Preliminary quad results update

Kees Ligtenberg

Lepcol meeting

January 28, 2019



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There was a bump in the diffusion histogram



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January 28, 2019 2 / 14

The bump is visible with only telescope data



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

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3 / 14

Updated event/hit selection

Quad selection

 $\begin{array}{l} -500 \ \mathrm{ns} < t_{\mathrm{hit}} - t_{\mathrm{trigger}} < 500 \ \mathrm{ns} \\ \mathrm{First} \ \mathrm{hit} \ \mathrm{readout} < 5 \times 409.6 \ \mathrm{\mu s} \\ \mathrm{Average} \ \mathrm{hit} \ \mathrm{readout} < 150 \times 409.6 \ \mathrm{\mu s} \\ \mathrm{Max} \ \mathrm{hit} \ \mathrm{readout} < 200 \times 409.6 \ \mathrm{\mu s} \\ \mathrm{Hit} \ \mathrm{ToT} > 0.15 \ \mathrm{\mu s} \\ \mathrm{Reject} \ \mathrm{outliers} \left(\ r_x < 2\sigma_x, r_z < 2\sigma_z \ \right) \\ \mathrm{Reject} \ \mathrm{outliers} \left(\ r_x < 1.5 \ \mathrm{mm}, r_z < 2 \ \mathrm{mm} \ \right) \\ N_{\mathrm{hits}} > 20 \\ \left(N_{r_x < 1.5 \ \mathrm{mm}} \ / \ N_{r_x < 5 \ \mathrm{mm}} \right) > 0.8 \\ \overline{x_{\mathrm{hit}}} - x_{\mathrm{track}} < 0.3 \ \mathrm{mm} \end{array}$

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4 / 14

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Transverse diffusion



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Transverse diffusion per chip



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Longitudinal diffusion



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Deformation plots

- $\, \bullet \,$ Combine 4 \times 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

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8 / 14

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Deformations in pixel plane before correction

bins with more than 300 entries



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Deformations in drift direction without calibration

bins with more than 300 entries



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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



Title January 28, 2019 11 / 14

Deformations after correction

bins with more than 300 entries



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Deformations after correction

bins with more than 1000 entries



Frequency of deformations

bins with more than 1000 entries

