Updates of Lorentz Angle for Silicon Strips

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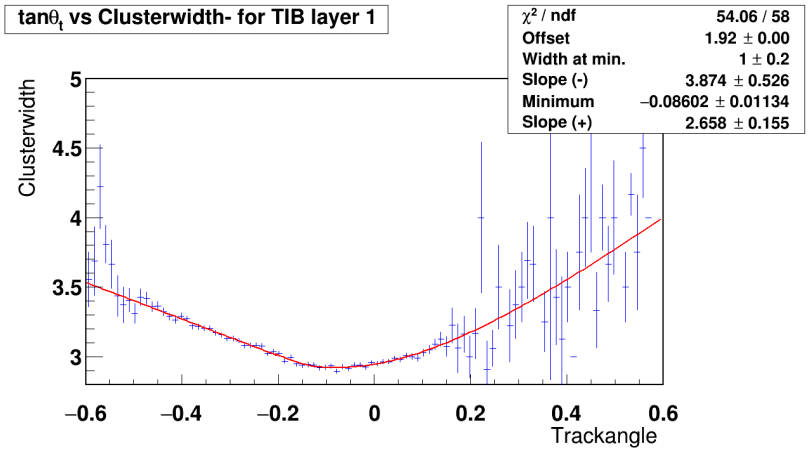
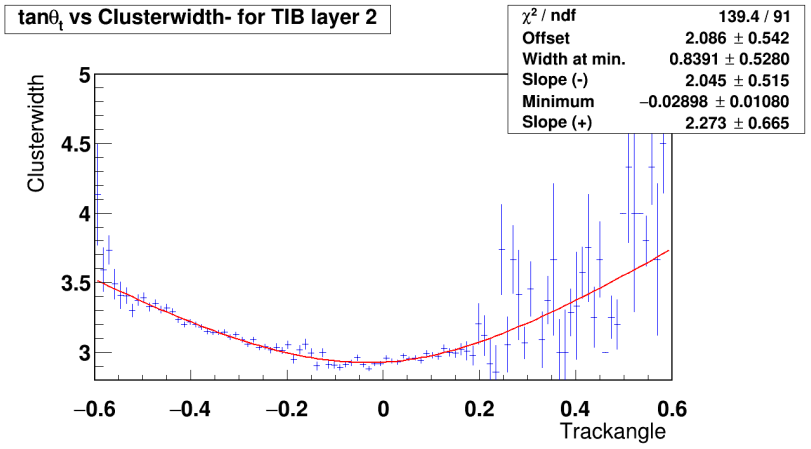
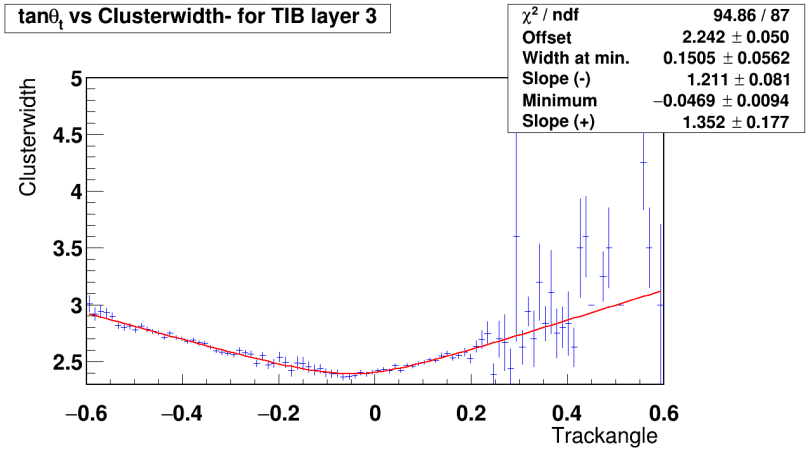
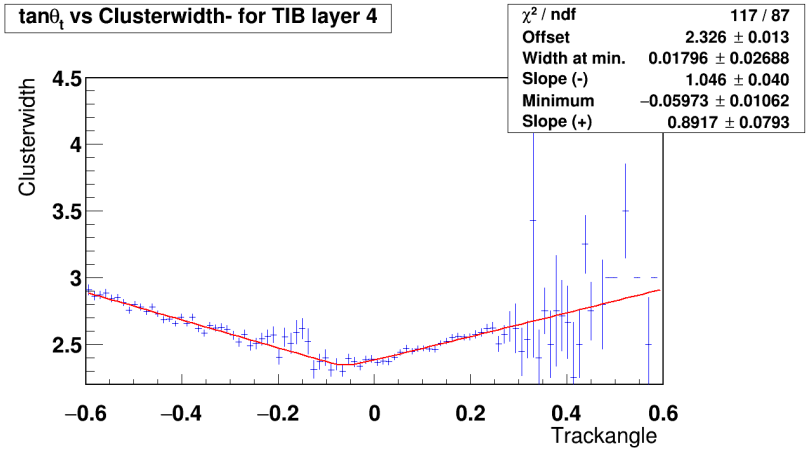
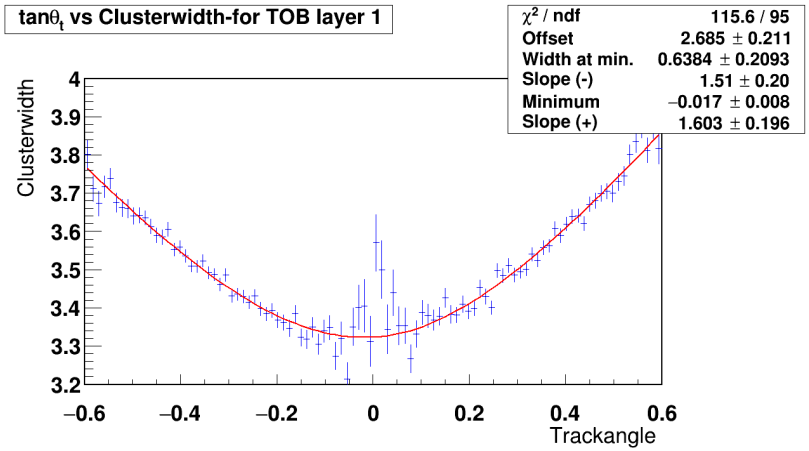
Ressurection of old analysis-Prabhat Sir

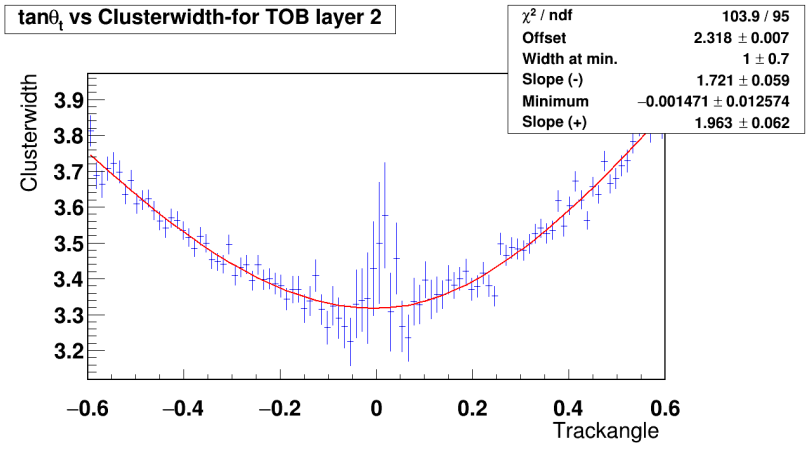


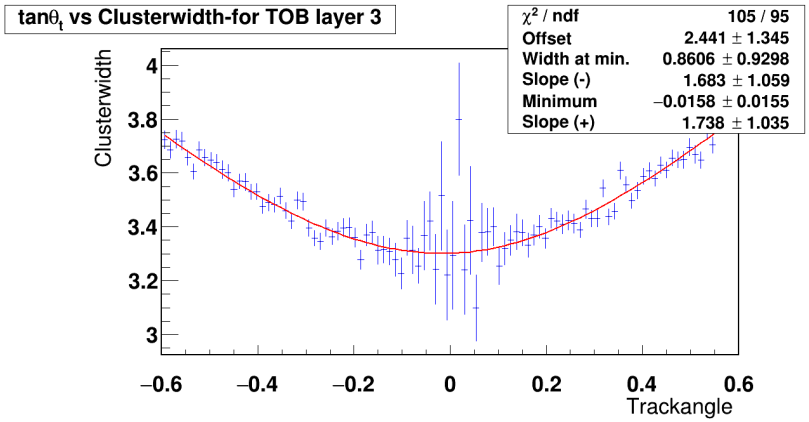


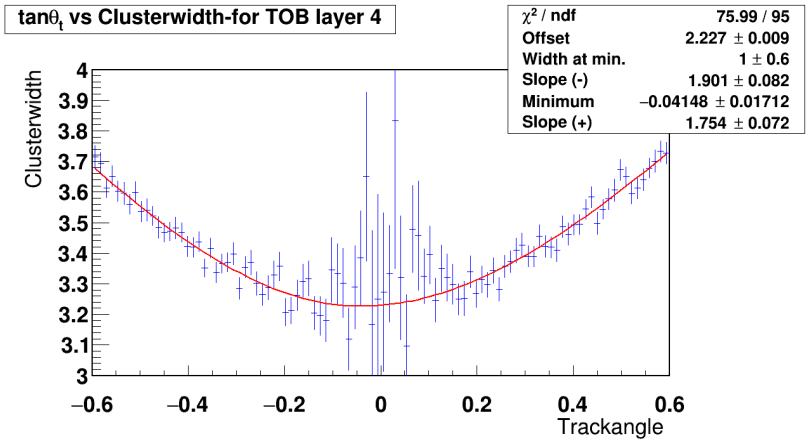





tanθt vs Clusterwidth-for TOB layer 1
χ² / ndf 115.6 / 95
Offset 2.685 ± 0.211
Width at min. 0.6384 ± 0.2093
Slope (-) 1.51 ± 0.20
Minimum −0.017 ± 0.008
Slope (+) 1.603 ± 0.196
Clusterwidth
Trackangle


tanθt vs Clusterwidth-for TOB layer 2
χ² / ndf 103.9 / 95
Offset 2.318 ± 0.007
Width at min. 1 ± 0.7
Slope (-) 1.721 ± 0.059
Minimum −0.001471 ± 0.012574
Slope (+) 1.963 ± 0.062
Clusterwidth
Trackangle


tanθt vs Clusterwidth-for TOB layer 3
χ² / ndf 105 / 95
Offset 2.441 ± 1.345
Width at min. 0.8606 ± 0.9298
Slope (-) 1.683 ± 1.059
Minimum −0.0158 ± 0.0155
Slope (+) 1.738 ± 1.035
Clusterwidth
Trackangle


tanθt vs Clusterwidth-for TOB layer 4
χ² / ndf 75.99 / 95
Offset 2.227 ± 0.009
Width at min. 1 ± 0.6
Slope (-) 1.901 ± 0.082
Minimum −0.04148 ± 0.01712
Slope (+) 1.754 ± 0.072
Clusterwidth
Trackangle

Rough LA

TIB(expected value for $\sim -5.8^0$ for layer 1)

- L1 -0.08602$\pm$0.01134 **LA:** $\sim$ -4.91^0
- L2 -0.02898$\pm$0.01080 **LA:** $\sim$ -1.66^0
- L3 -0.0469$\pm$0.0094 **LA:** $\sim$ -2.68^0
- L4 -0.05973$\pm$0.01062 **LA:** $\sim$ -3.4182^0

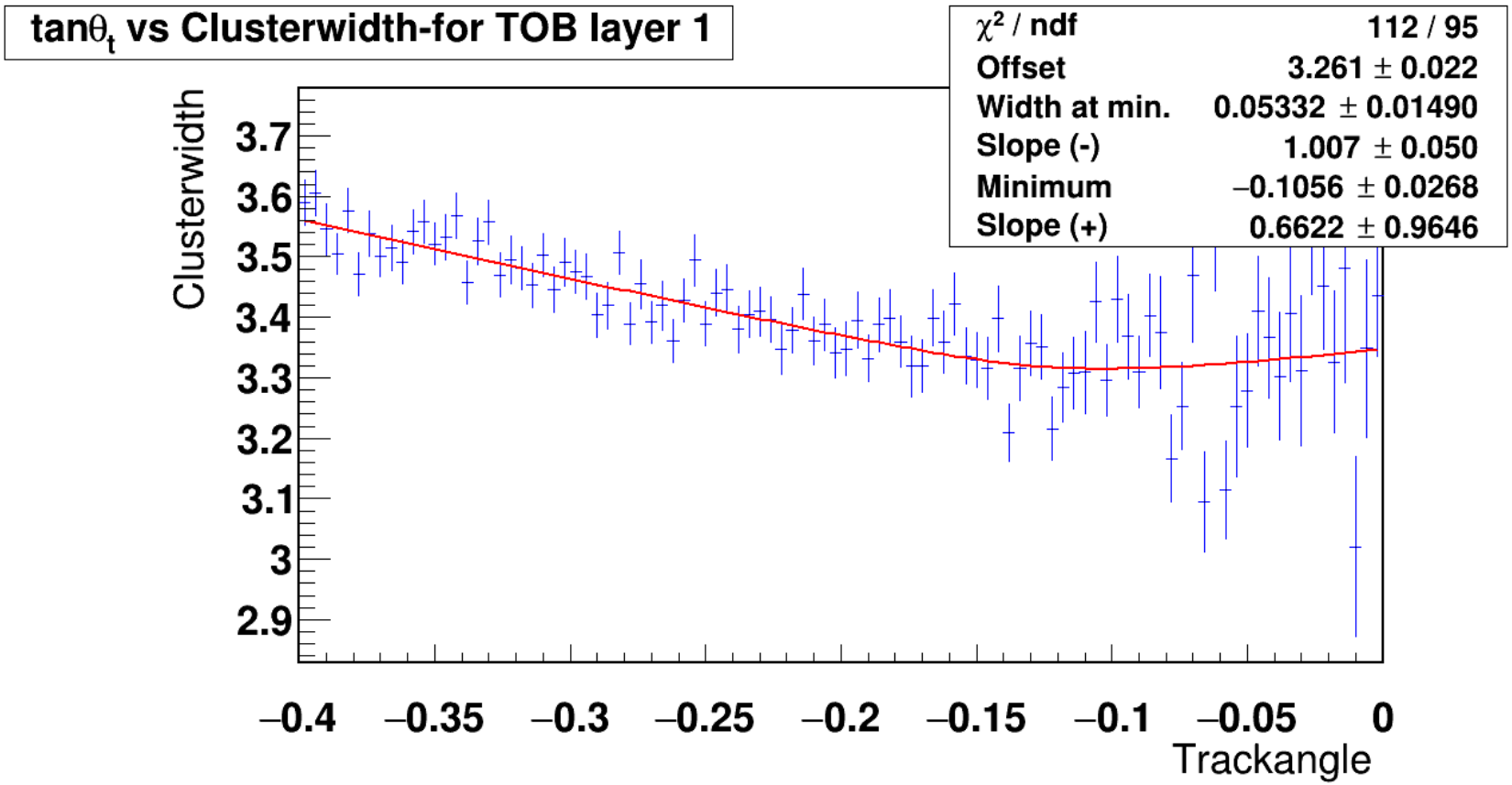
TOB(expected value for layer 1 $\sim -6.4^0$)

- L1 -0.017$\pm$0.01134 **LA:** $\sim$ -0.97^0
- L2 -0.001417$\pm$0.012574 **LA:** $\sim$ -0.084^0
- L3 -0.0158$\pm$0.0155 **LA:** $\sim$ -0.905^0
- L4 -0.04148$\pm$0.01062 **LA:** $\sim$ -2.37^0

An uniform energy loss to calculate the centroid of the cluster formed by the holes generated by the passage of the particle.

One side

TOB Layer 1 the LA= -6.02^0



- The measurement has been performed on the aggregate data coming from all modules assembled on each layer. Though in different layer orientations of modules are different. In local reference frame some modules have y axis parallel to the $\mathbf{B}$ while other antiparallel. this causes different signs in LA. For $\hat{y}.\mathbf{B} > 0$ LA is ve$^+$ and ve$^-$ otherwise.
- Only the cluster centroid displacement orthogonal to the module strip is measurable by the detector.
- Stereo detectors are tilted wrt. to mono detector by 100mrad which cuases smaller cluster centroid displacement in stereo's than mono's for same incident angle.

$\Delta x_m = \frac{\Delta x_s}{\cos\alpha}$ α is the angle between y axis and the magnetic field where, $\cos\alpha = \frac{\hat{y}.\mathbf{B}}{\mathbf{B}}$ and $\frac{1}{\cos\alpha}$ has to be multiplied to trackangle $\tan\theta_t$ for stereo's and for mono's $\cos\alpha = \pm 1$.

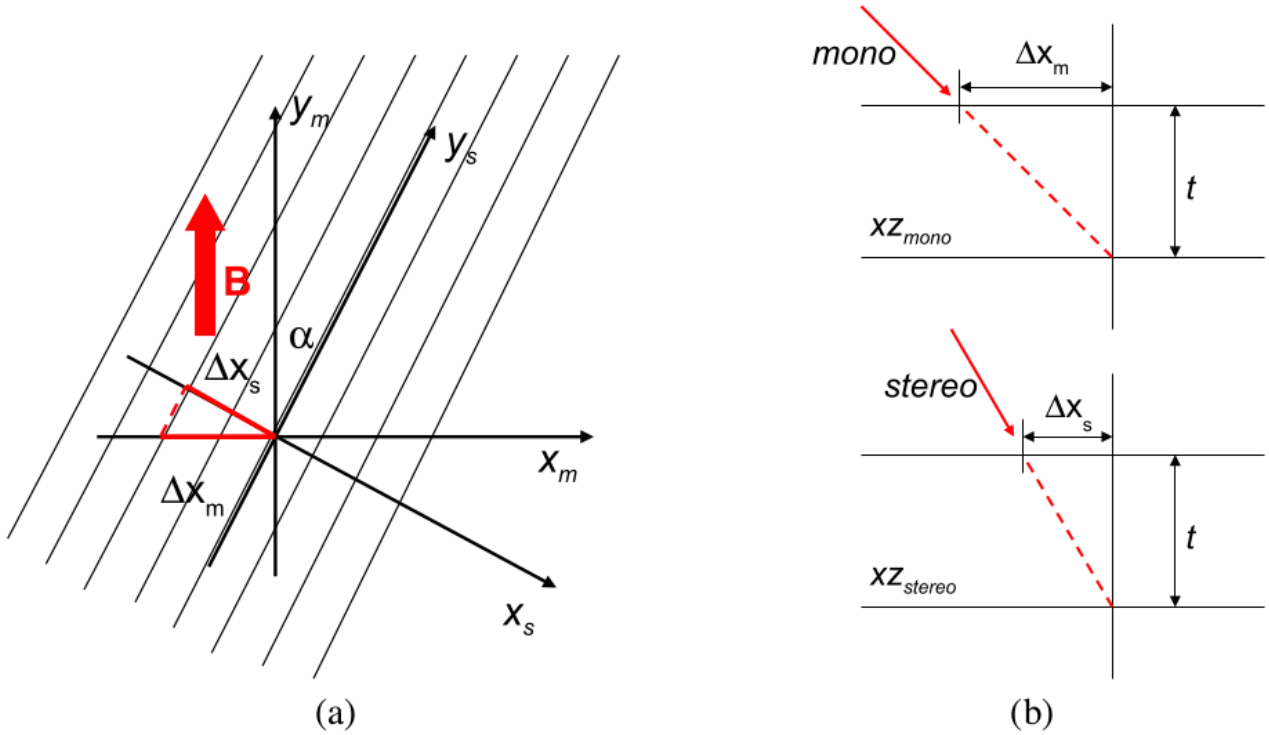


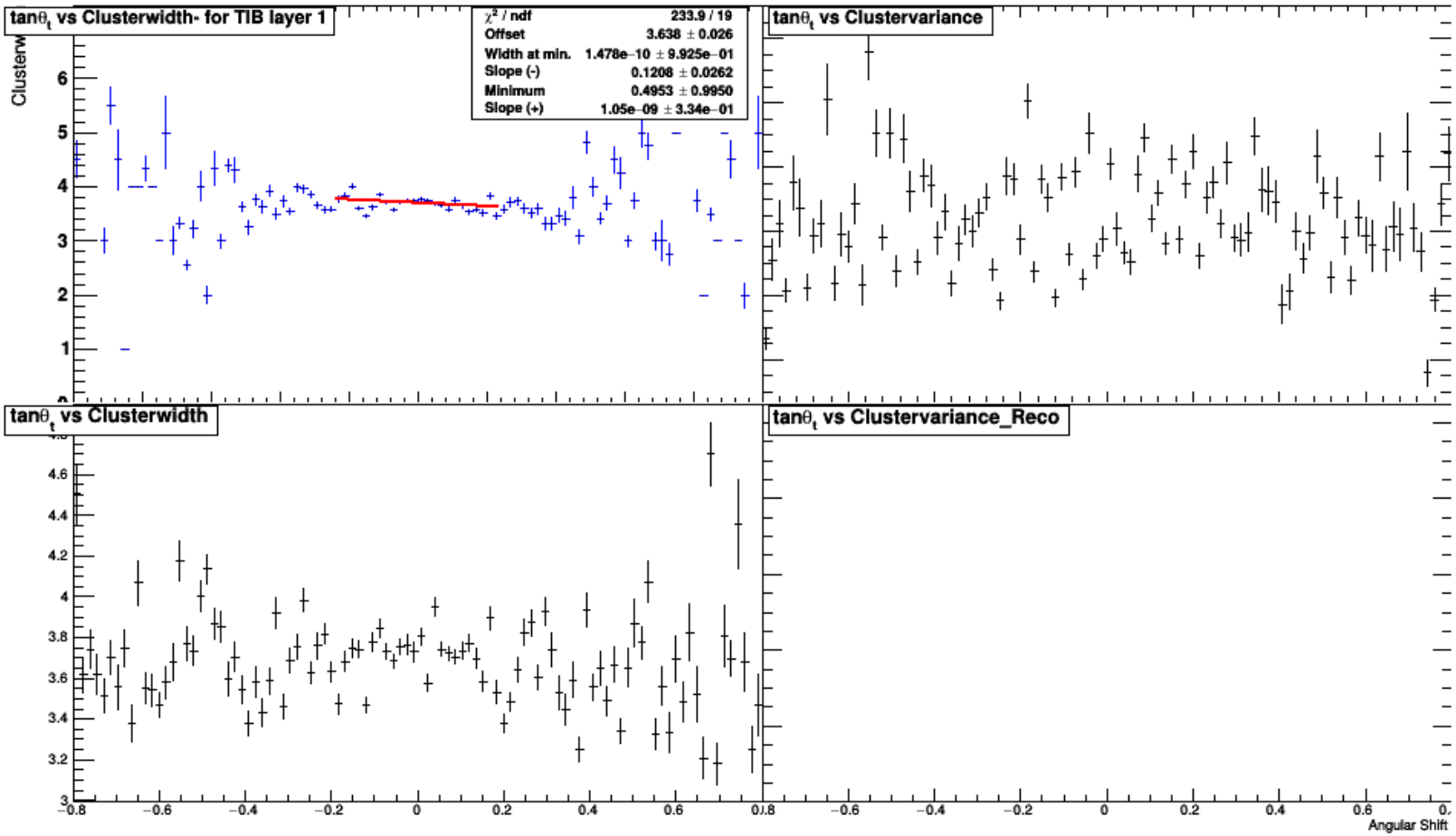
Figure 5 : Schematic representation of the Lorentz deviation in mono and stereo detectors; (a) junction side view: is the angle between the stereo strips and the magnetic field (supposed parallel to the mono strips); (b) xz-mono and xz-stereo plane view: dashed lines represent the projection of the drift direction in the xz module plane, while the arrows represent the projection of the tracks which minimizes the cluster size

Production of new ntuple-Suchandra Ma'am and Jean

- The producer CalibTracker/SiStripLorentzAngle/python/ntuple-cff.py
- Mauro adapted a cfg file for using it with the current common format:lantuple.py Using both of them I have booked my ntuple.
- As I said earlier that these contains **gainCalibrationTree/tree** **anEff/traj** and are not containing variables which can calculate LA.
- So I moved to create mine one. I have modified the ntuple-cff.py as per interest of LA calculation.

New ntuple

Both clustervariance and cluster width are not giving expected plot.
Work is under process....!!



Cluster Variance

$\Delta x = z \tan\theta_t + \delta x$ and $x = \frac{1}{t}\int_{-t}^{0} \Delta x dz + x_{track}$.
Clusterwidth=$x_{max} - x_{min}$;
Cluster variance is given by,

$$\sigma^2 = \frac{\sum_{strips=i}^{i+1} x^2 q_i}{\sum_{strips} q_i} - \left(\frac{\sum_{strips=i}^{i+1} x q_i}{\sum_{strips} q_i}\right)^2$$

$\tan^{-1}(-0.1) = -5.71^0$ which matches well with the expected value for tracker inner barrel.