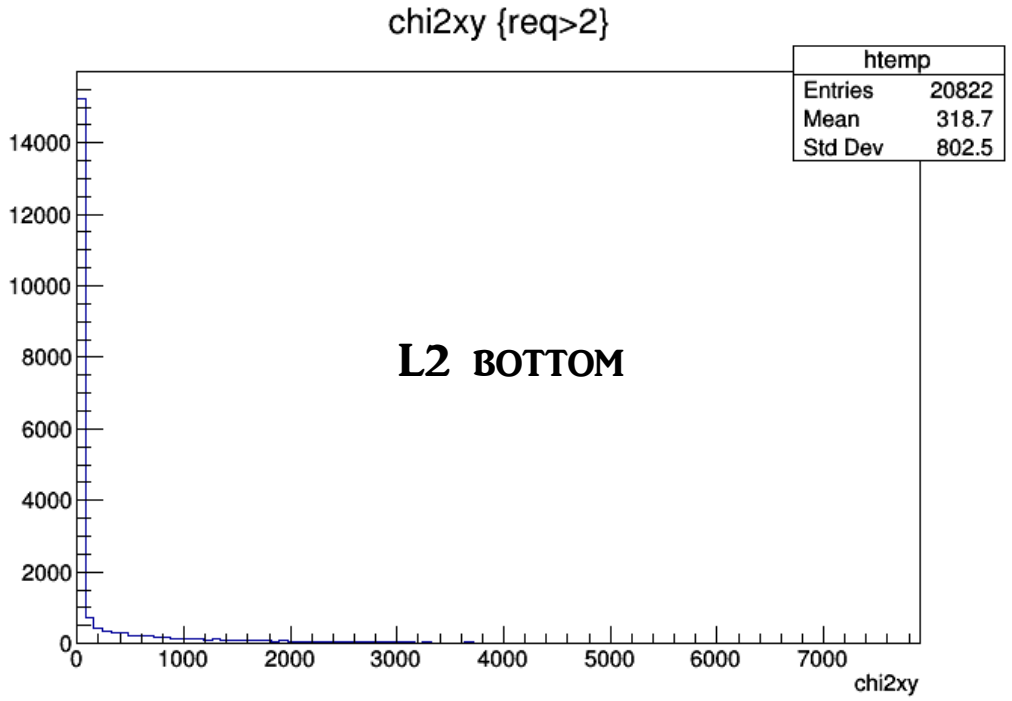
Run 10
Analysis in CgemBoss

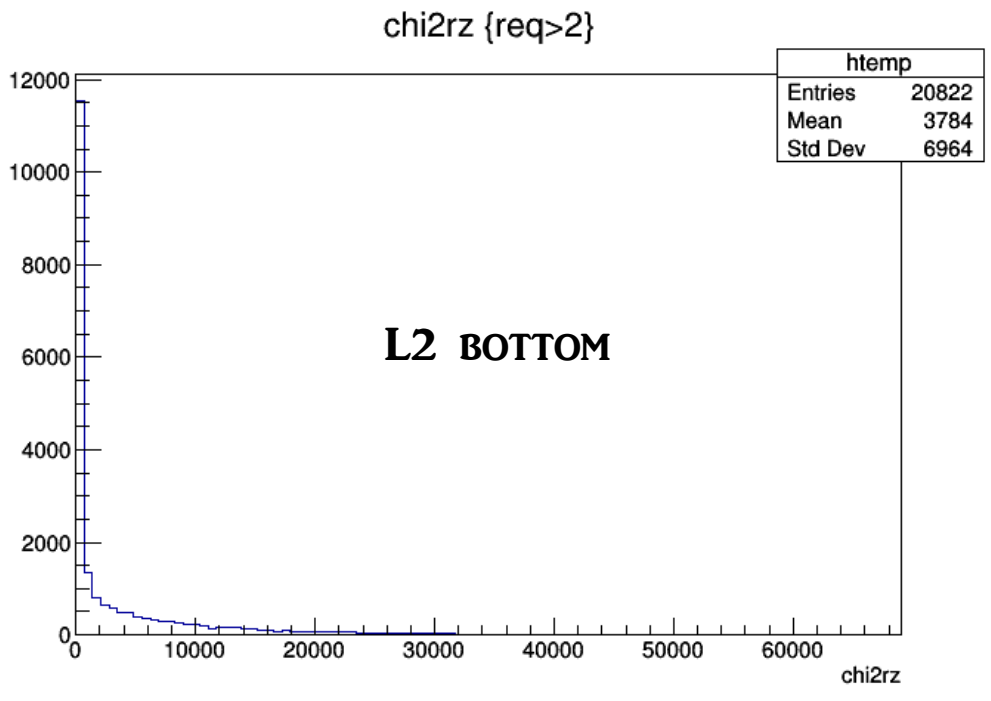
2020-01-21

FIT AND CHI2 DISTRIBUTIONS

- separation of L1 top, L1 bottom, L2 top, L2 bottm
- analytical fit in xy and Rz (with signed R)
- evaluation of respective chi2 (xy, rz)
- all points with same, large error = 1mm
  → cut on chi2 is relevant, but not concerning its "*value*"

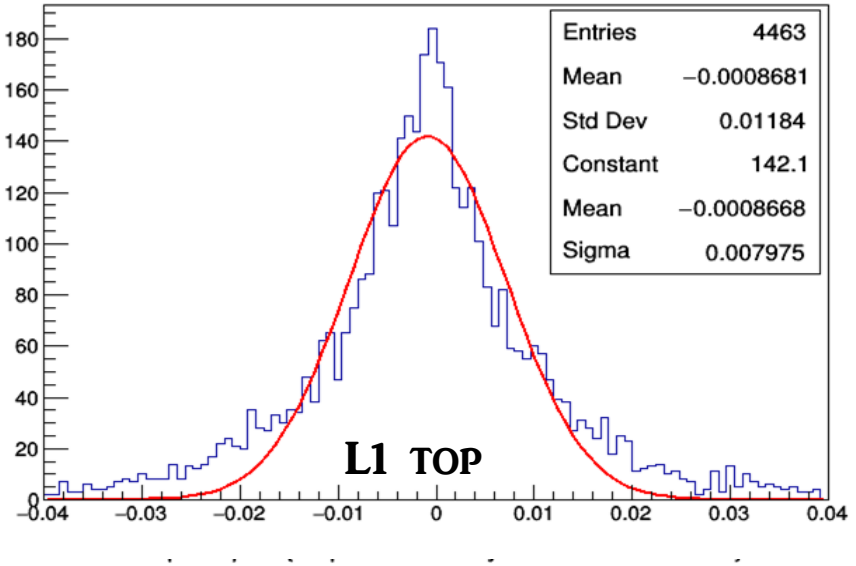
- three planes are the trackers, the fourth is the test chameber
- cut **always applied** on test chamber Q > 2 fC

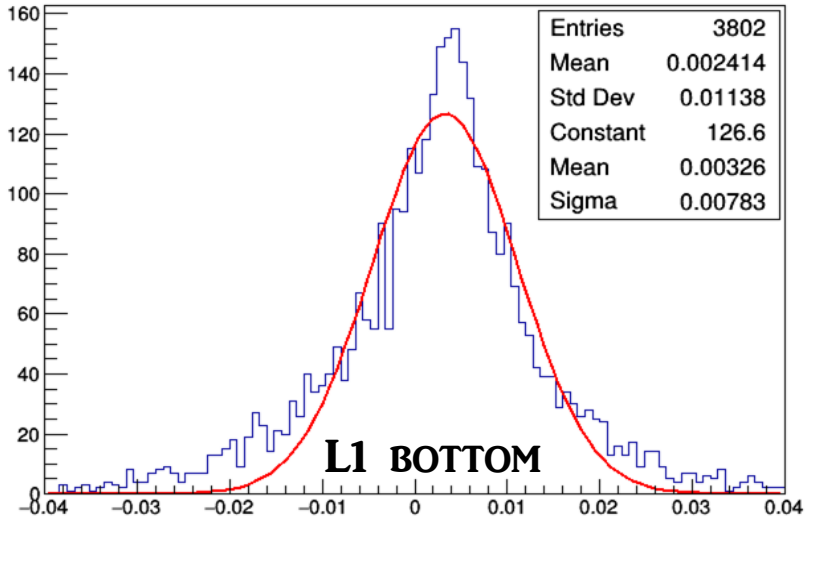


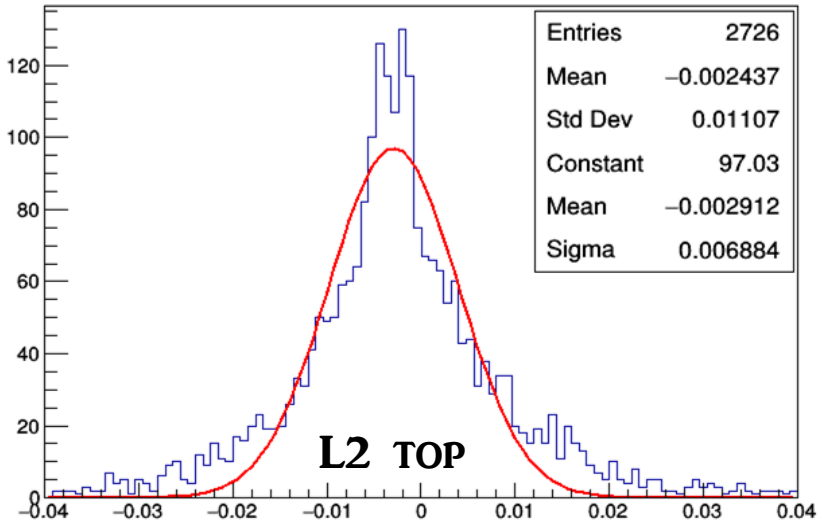


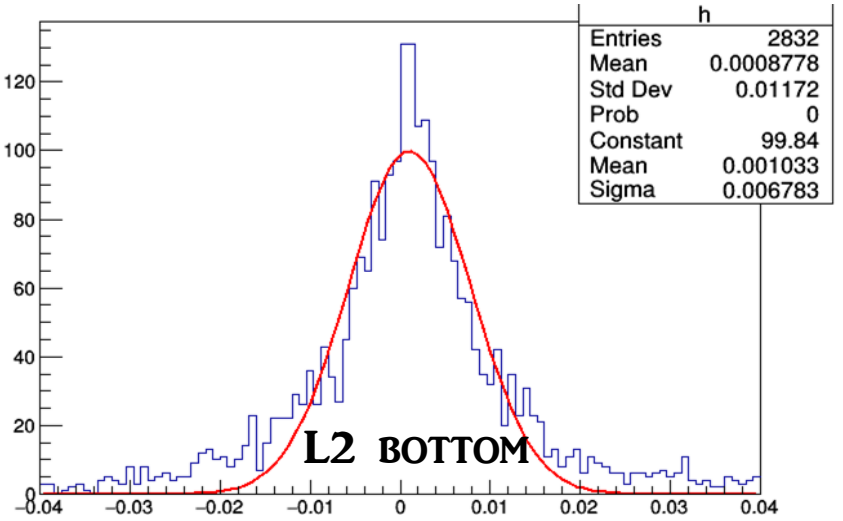
CHECK ALIGNMENT IN PHI

- usual procedure for alignment in ϕ → shift = 0.01 rad (0.5°)
- cut on test chamber Q > 2 fC
- $\chi^2_{xy} < 0.2$; $\chi^2_{rz} < 20$ (for L2) and $\chi^2_{rz} < 2$ (for L1)



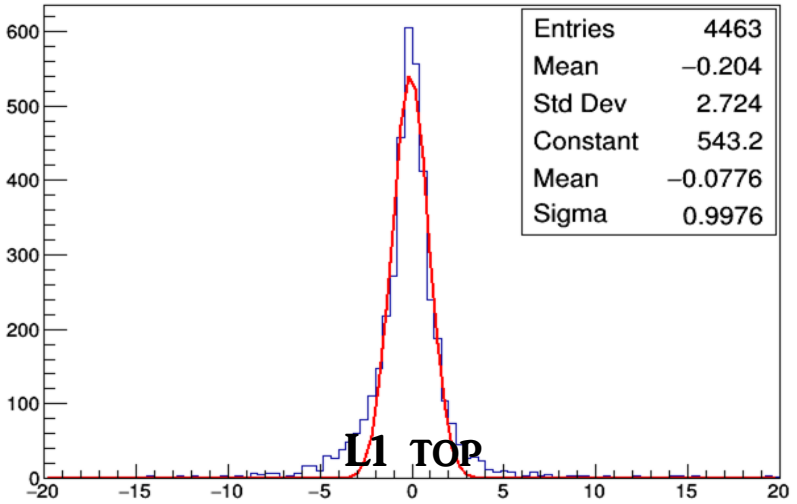


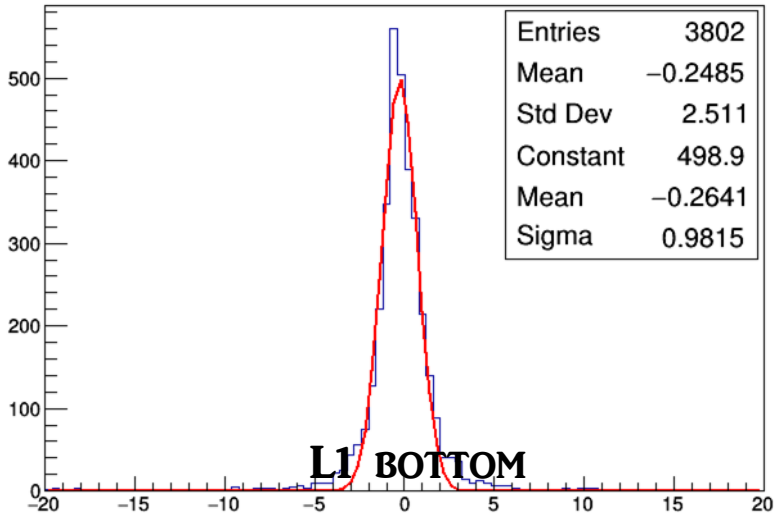


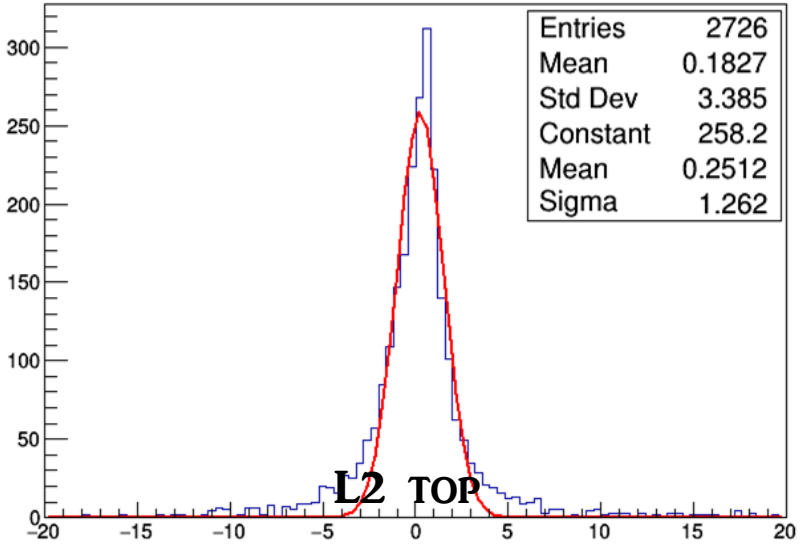


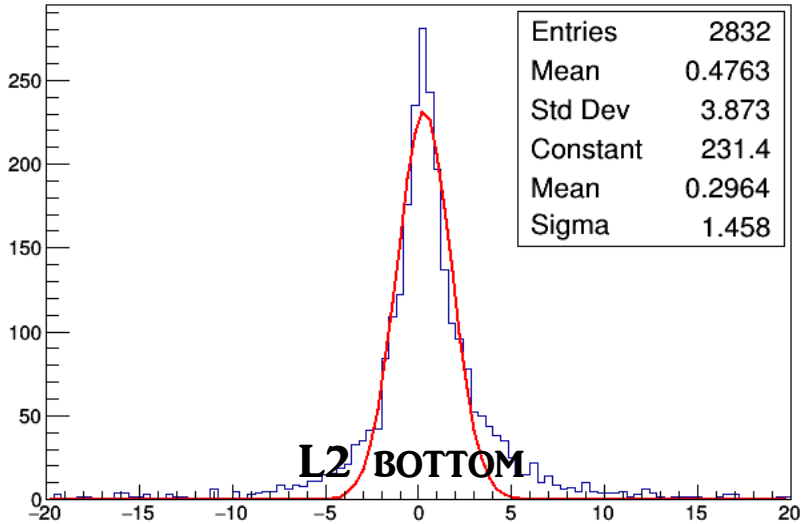
CHECK ALIGNMENT IN Z

- usual procedure for alignment in z → shift = -1.85 mm
- cut on test chamber Q > 2 fC
- $\chi^2_{xy} < 0.2$; $\chi^2_{rz} < 20$ (for L2) and $\chi^2_{rz} < 2$ (for L1)





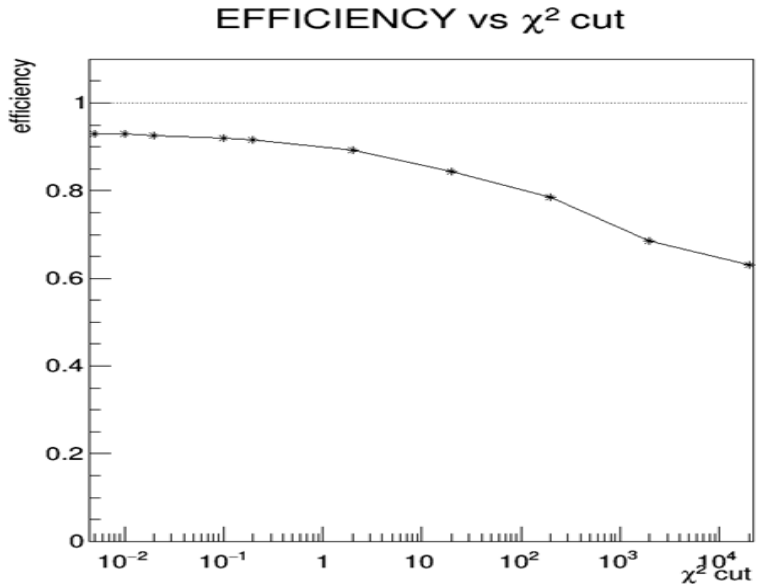


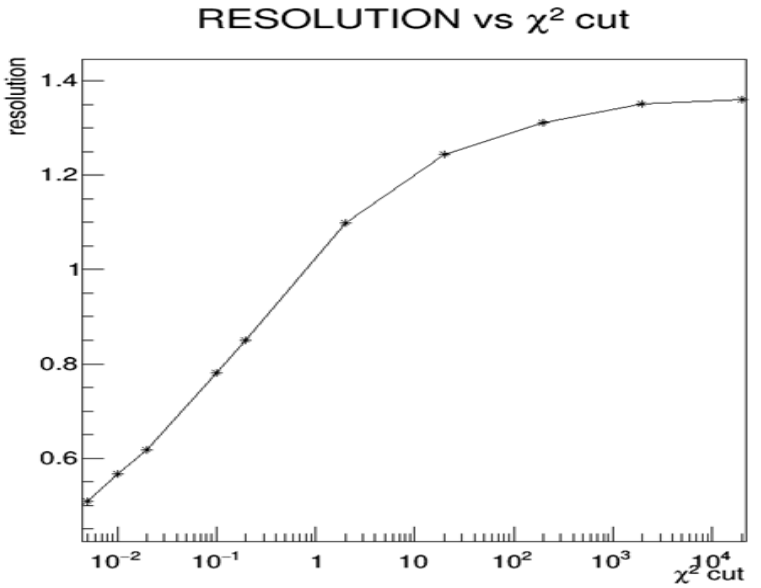


Scan in chi2 xy – L1

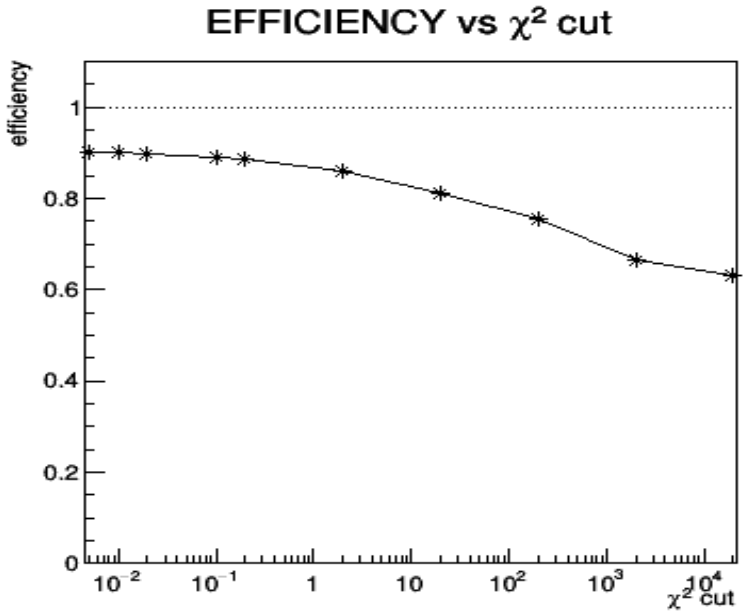
Only cut: test chamber Q > 2 fC

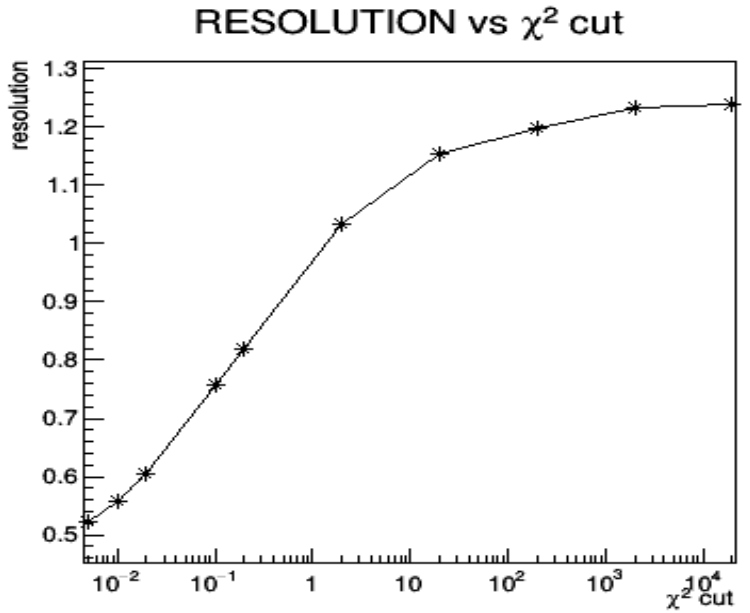
TOP





BOTTOM

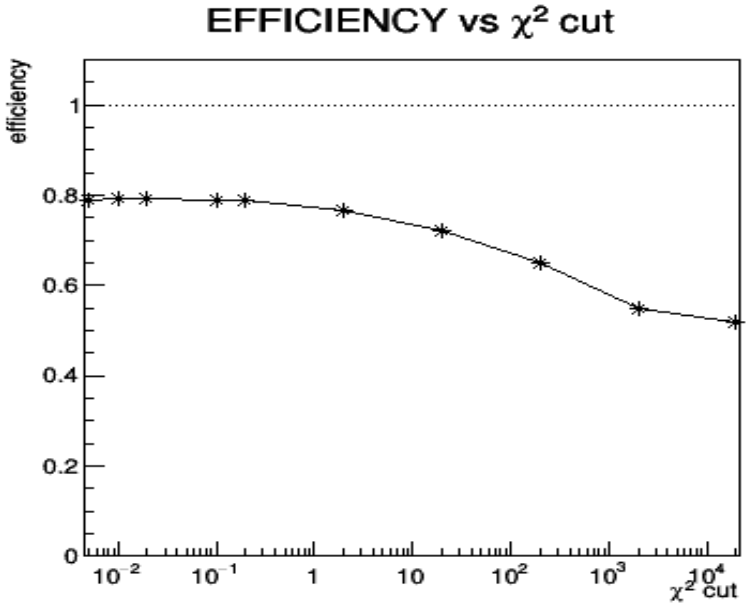


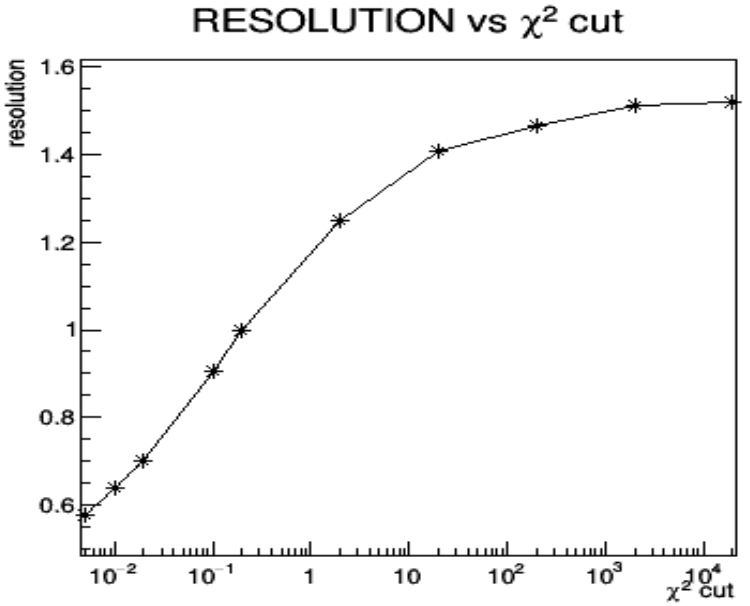


Scan in chi2 xy – L2

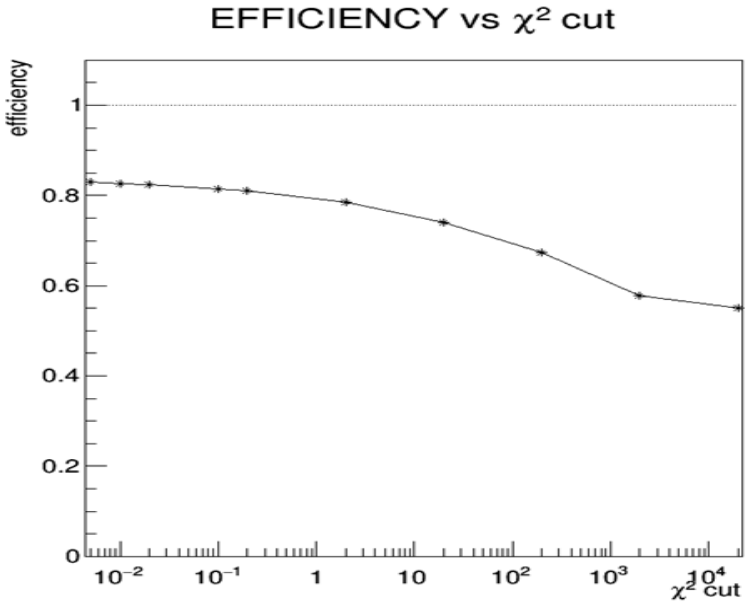
Only cut: test chamber Q > 2 fC

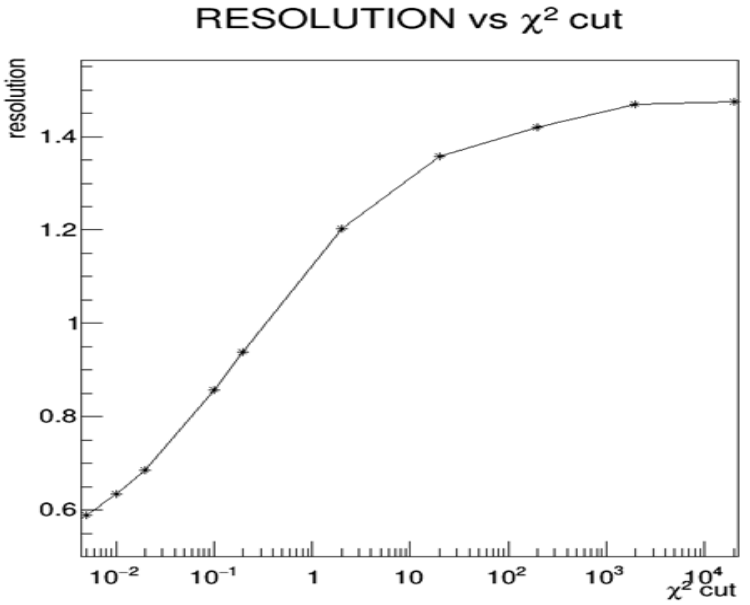
TOP





BOTTOM





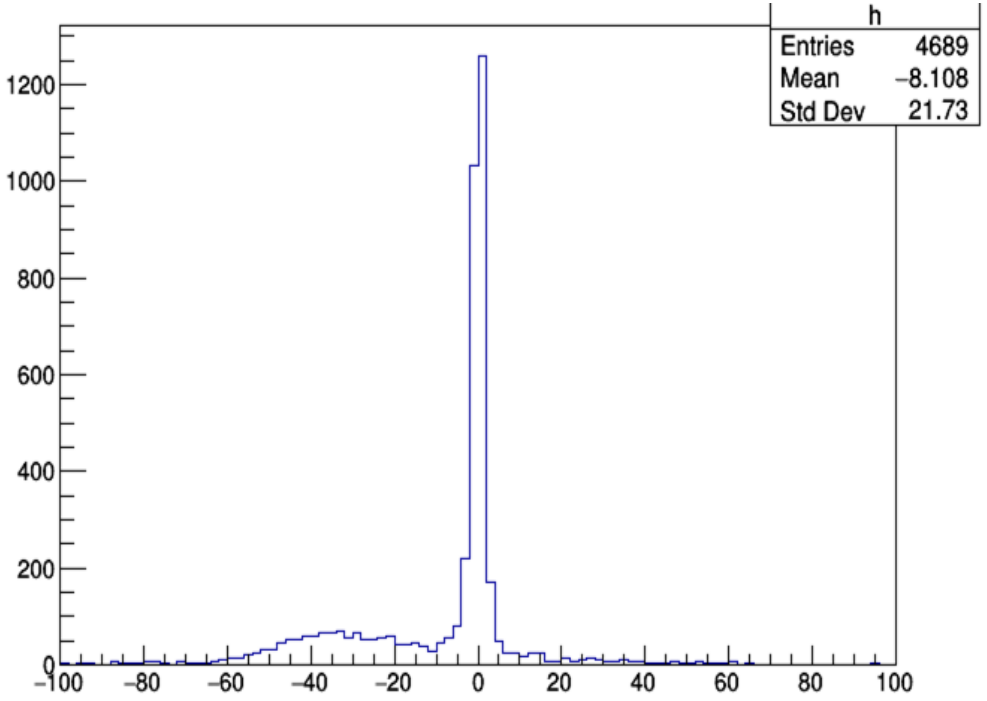
Scan in chi2 rz – L1

Applied cuts:

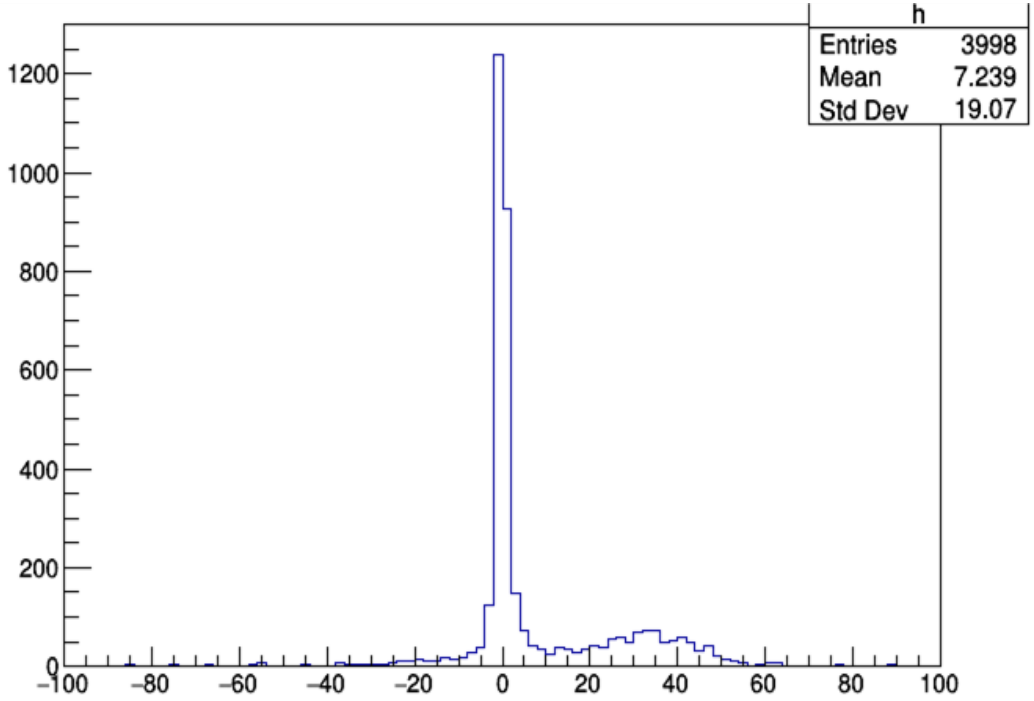
- test chamber Q > 2 fC
- chi2 xy < 0.01

Without any cut in chi2 the residual on the test chamber has a tail

L1 bottom



L1 top

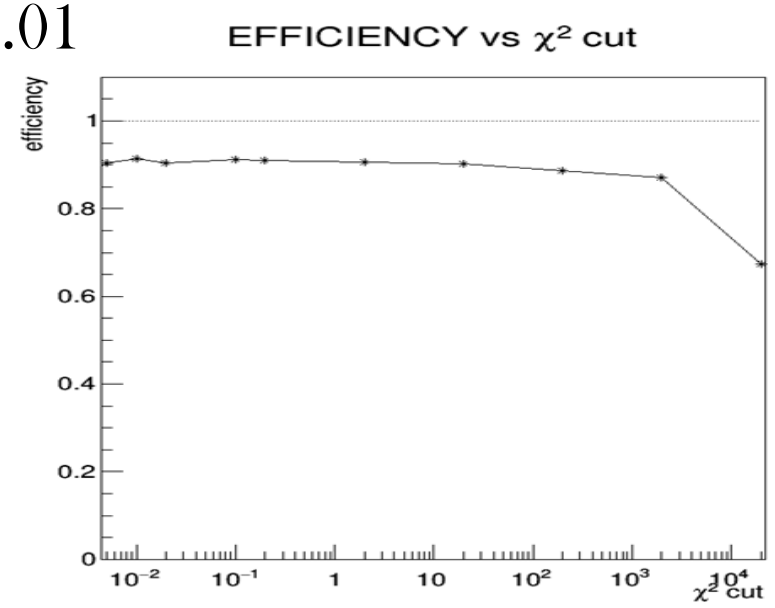


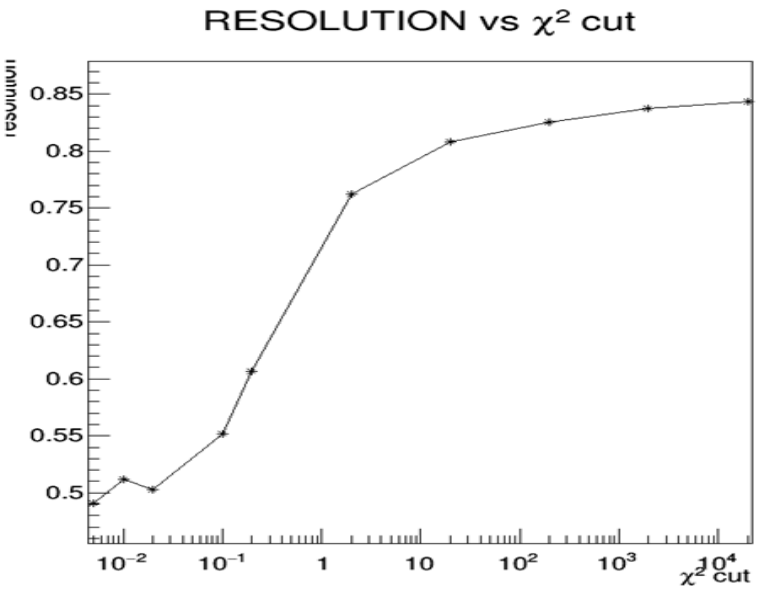
Scan in chi2 rz – L1

Applied cuts:

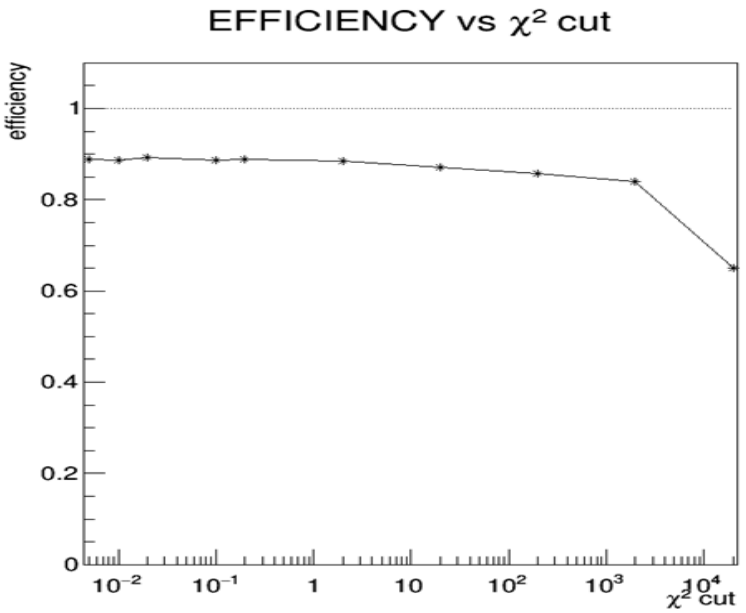
- test chamber Q > 2 fC
- chi2 xy < 0.01

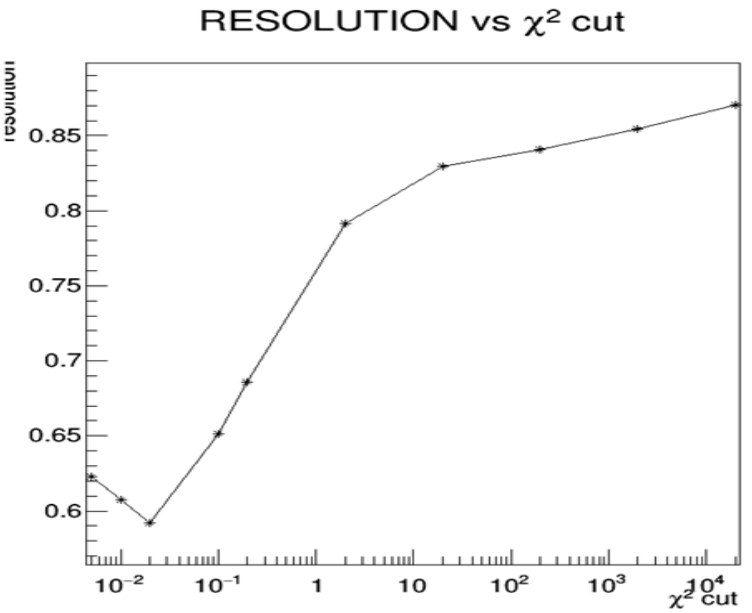
TOP





BOTTOM

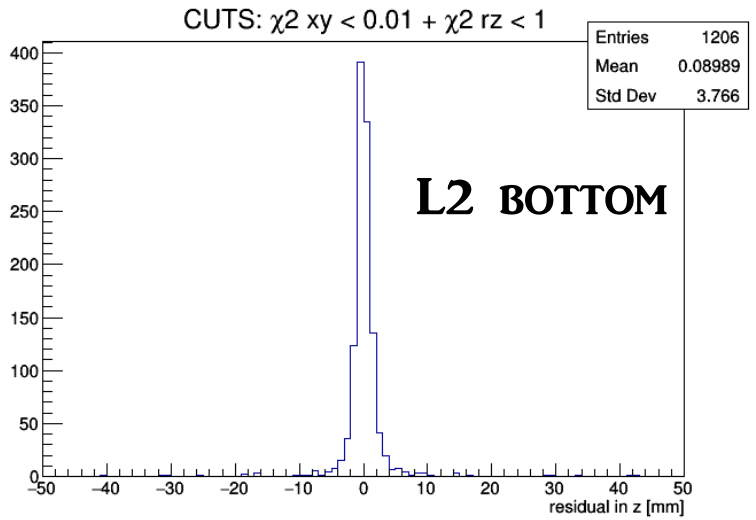




Scan in chi2 rz – L2

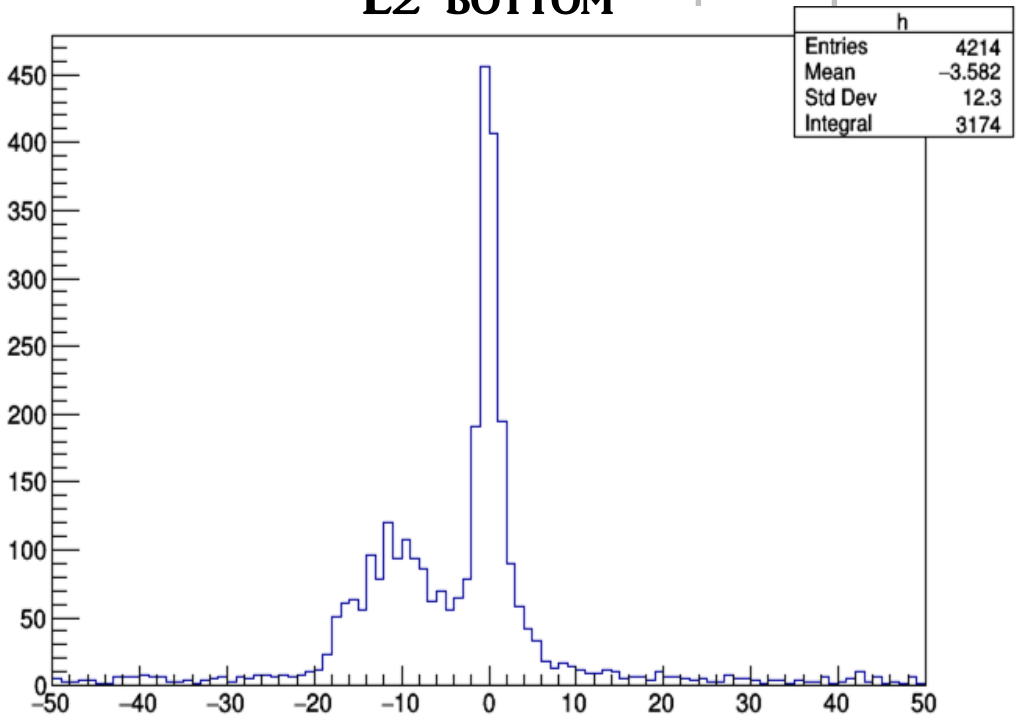
Applied cuts:

- test chamber Q > 2 fC
- chi2 xy < 0.01

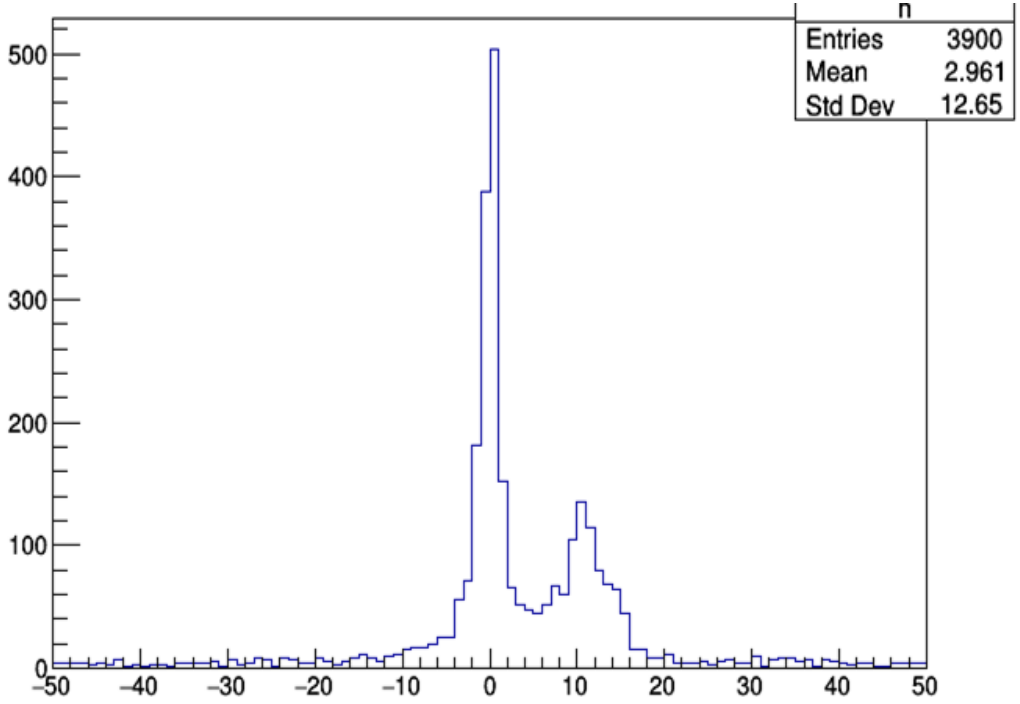


Without any cut in chi2 the residual on the test chamber has a bump

L2 BOTTOM



L2 TOP

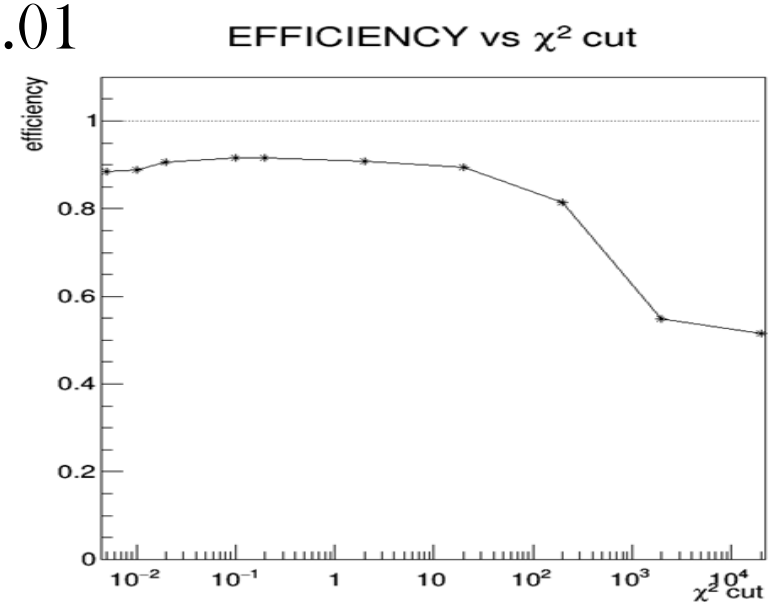


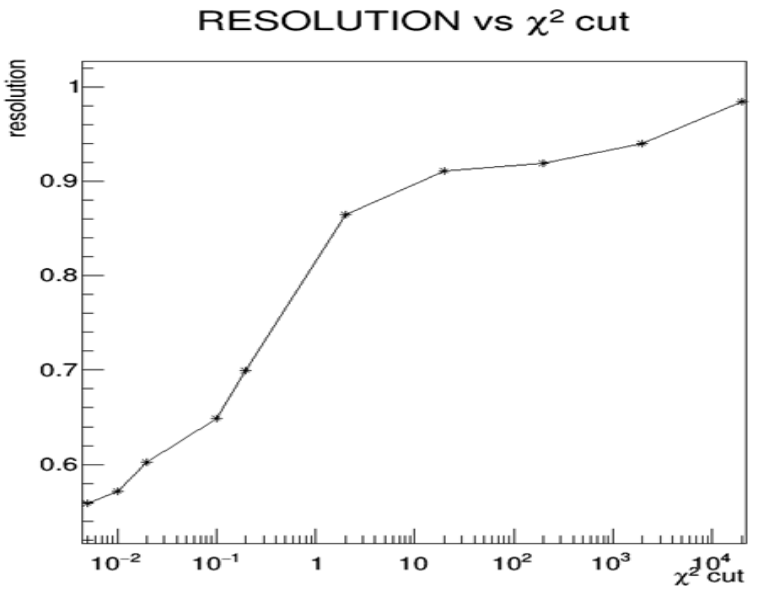
Scan in chi2 rz – L2

Applied cuts:

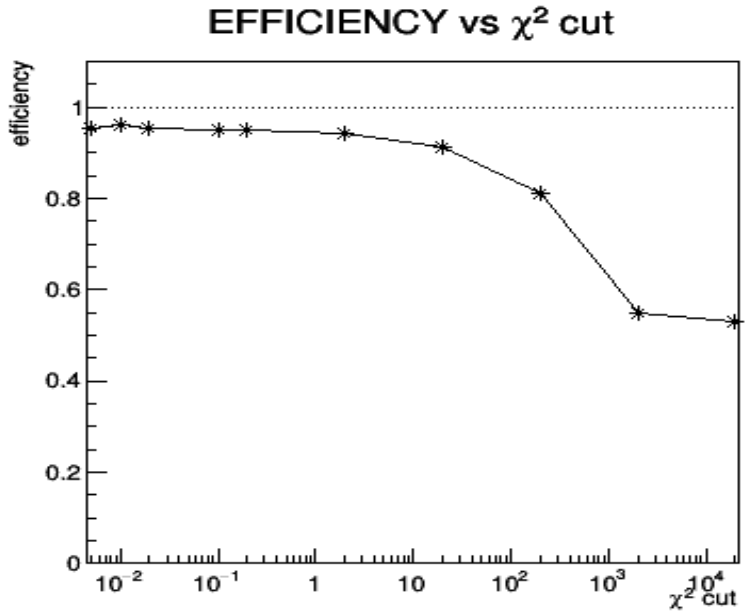
- test chamber Q > 2 fC
- chi2 xy < 0.01

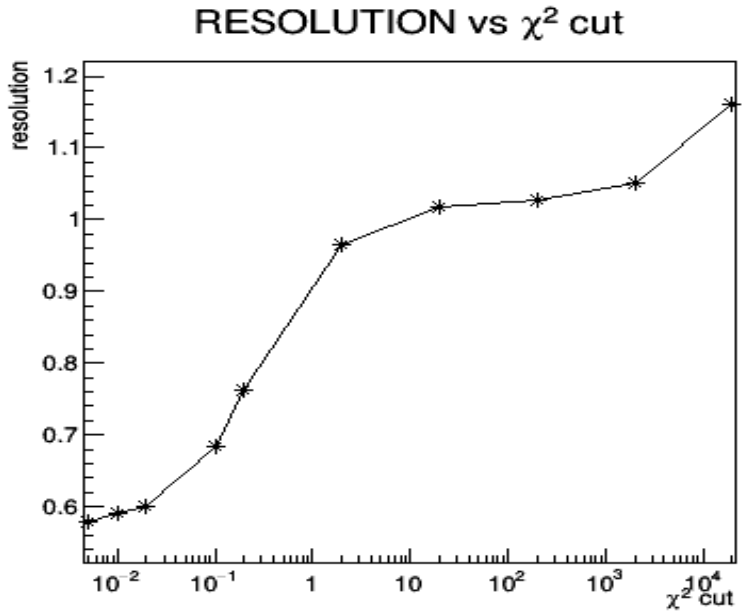
TOP





BOTTOM



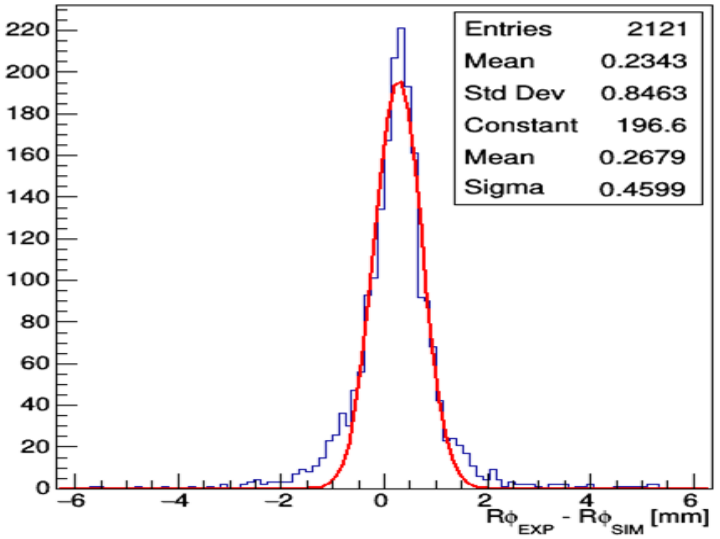


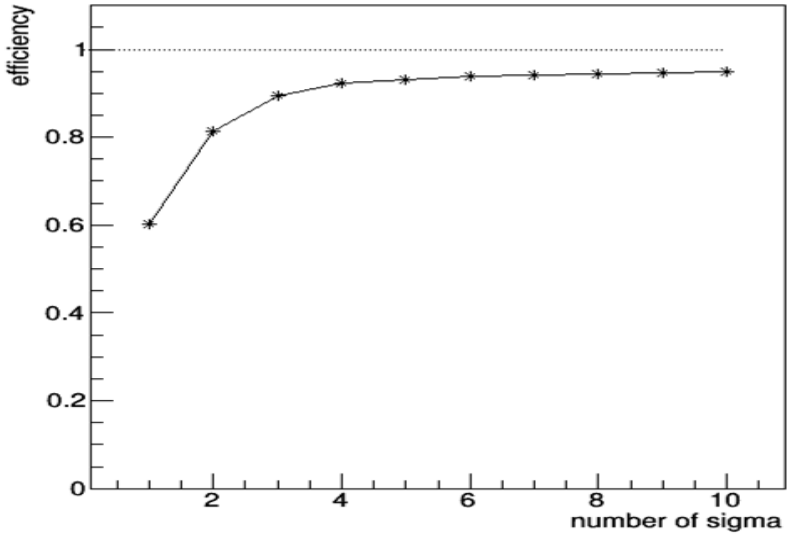
EFFICIENCY VS NUMBER OF SIGMA – L1

Applied cuts:

- test chamber Q > 2 fC
- $\chi^2_{xy} < 0.01$
- $\chi^2_{rz} < 1$

TOP





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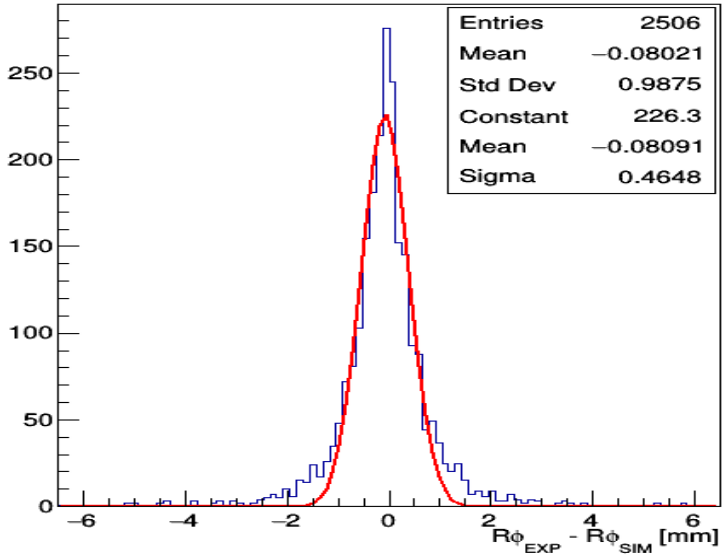
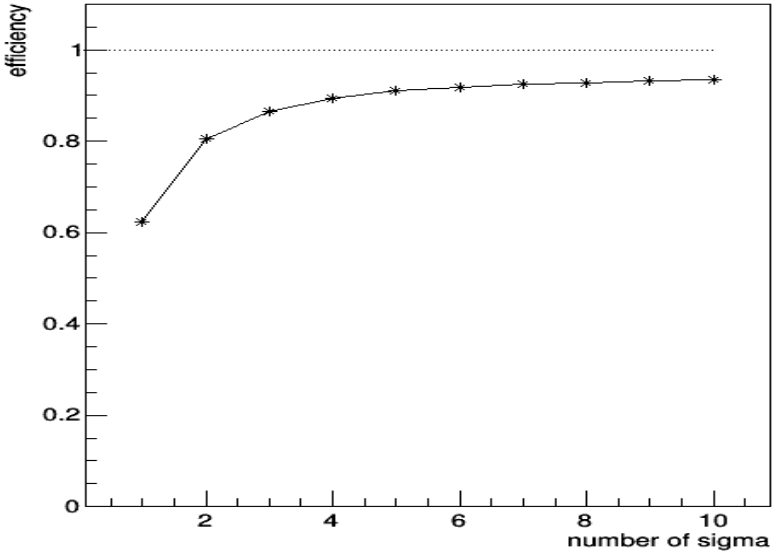


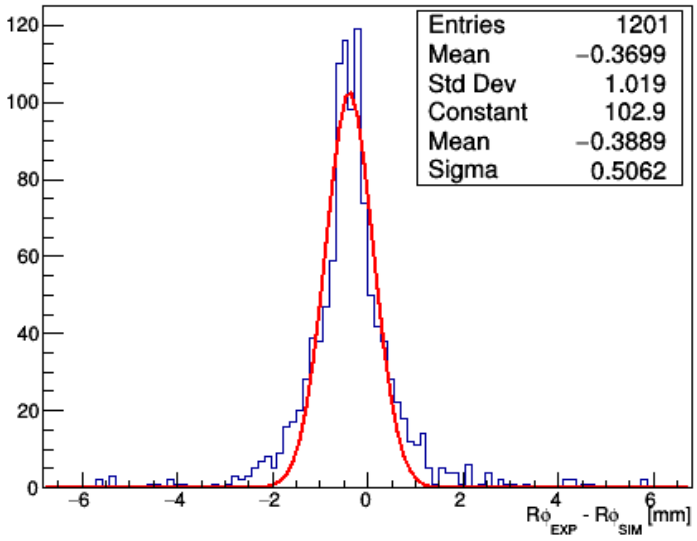


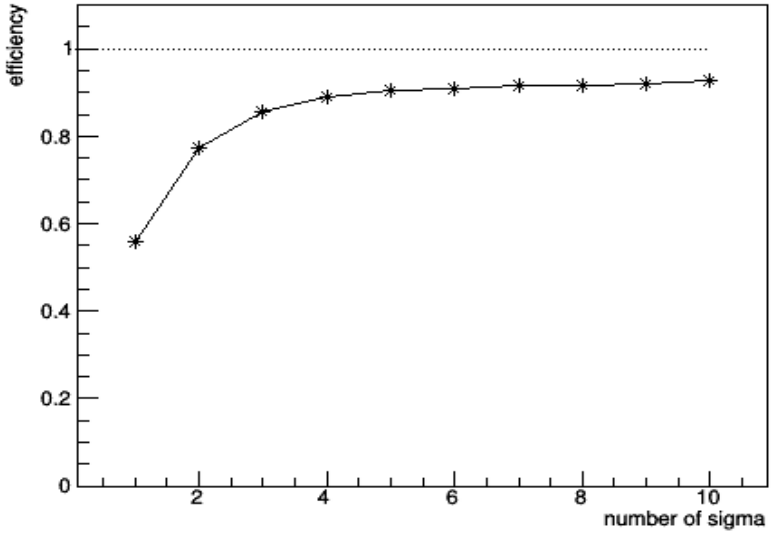
EFFICIENCY VS NUMBER OF SIGMA – L2

Applied cuts:

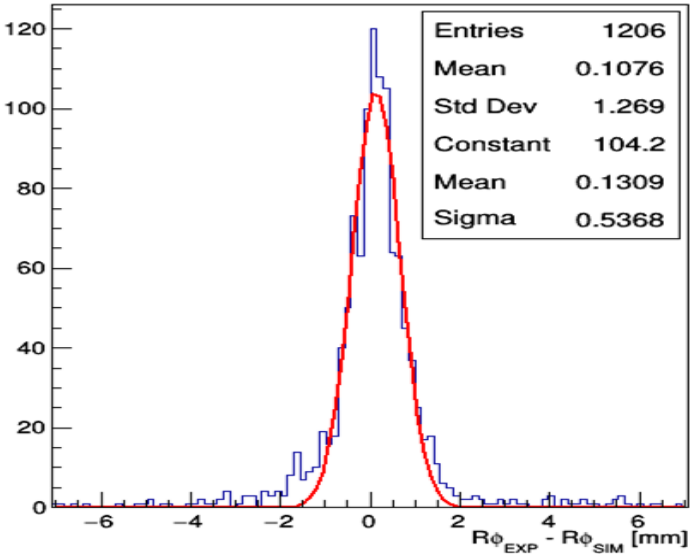
- test chamber Q > 2 fC
- $\chi^2_{xy} < 0.01$
- $\chi^2_{rz} < 1$

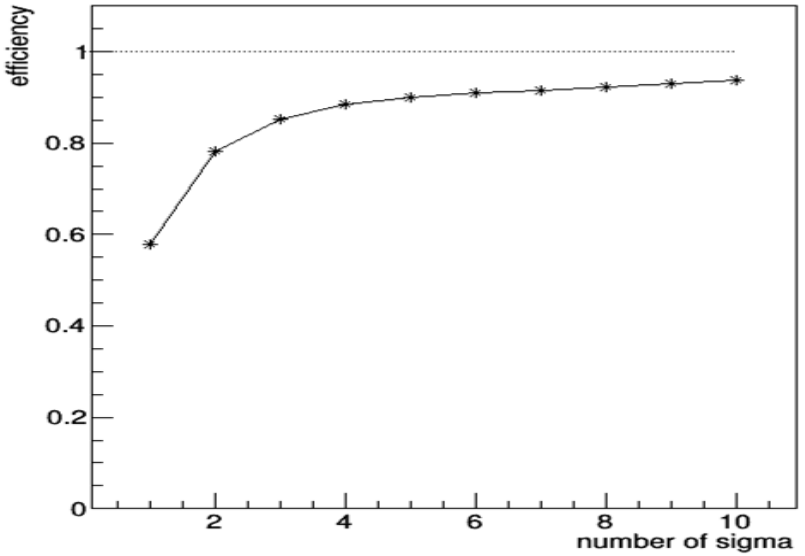
TOP





BOTTOM





PRELIMINARY RESULTS

- **without any cut** on the goodness of the fit, the residuals are around1mm (both xy and rz, both L1 and L2)
- **with cuts** to select good tracks we can appreciate better the resolution of the detector:
  - $\chi^2_{xy} < 0.01$
  - $\chi^2_{rz} < 1$

the sigma of the residual distributions lowers to 450-500 μm and the efficiency is around 90-95% within 5 sigma.

- **NOTE 1 -** the cut on chi2 corresponds to a cut in incident angle → with these cuts the incident angle is < 20° → better charge centroid reconstruction

- **NOTE 2** - now we are using the charge centroid *only* !