

Preliminary quad results update

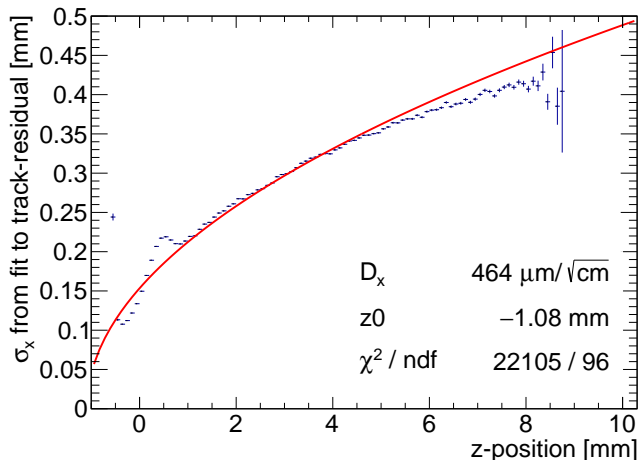
Kees Ligtenberg

Lepcol meeting

January 28, 2019

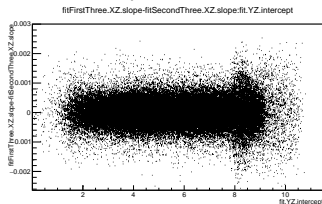
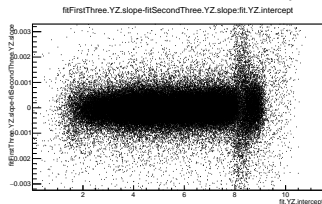


There was a bump in the diffusion histogram



The bump is visible with only telescope data

Fit with only telescope (no Timepix data)



We fit the first and last separately, and cut on the maximum slope difference (< 0.001)

Updated event/hit selection

Quad selection

$$-500 \text{ ns} < t_{\text{hit}} - t_{\text{trigger}} < 500 \text{ ns}$$

$$\text{First hit readout} < 5 \times 409.6 \mu\text{s}$$

$$\text{Average hit readout} < 150 \times 409.6 \mu\text{s}$$

$$\text{Max hit readout} < 200 \times 409.6 \mu\text{s}$$

$$\text{Hit ToT} > 0.15 \mu\text{s}$$

$$\text{Reject outliers} (r_x < 2\sigma_x, r_z < 2\sigma_z)$$

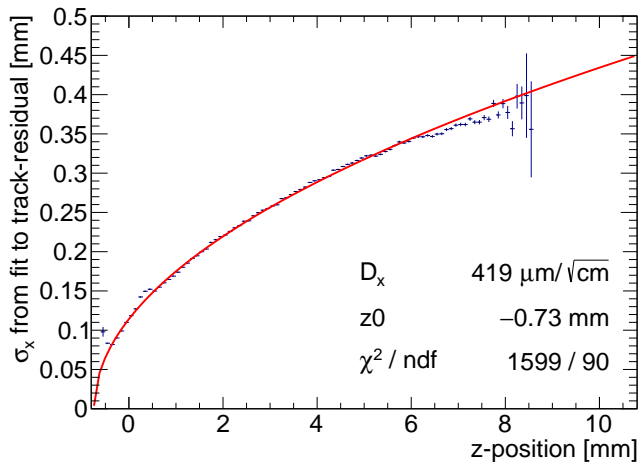
$$\text{Reject outliers} (r_x < 1.5 \text{ mm}, r_z < 2 \text{ mm})$$

$$N_{\text{hits}} > 20$$

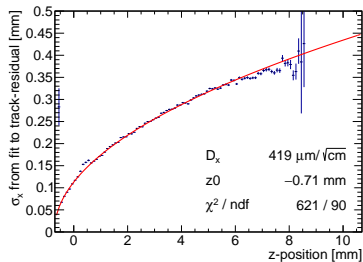
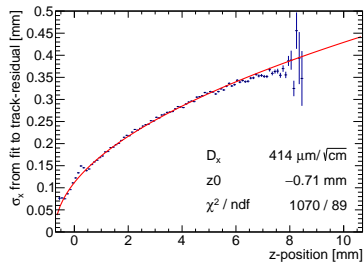
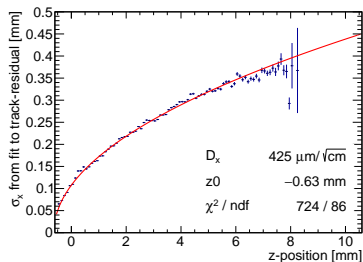
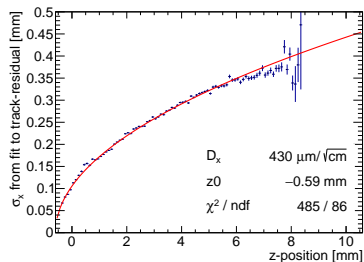
$$(N_{r_x < 1.5 \text{ mm}} / N_{r_x < 5 \text{ mm}}) > 0.8$$

$$\overline{x_{\text{hit}}} - x_{\text{track}} < 0.3 \text{ mm}$$

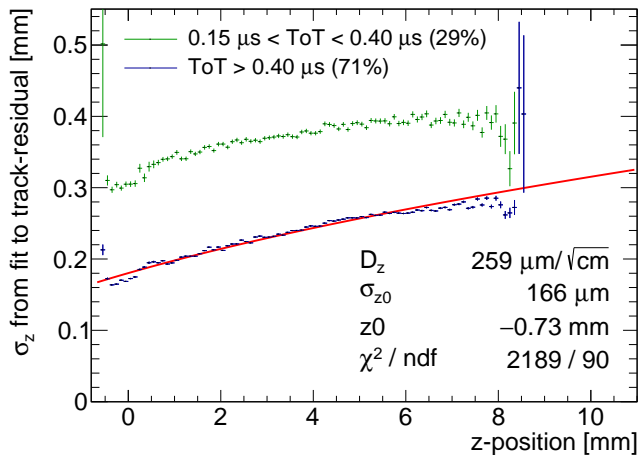
Transverse diffusion



Transverse diffusion per chip



Longitudinal diffusion

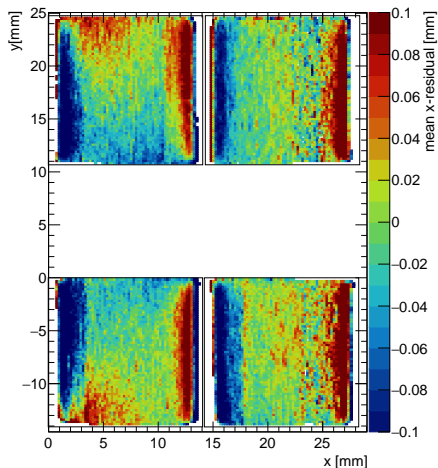


Deformation plots

- Combine 4×4 pixels into bins to find deformation histogram
- Preliminary: the runs are aligned independently
- There is a small alignment error on the left two chips
- The diagrams will be updated with more statistics

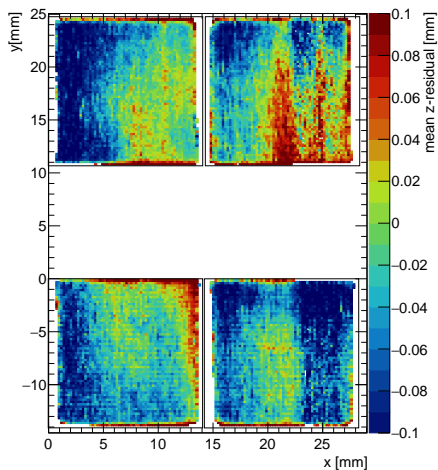
Deformations in pixel plane before correction

bins with more than 300 entries



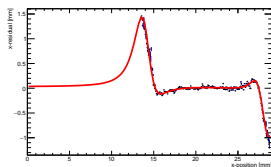
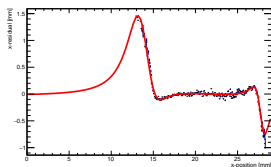
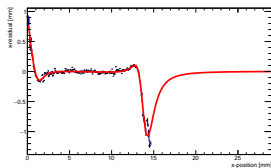
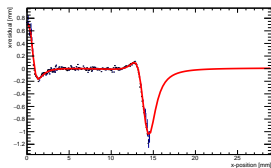
Deformations in drift direction without calibration

bins with more than 300 entries



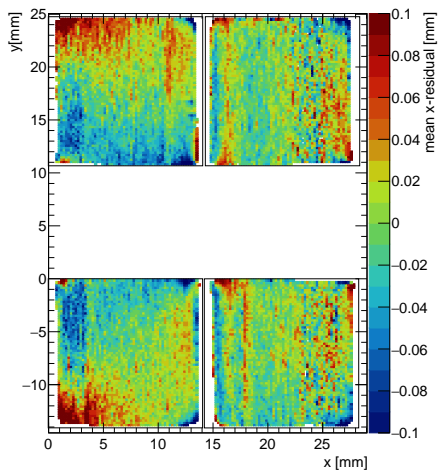
Correction of deformations

Fit the deformations with a combination of 4 Breit-Wigners and an offset per chip (13 parameters). This corrects edge effects and field distortions



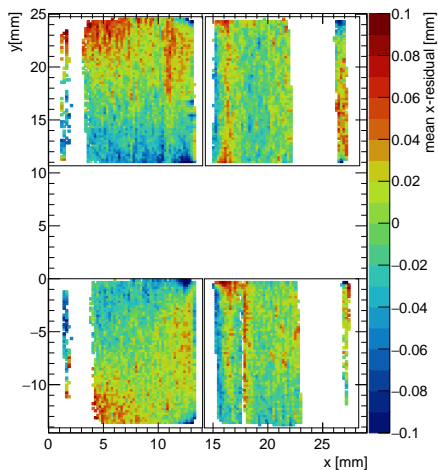
Deformations after correction

bins with more than 300 entries



Deformations after correction

bins with more than 1000 entries



Frequency of deformations

bins with more than 1000 entries

