Alma Mater Studiorum - Università di Bologna

Glb Analysis update

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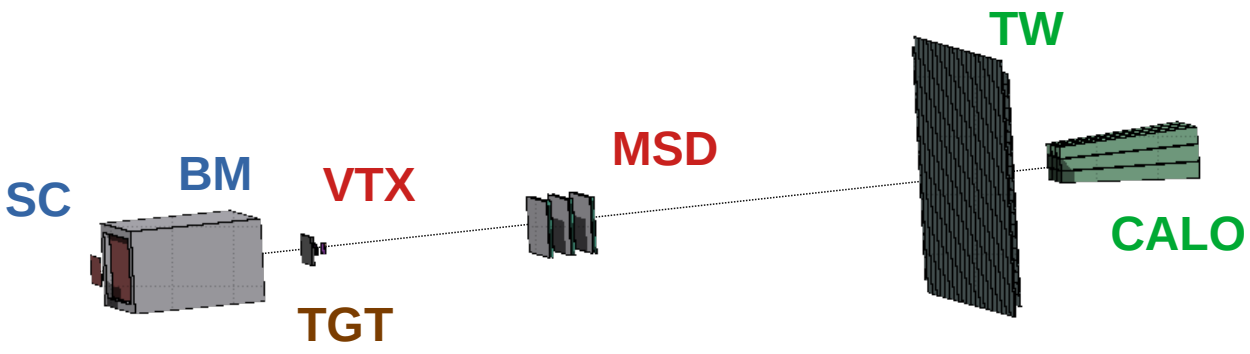
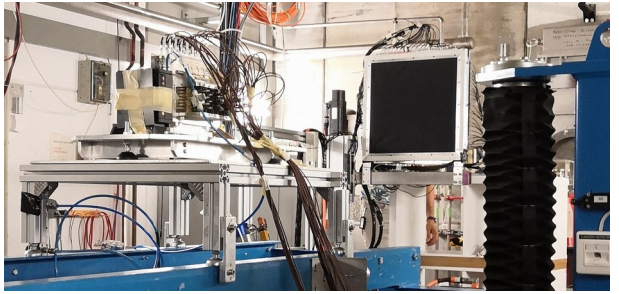
GSI 2021 Analysis

- Data-taking at GSI (Darmstadt, Germany) in 2021
- **^{16}O 400 MeV/u** on 5 mm **C target**
- Partial setup: no magnet, only one module of calorimeter





MC used Dataset:

- /gpfs_data/local/foot/Simulation/GSI2021_MC/16O_C_400_**1**_shoereg.root

VTX pull

vtx Clusterization

- cluster position from center of gravity of the pixels

$$x = \frac{\sum f_n x_n}{\sum f_n} \quad y = \frac{\sum f_n y_n}{\sum f_n}$$

- cluster position resolution as follows:

$$\sigma_{\mu'} = \frac{\sigma_x}{\sqrt{2n}}$$

where $\sigma_x = \sqrt{\frac{\sum f_n (x_n - x)^2)}{\sum f_n}}$

- linear fit estrapolation at z of each plane

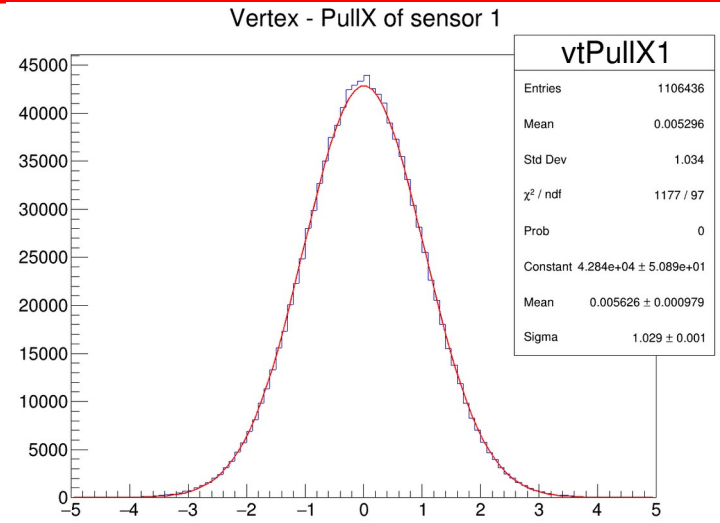
$$x = mz + q$$

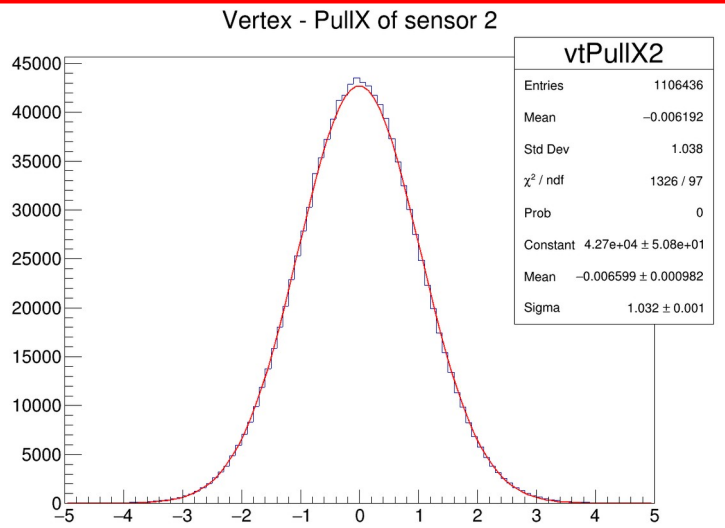
- resolution given by error propagation

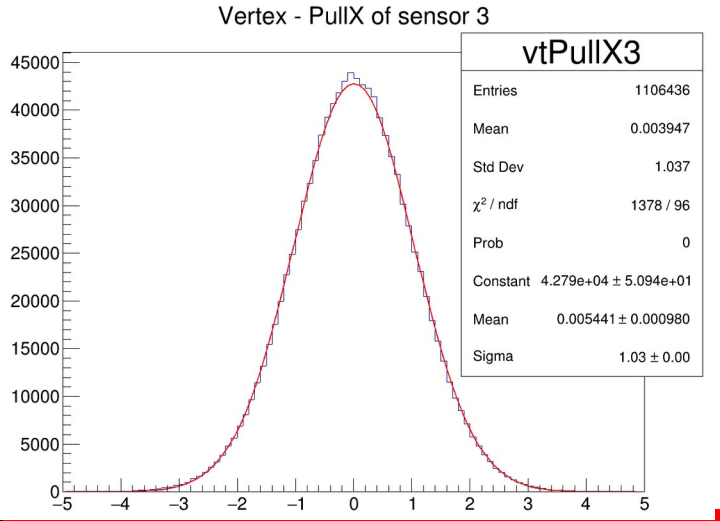
$$\sigma_x = \sqrt{(\frac{dx}{dm}\sigma_m)^2 + \frac{dx}{dq}\sigma_q)^2 + 2\frac{dx}{dm}\frac{dx}{dq}cov(\sigma_m, \sigma_q)}$$

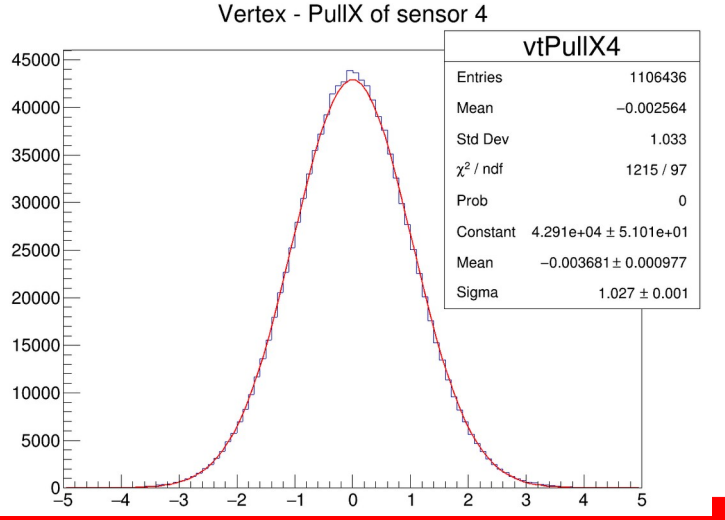
VTX Pull – X coordinate

MC data



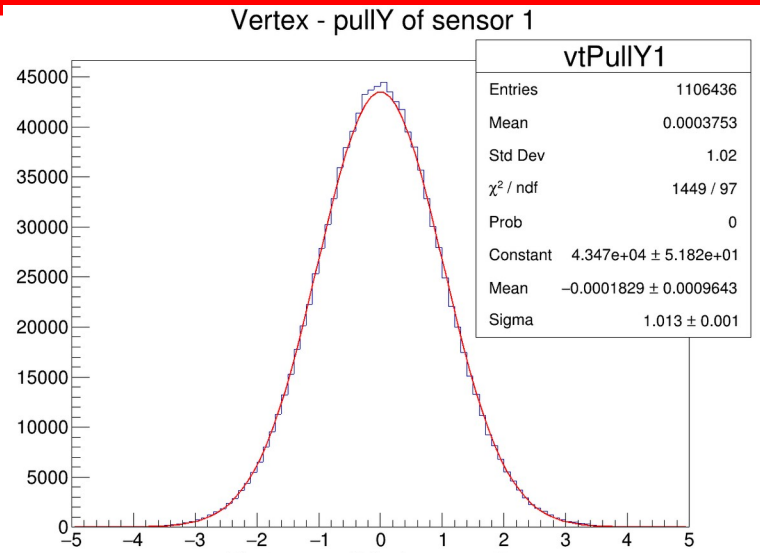


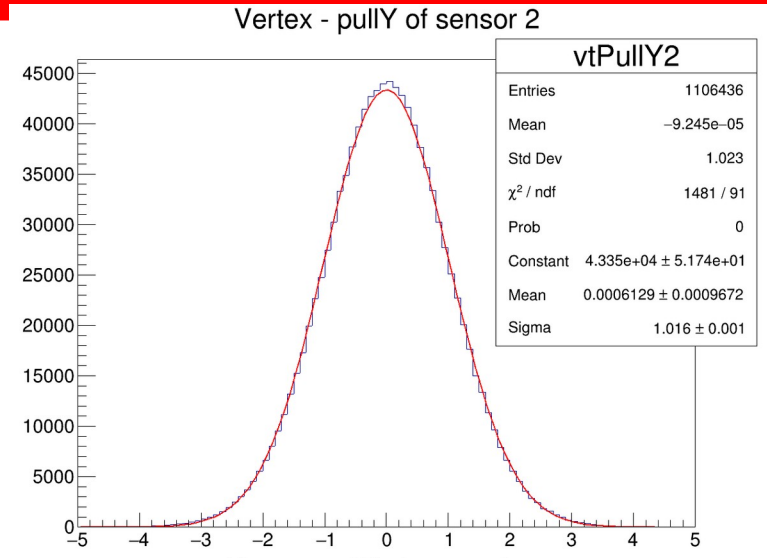


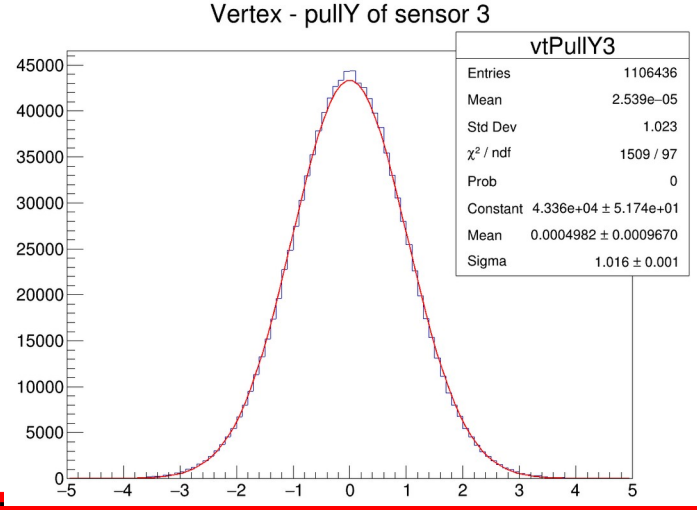


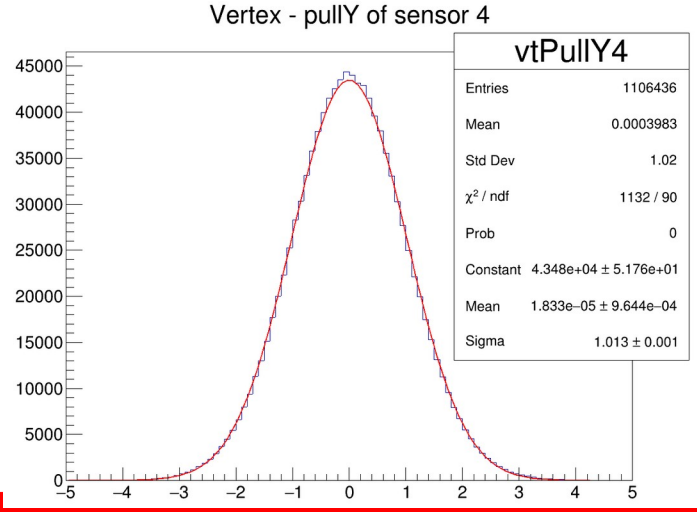
VTX Pull – Y coordinate

MC data



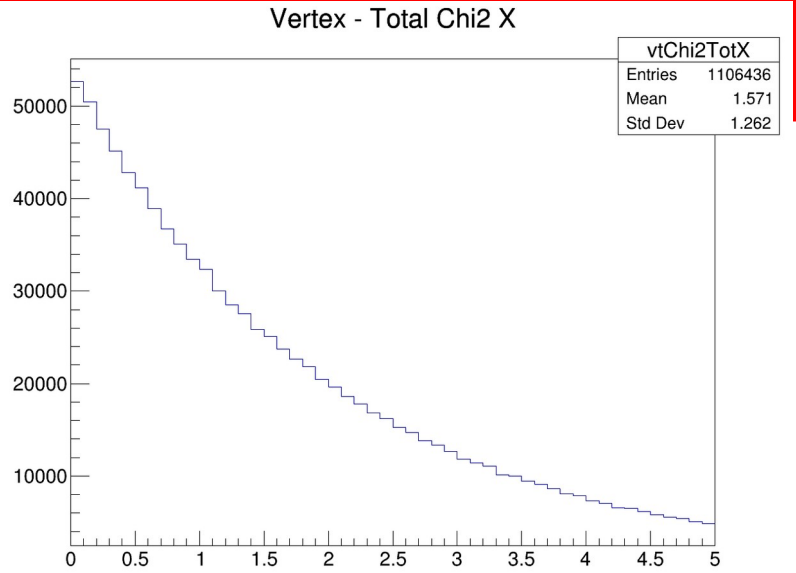


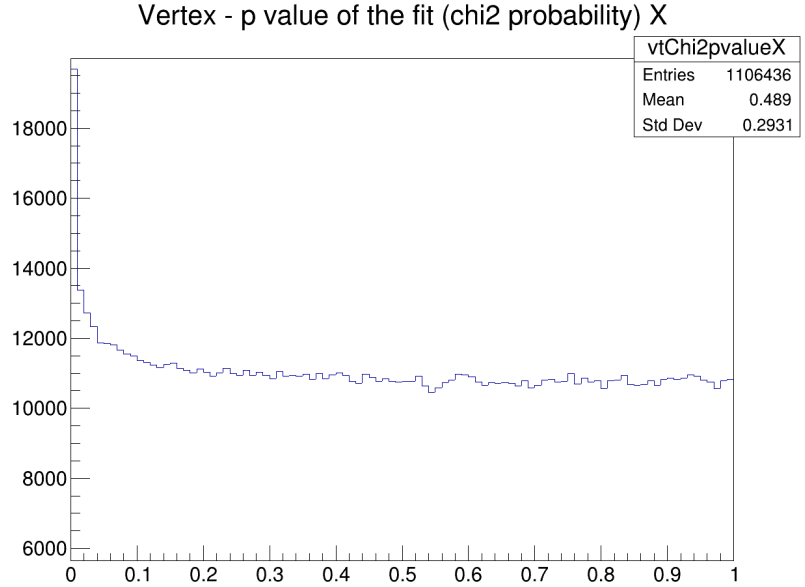


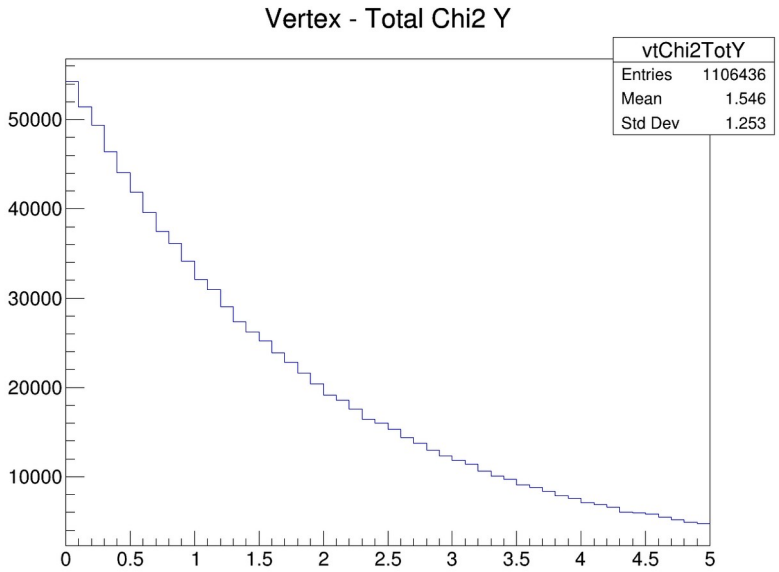


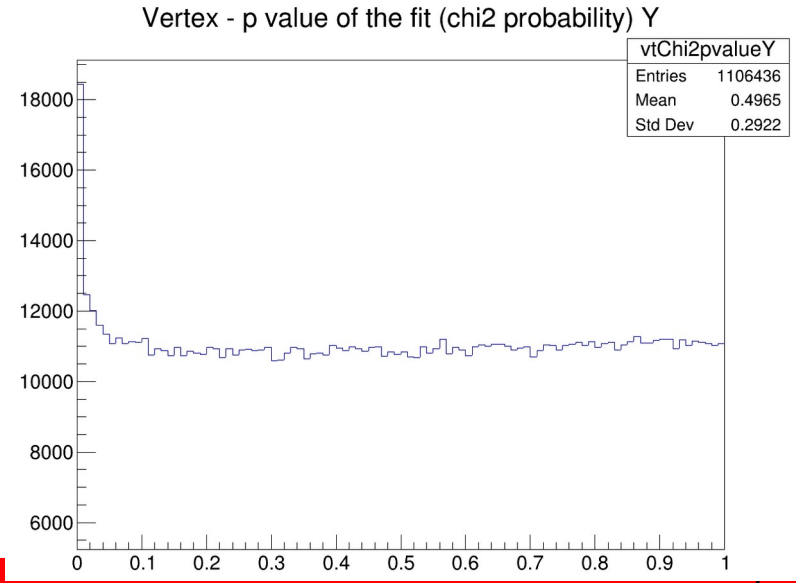
Chi2

MC data


Vertex - Total Chi2 X
vtChi2TotX
Entries 1106436
Mean 1.571
Std Dev 1.262


Vertex - p value of the fit (chi2 probability) X
vtChi2pvalueX
Entries 1106436
Mean 0.489
Std Dev 0.2931

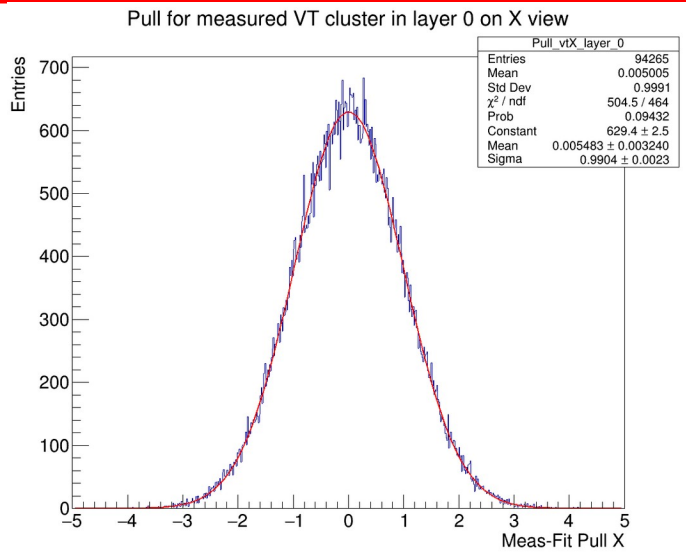

Vertex - Total Chi2 Y
vtChi2TotY
Entries 1106436
Mean 1.546
Std Dev 1.253

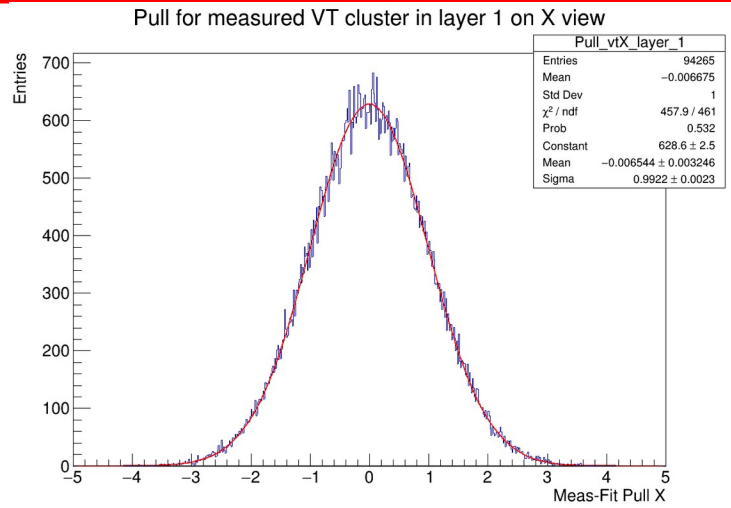

Vertex - p value of the fit (chi2 probability) Y
vtChi2pvalueY
Entries 1106436
Mean 0.4965
Std Dev 0.2922

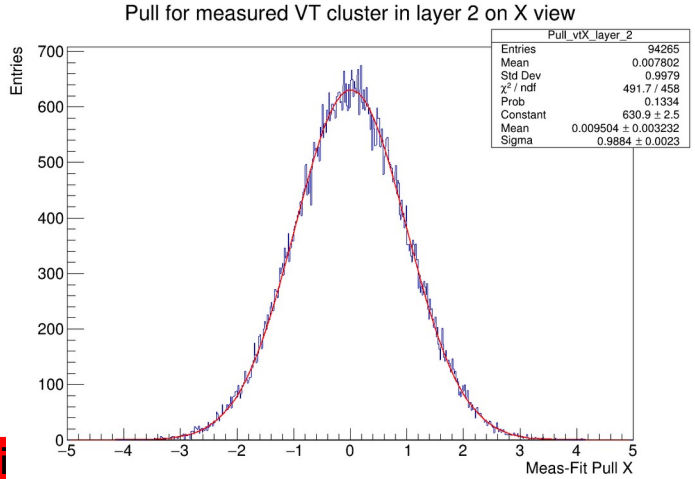
Glb Tracking Pull

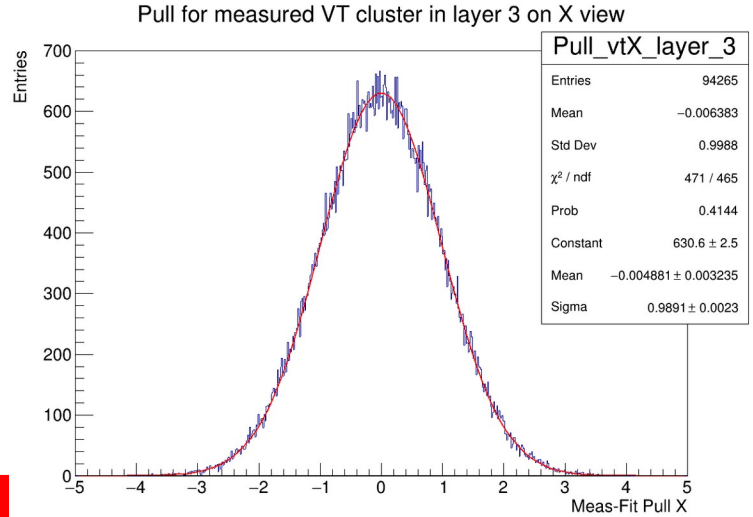
Pull – X coordinate

MC data



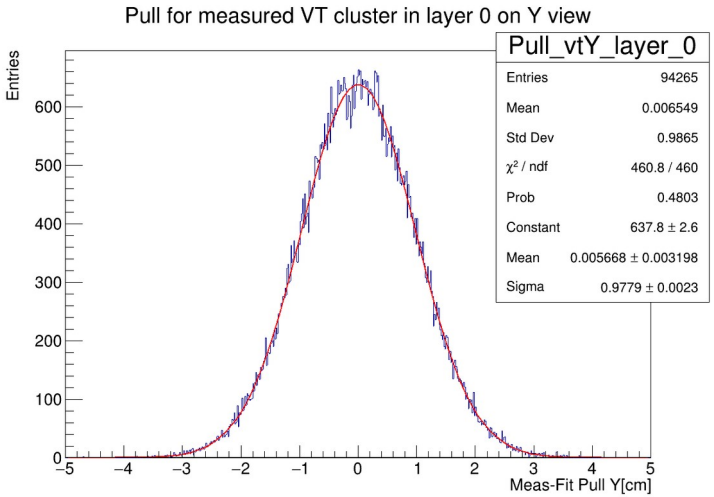


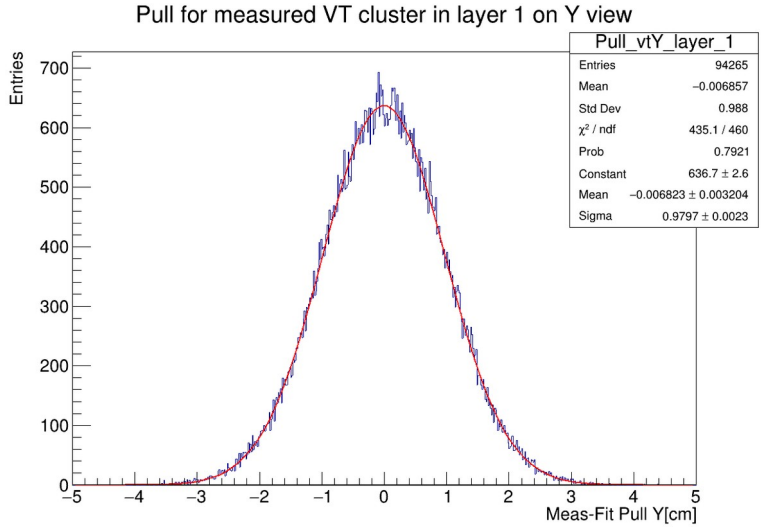


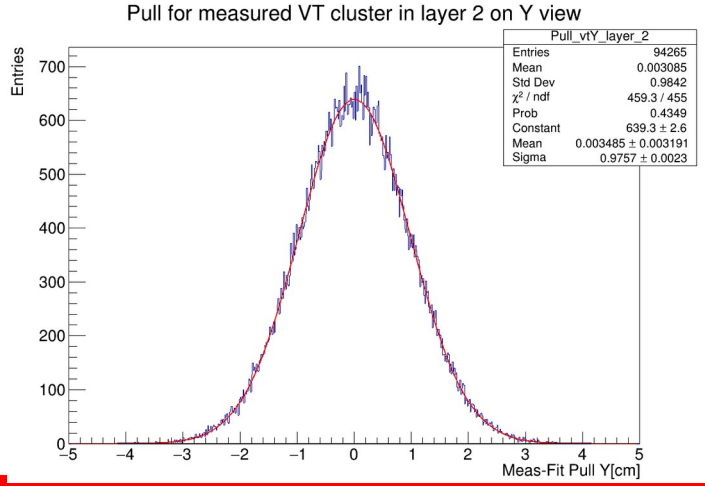


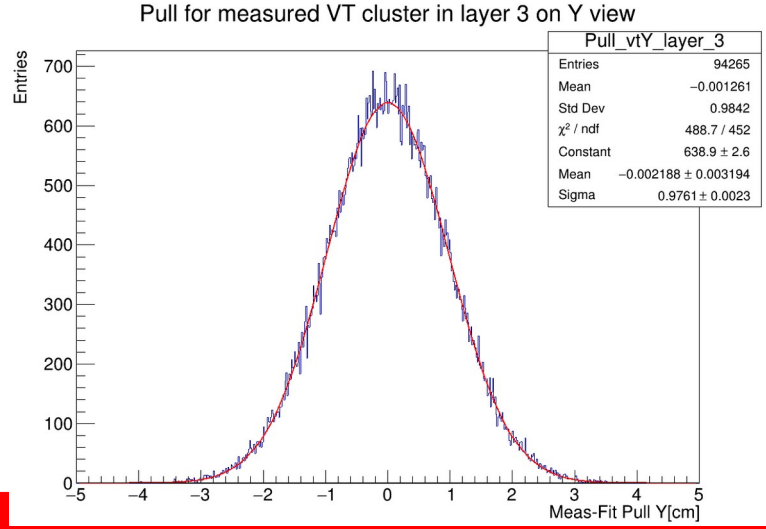
Pull – Y coordinate

MC data



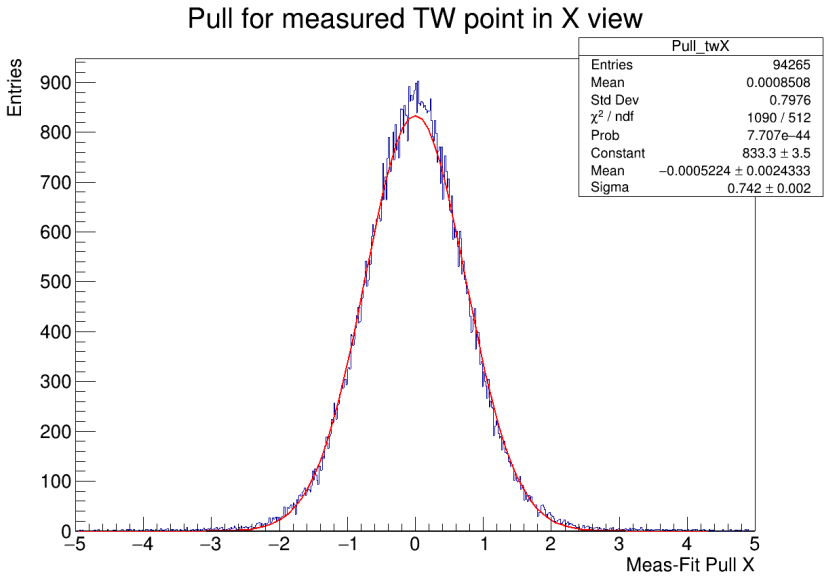


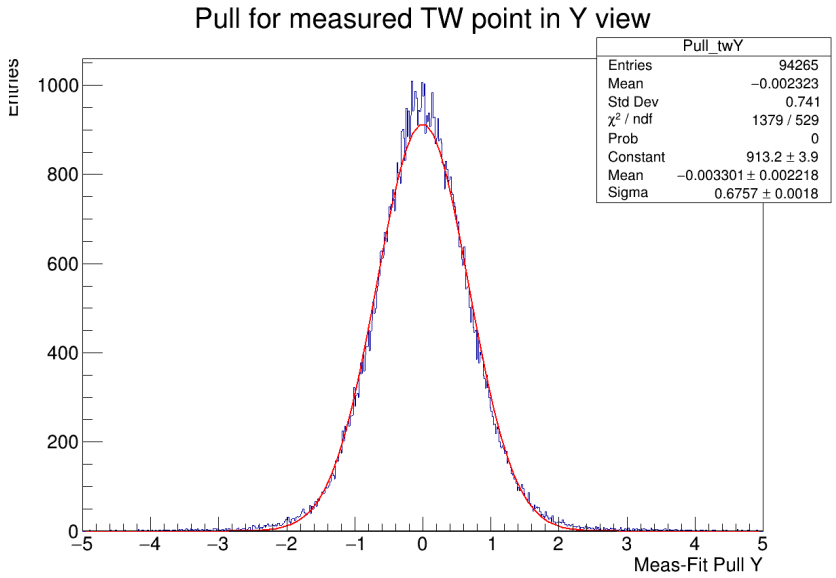




Pull TW point

MC data





efficiency

N_selected: global tracks before the fitting
N_reference: particles generated in the
geometrical acceptance of the FOOT geometry

$$\epsilon = \frac{N_{selected}}{N_{reference}}$$