

# Quad test beam update: mean residuals

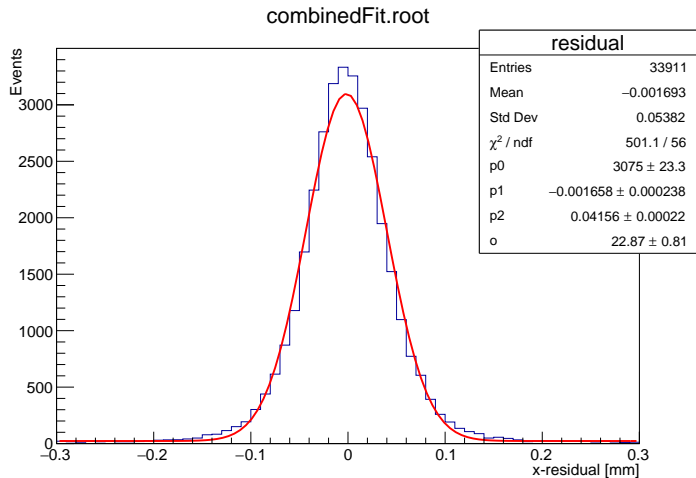
Kees Ligtenberg

Lepcol meeting

May 17, 2019

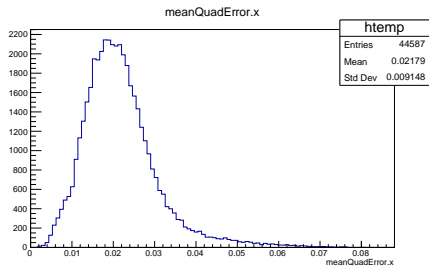


# Mean distance from quad to telescope track

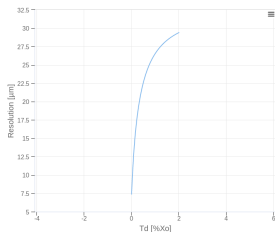


fitted with Gaussian + offset

# Error of mean quad position and telescope fit



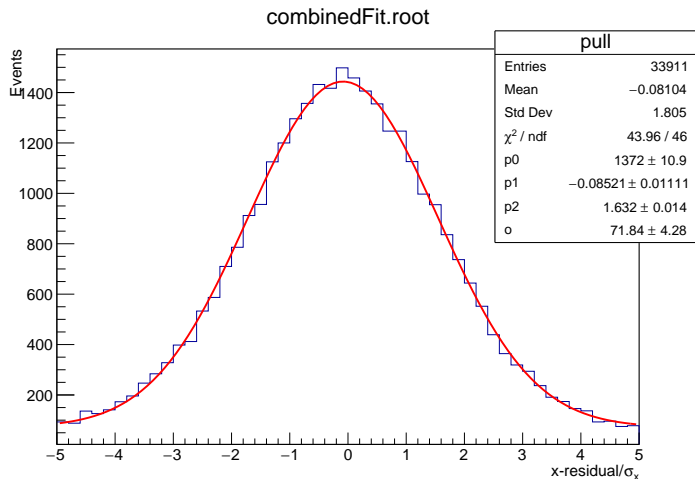
# Error on telescope track prediction



	X0	d	Thickness
Argon	117 m	~10 cm	0.09 %X0
Kapton	286 mm	2×50 µm	0.035 %X0
Air	304 m	360 mm	0.12 %X0
Telescope per plane (included in graph)			0.075 %X0

Track fit in analysis does not take multiple scattering into account, so the telescope error in the analysis is too small

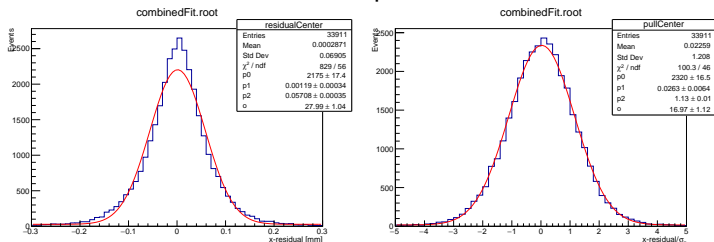
# Pull of distance from quad to telescope track



$\sigma_{\text{fit}} = 42 \mu\text{m}$  and pull is 1.6, so  $33 \mu\text{m}$  unaccounted for

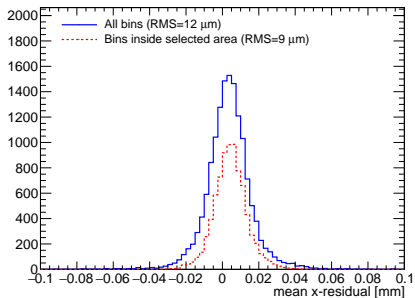
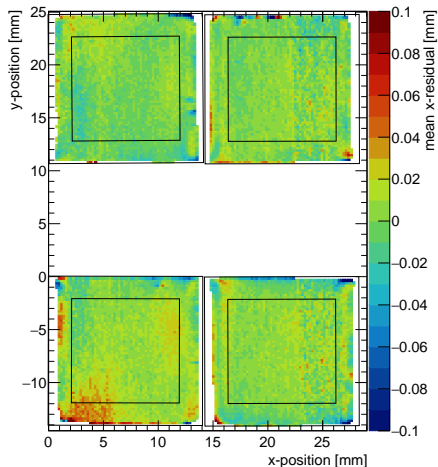
# Difference of two partial fits

Fit first three telescope plane together with the first two chips and the last two telescope planes together with the last two chips and calculate their difference in the center of the quad

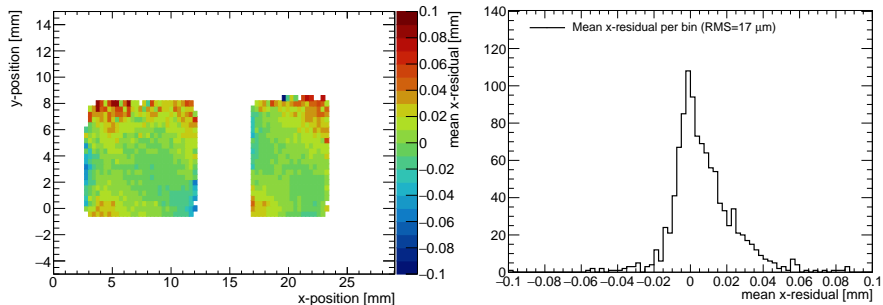


$\sigma_{\text{fit}} = 69 \mu\text{m}$  and pull is 1.13, so  $32 \mu\text{m}$  unaccounted for

# Deformations in the pixel plane



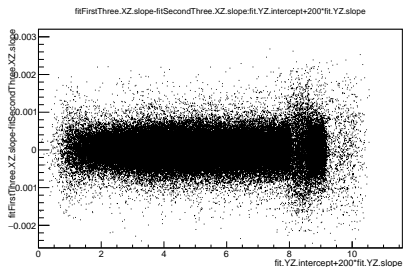
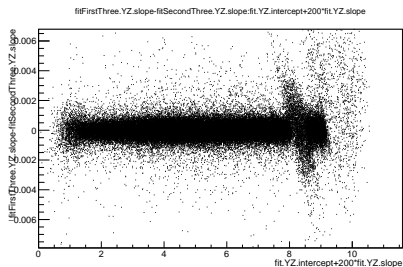
# x-deformations in the drift direction



After correction for bins with more than 500 entries



# Multiple scattering



No indication for scattering on e.g. field wires  
StdDev 0.4 mRad

# Quad resolution

The demonstrated resolution is  $42\ \mu\text{m}$

- $26\ \mu\text{m}$  from quad and statistical telescope error?
- $32\ \mu\text{m}$  from other contributions:
  - ▶  $9\ \mu\text{m}$  from deformations in pixel plane
  - ▶  $17\ \mu\text{m}$  from deformations in drift direction
  - ▶  $26\ \mu\text{m}$  from Telescope / other unknown contributions?



# x residual by ToT

