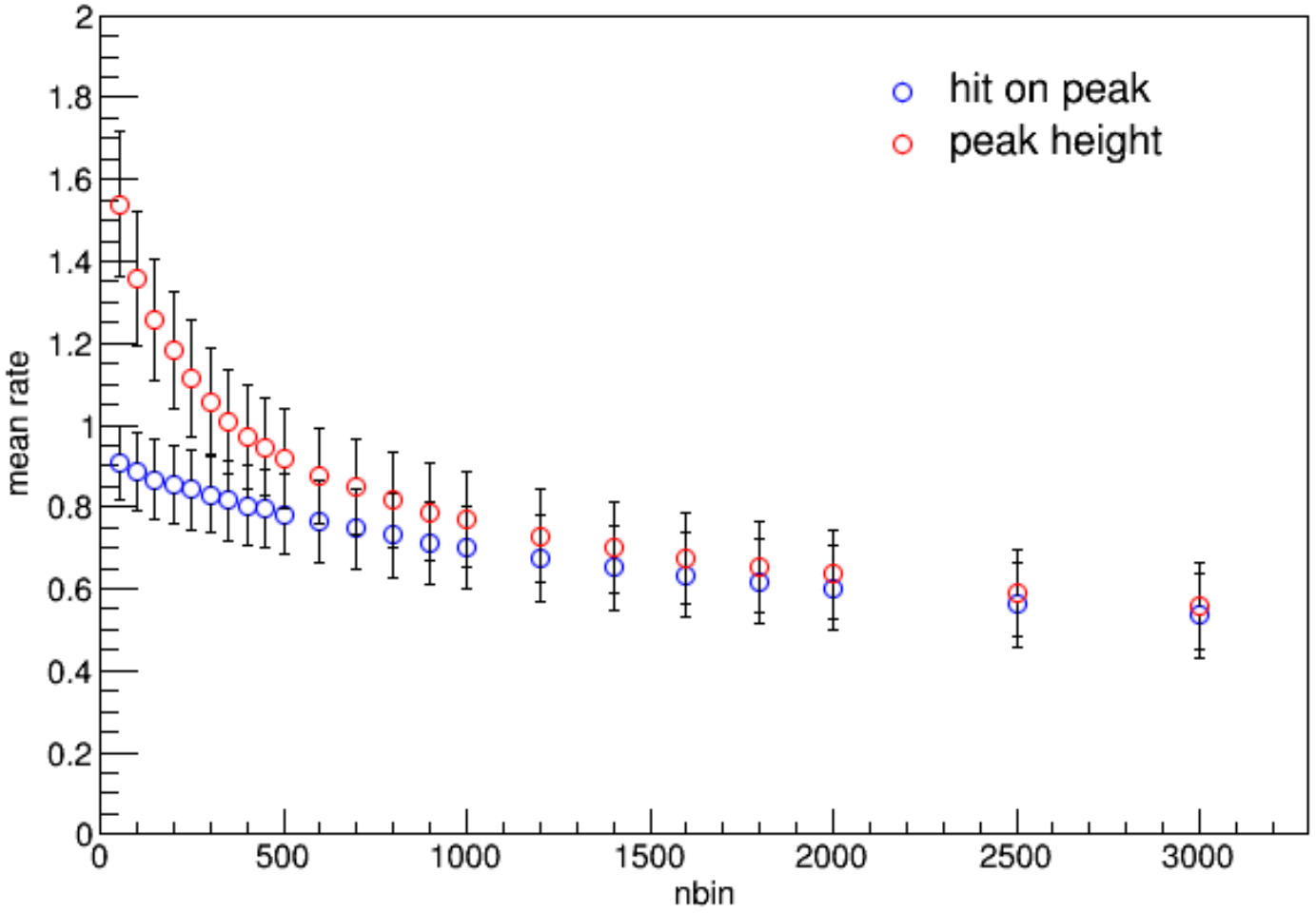
$$hit\ rate = \frac{hits\ of\ \ peak}{hits\ of\ \ event}$$

- For each bin number, fill hit rate of 1000 events into a histogram, then get mean and RMS of the
- Draw the bin-mean plot and hits of peak distribution by layer

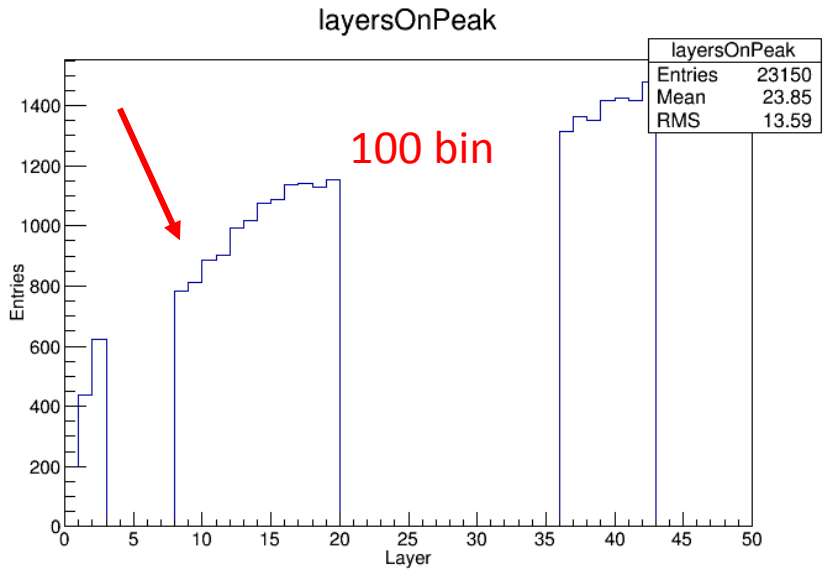


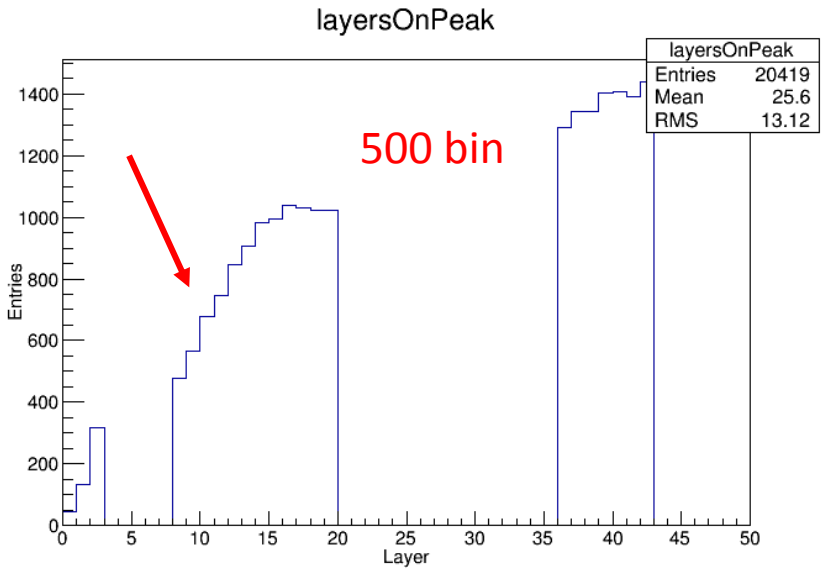


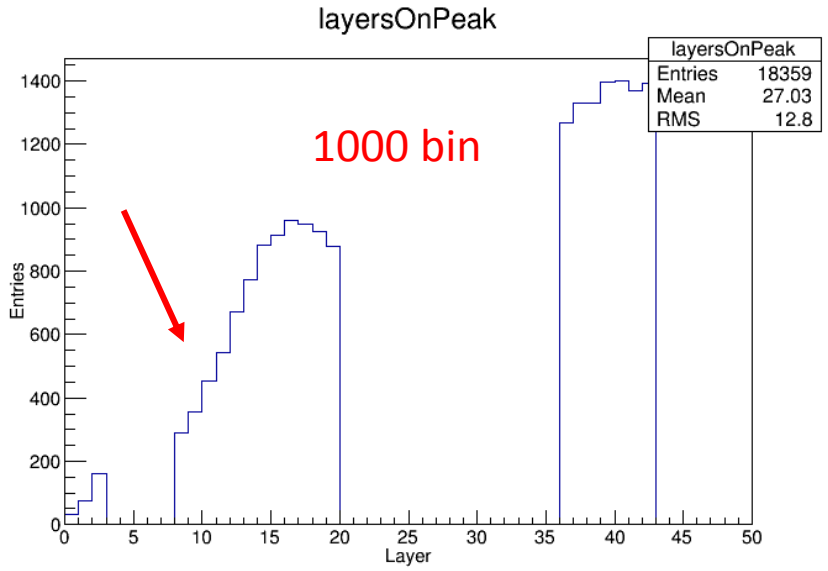
Bin-Mean Plot

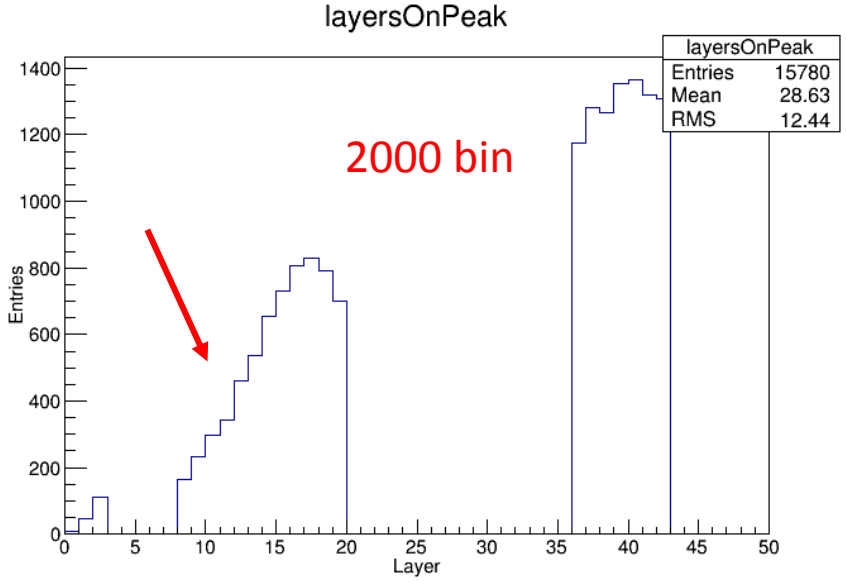


Hits of Peak distribution



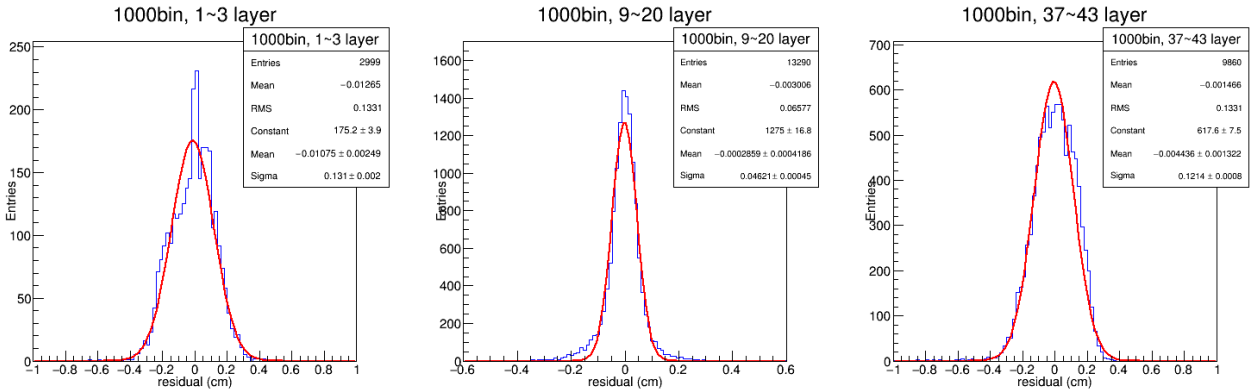


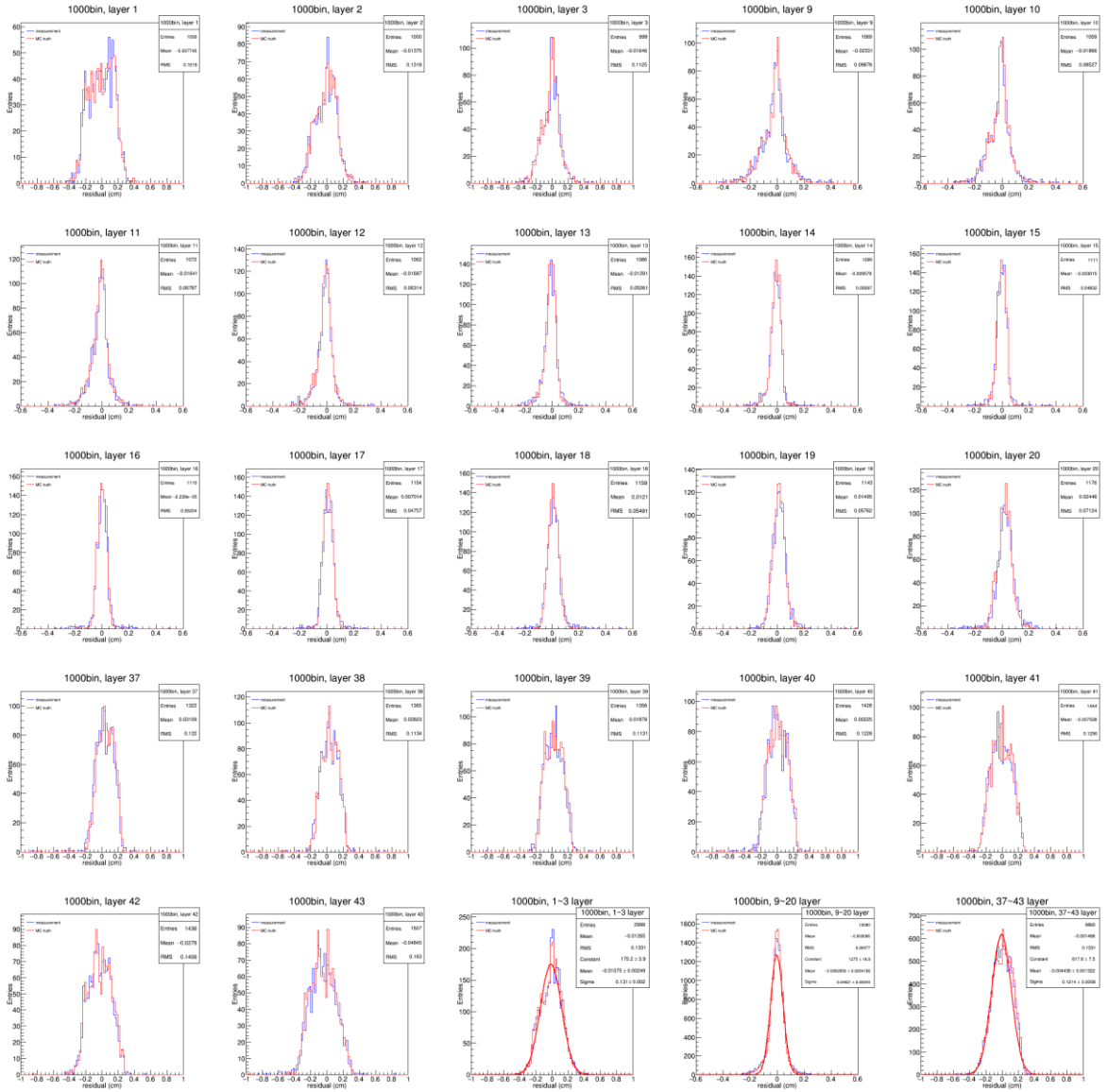




Residual of hits for each layer

- Residual of 1-3 layer have similar distribution, so we fill them in one histogram. So are 9-20 layer and 37-43 layer .
- Fit the histogram to get sigma and draw the bin-sigma plot





Bin-Sigma Plot

- Finally we decide to take 1000 bin