Preliminary results on INMAPS

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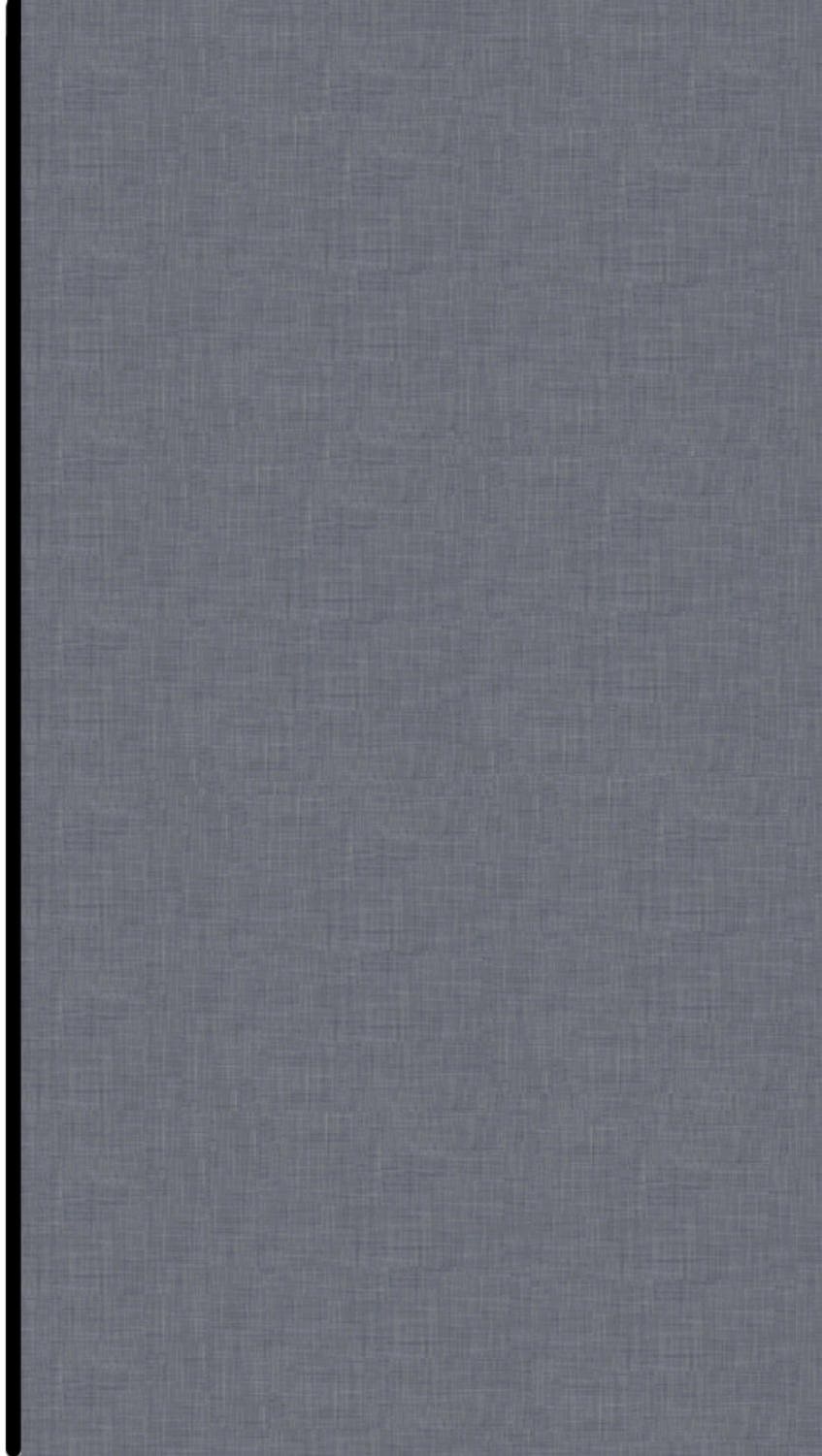
12th December 2012

Overview

- Test beam facility
- Triggering and pre selection
- Analysis strategy

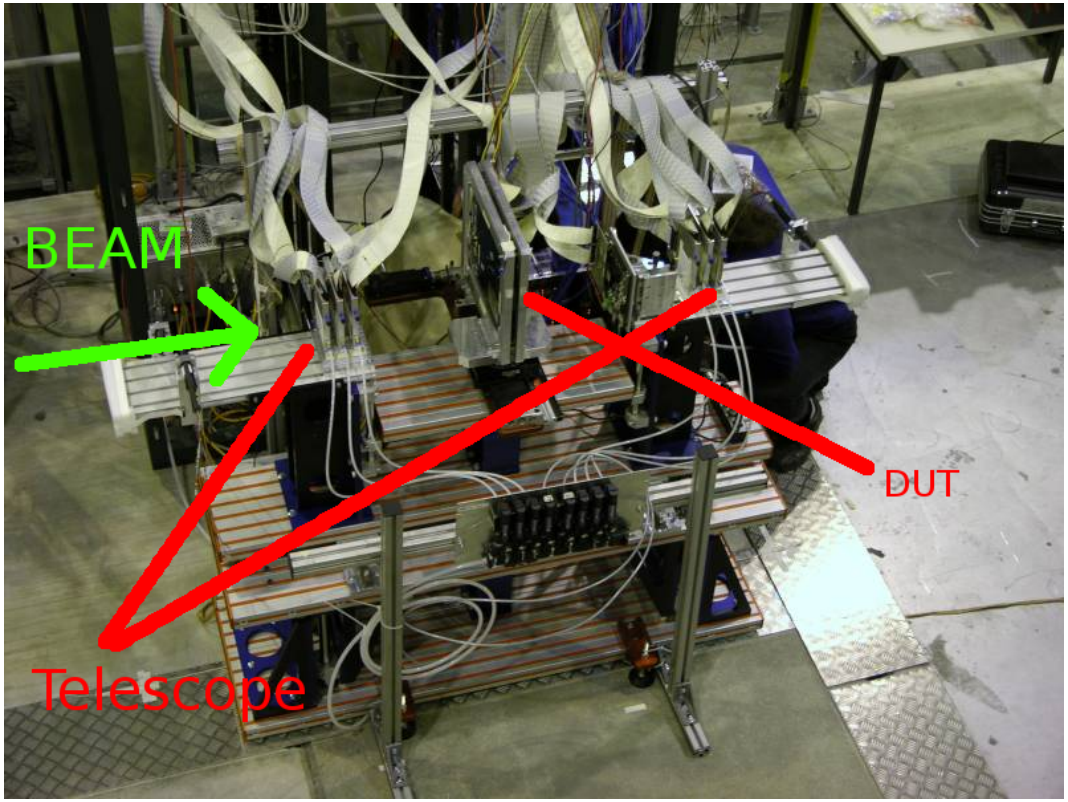
Results

- Threshold studies.
- Angular studies.



Test beam facility

1. Site cern site prevessin .
   - 120GeV π beam.
2. SLIM5 Telescope + DUT
   - 3 CHIPS
   - Angular studies
   - Threshold studies



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Triggering and pre selection

For off-line analysis:

1. All telescope planes fire.
2. Only one track peer event.
3. Simple alignment $\rightarrow$ minimalising the residuals.
4. DUT alignment done separately.

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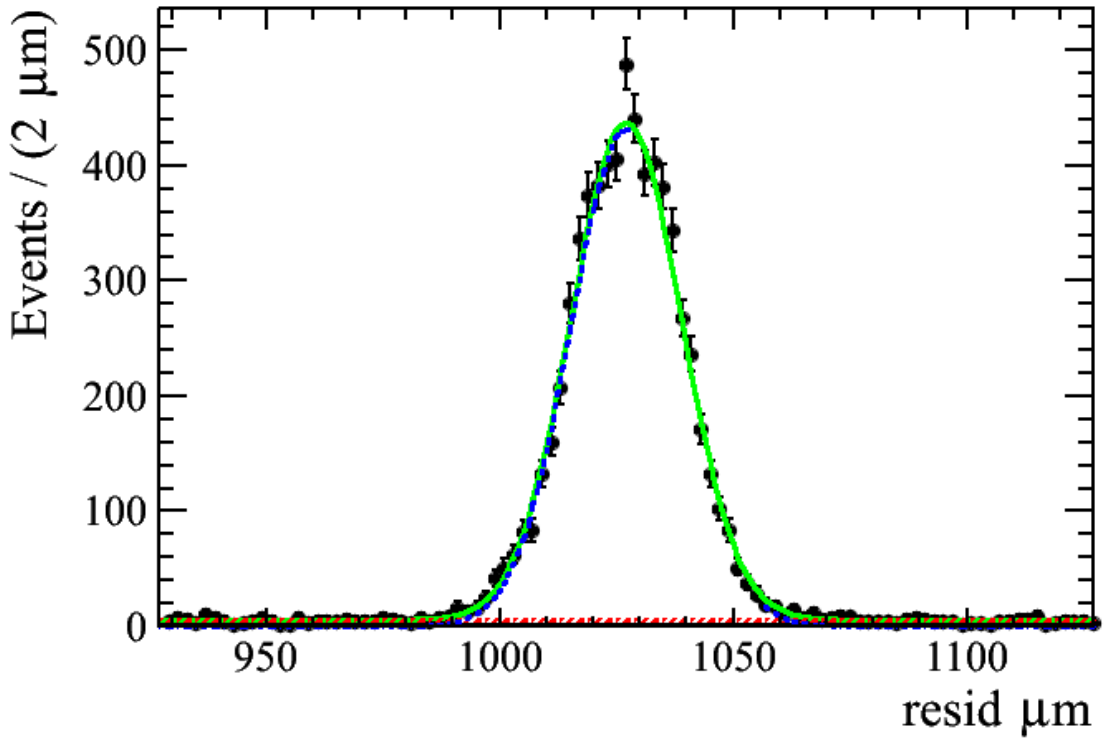
Analysis strategy

1. Alignment

- Alignment is done by fitting the residual distribution.
- PDF used: $f(x) = \alpha Gauss(x; \sigma, \overline{x}) + (1-\alpha)c$ where c is const.
- Free variables: σ, $\overline{x}$, α.



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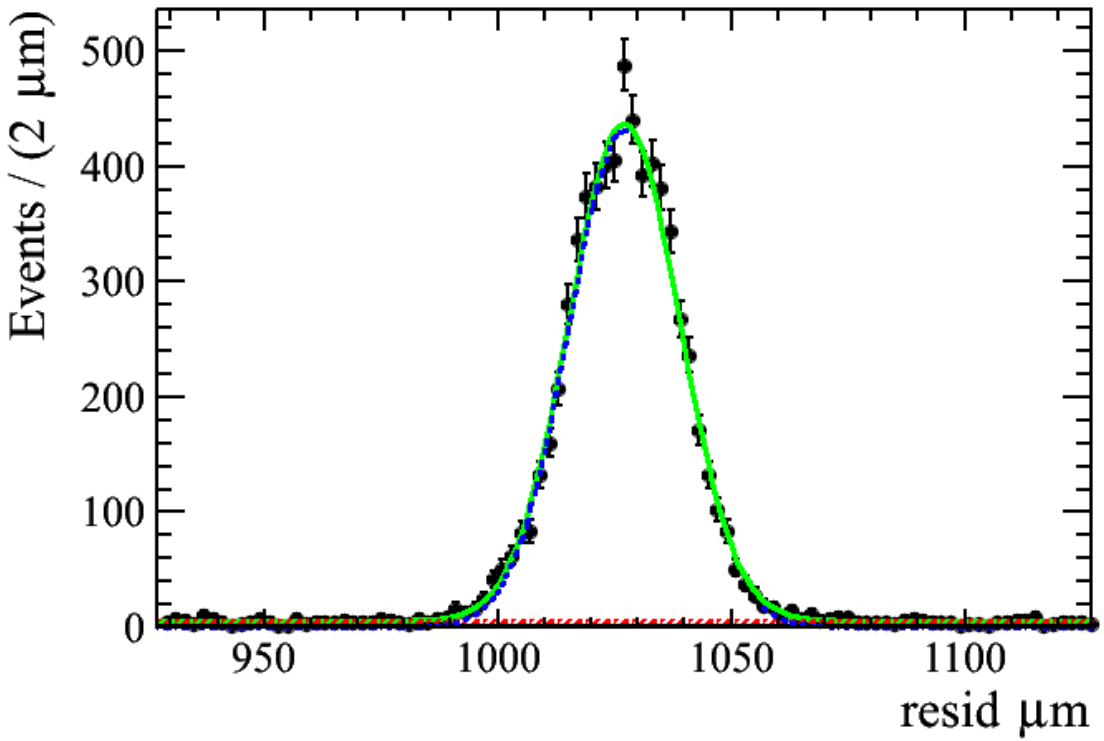
Analysis strategy

(2) Efficiency

- Using parameters from the fit we extract number of signal events.
- We assign a systematic error from fit parameters.
- Efficiency is calculated using Bayesian formula:
  $Eff = \frac{n + 0.5}{t + 1}$, where
  n- number of hits
  t- number of tracks



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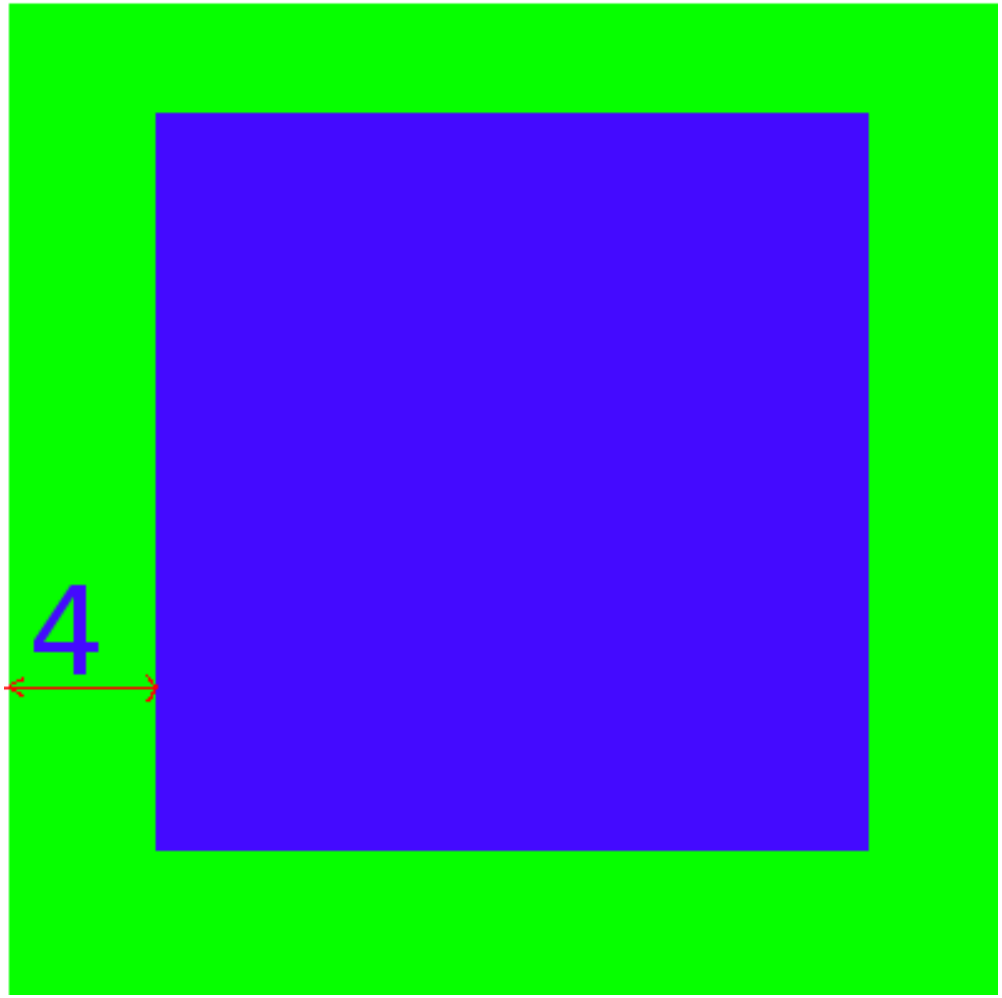
Analysis strategy

3 Fiducial cut

- Borders of DUT have been seen to be less efficient.
- 4 pixel fiducial cut around the DUT is used



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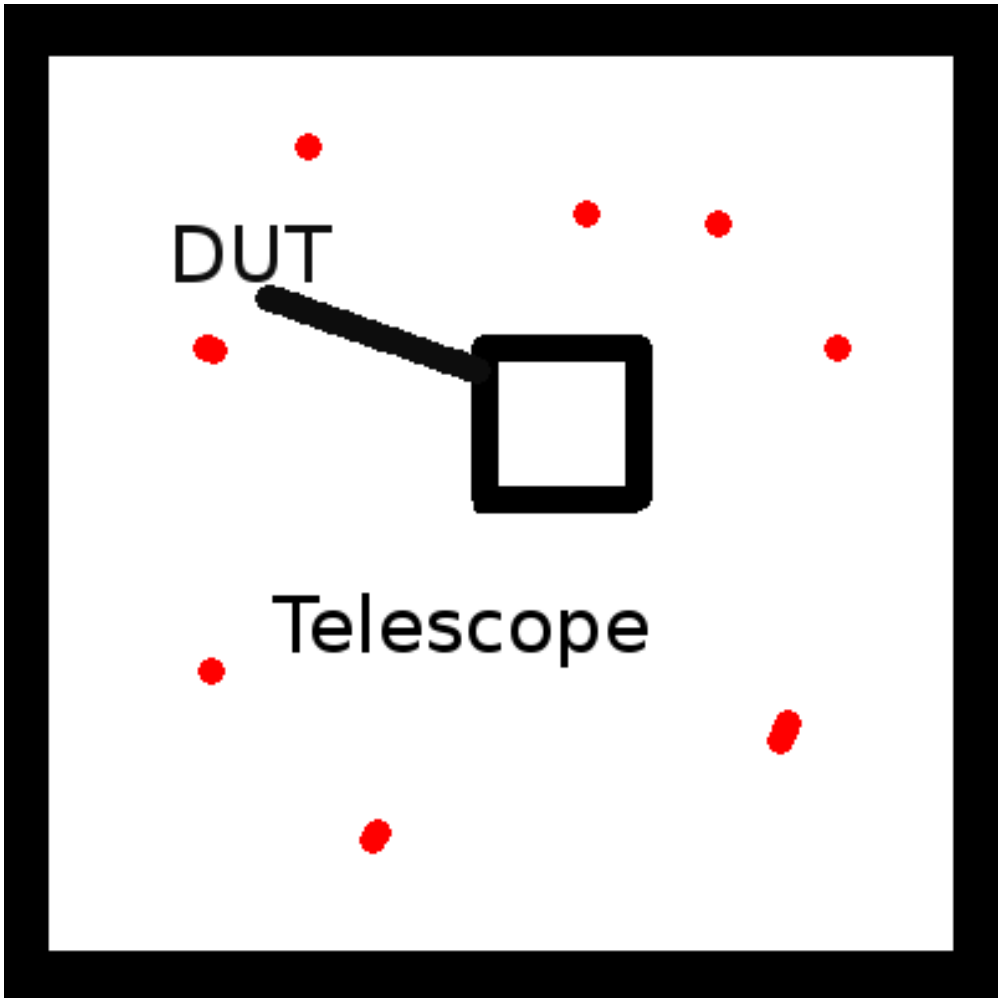
Analysis strategy

3 Noise rate

- To study noise appearance we select the events that have extrapolate track outside the DUT.
- Noise rate is defined: $NR = \frac{nfp}{ntrks}$, where *nfp* is the number of fired pixels, *ntrks* is the number of tracks.



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Efficiency vs threshold

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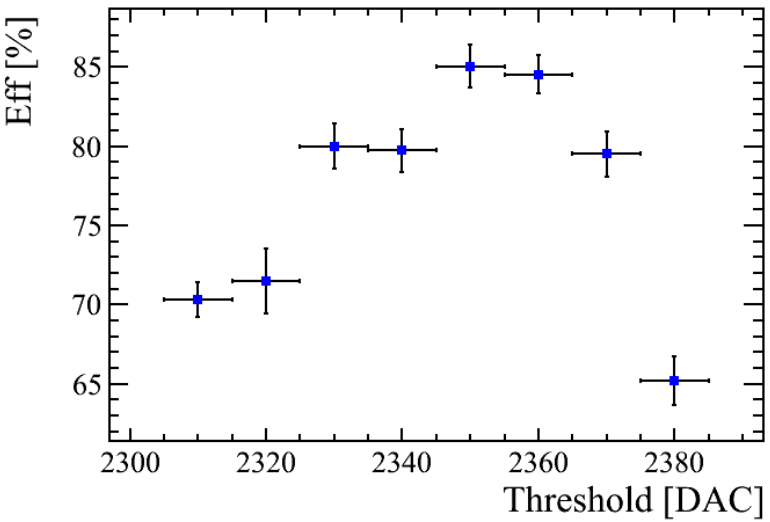
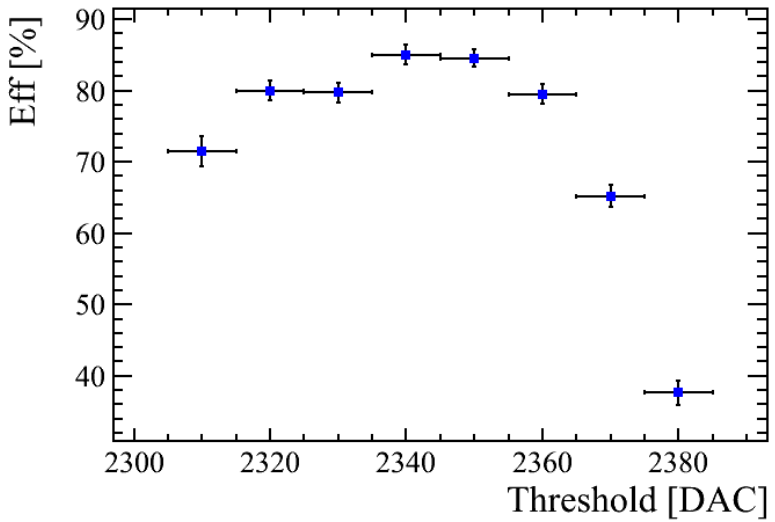


CHIP 14



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Noise rate

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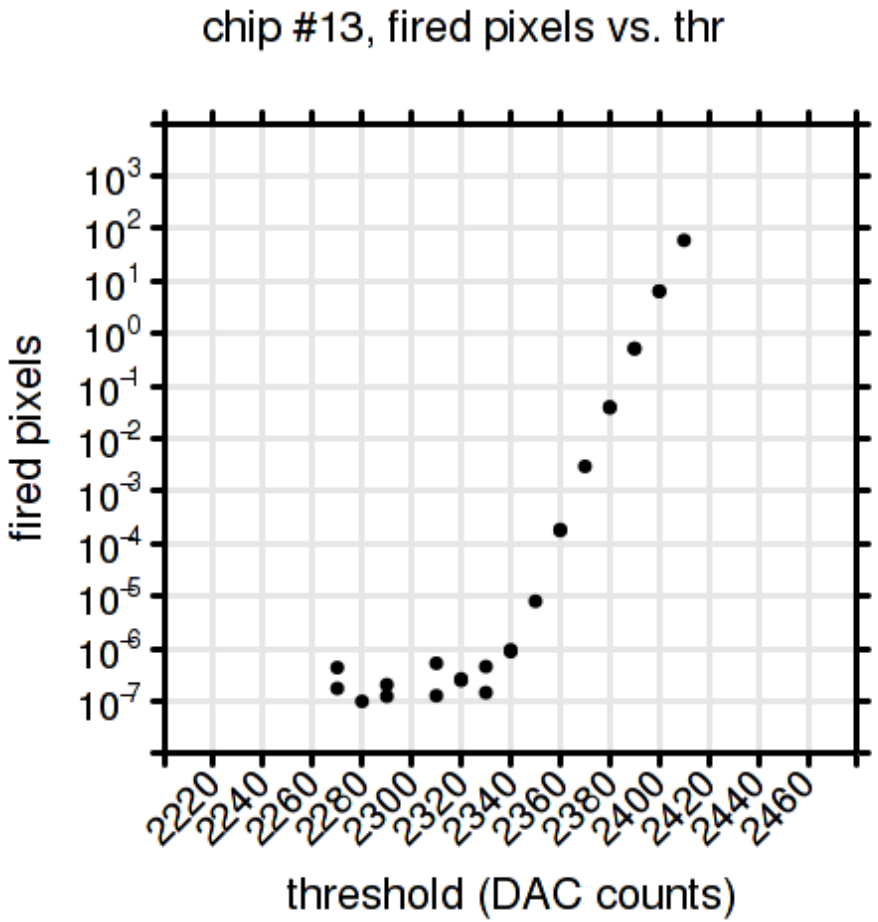

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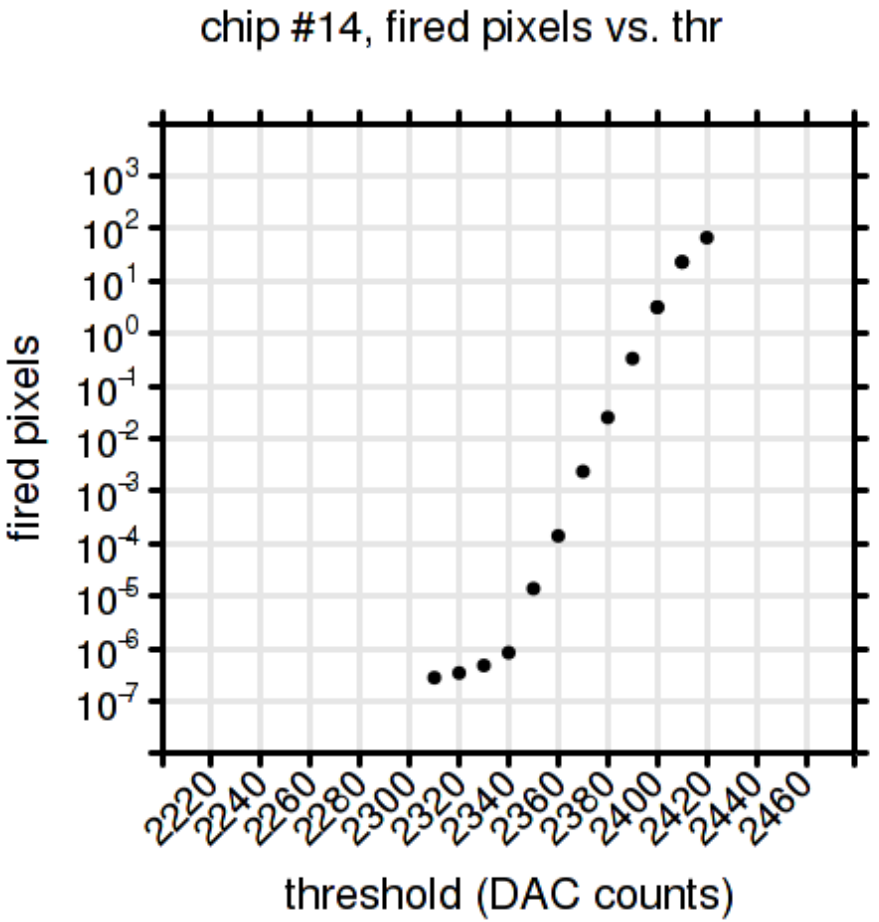

Thanks to Alberto.

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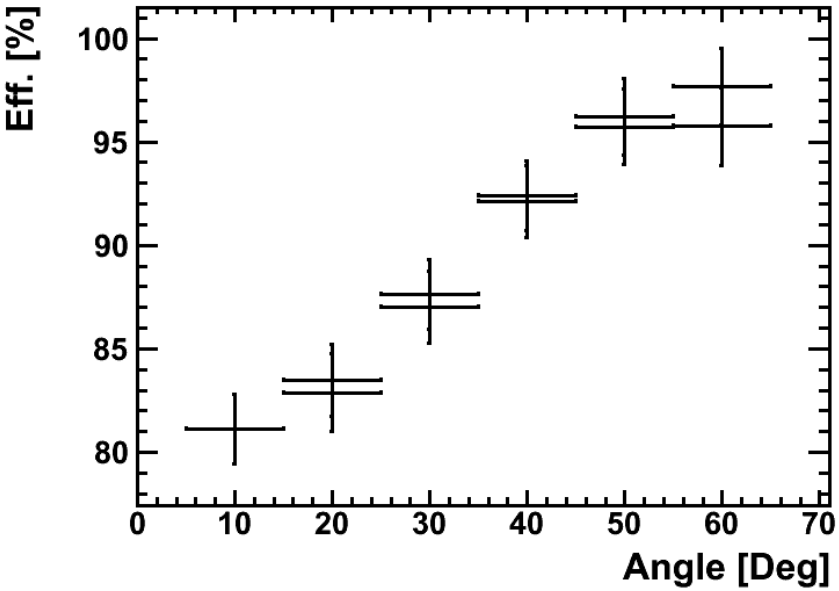
Eff vs. angle

CHIP 13



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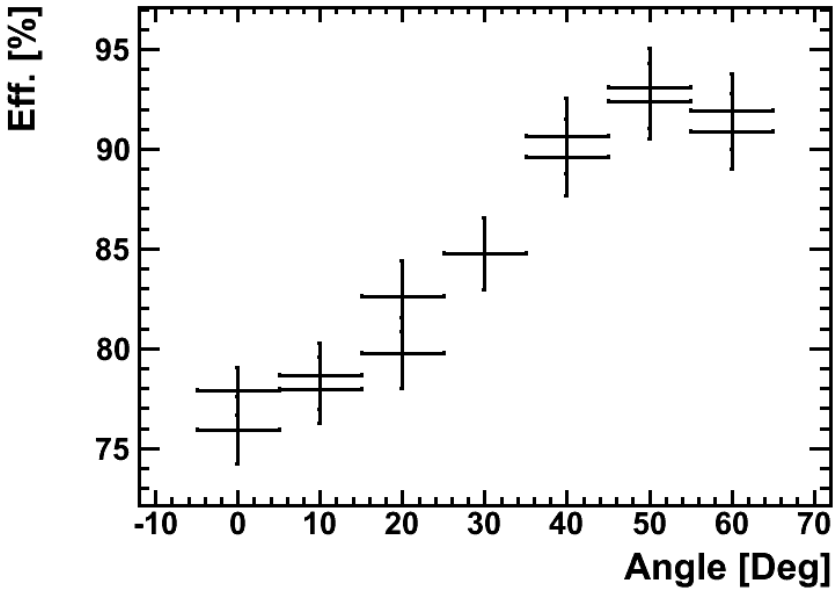

THRESHOLD: $2360 \rightarrow 280e \pm 5\%$

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Resolution X vs angle

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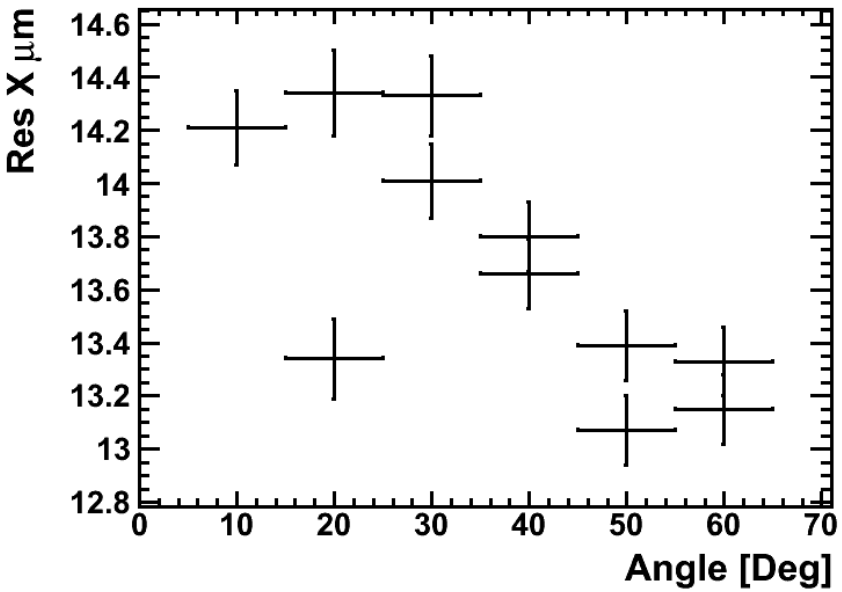

THRESHOLD: 2360

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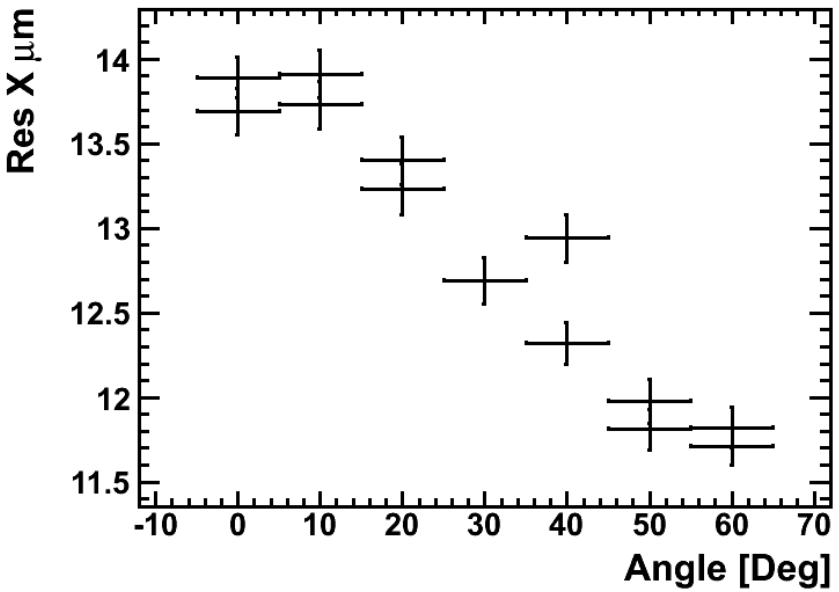

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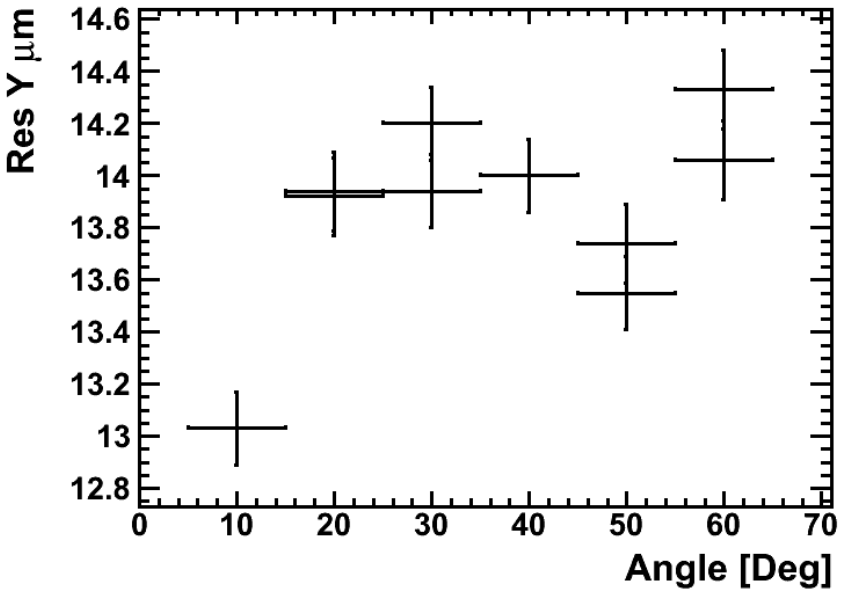
Resolution Y vs angle

CHIP 13



THRESHOLD: 2360

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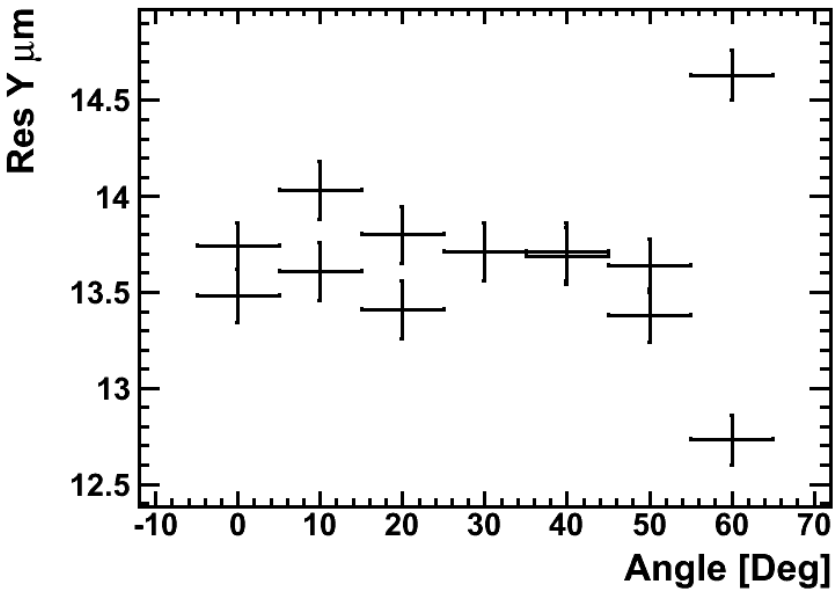

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Multiplicity vs angle

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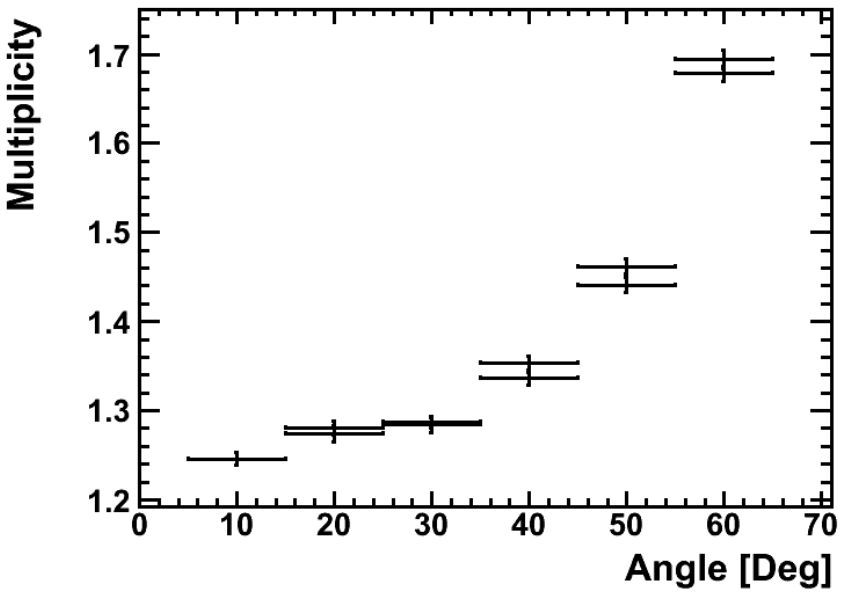

THRESHOLD: 2360

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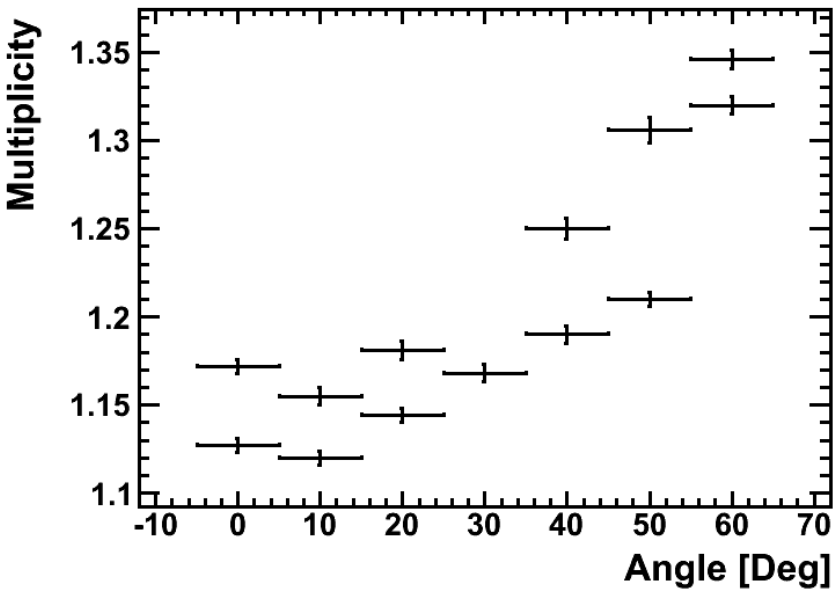

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Multiplicity X vs angle

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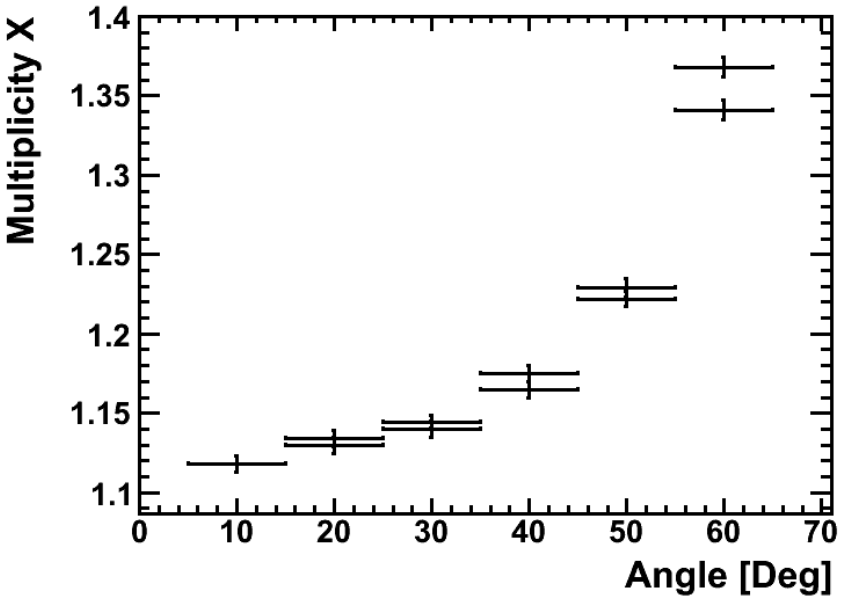

THRESHOLD: 2360

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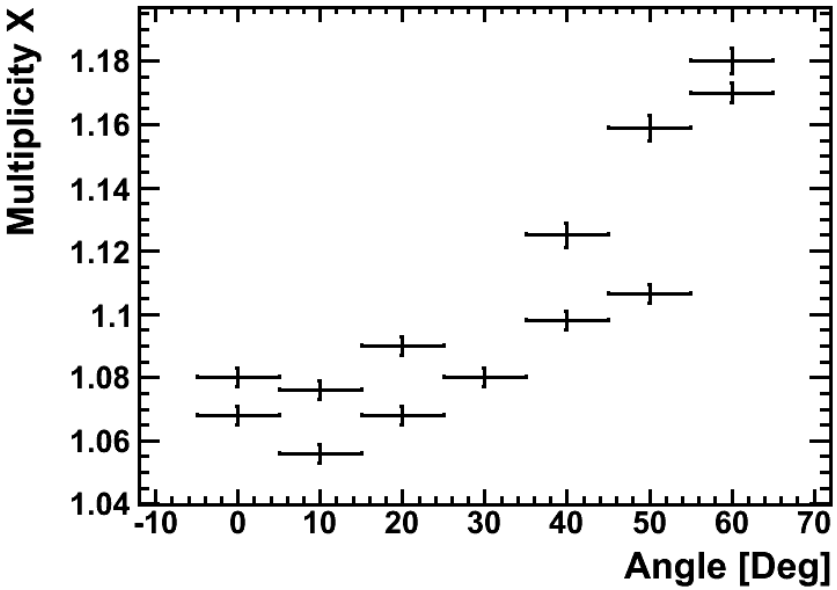

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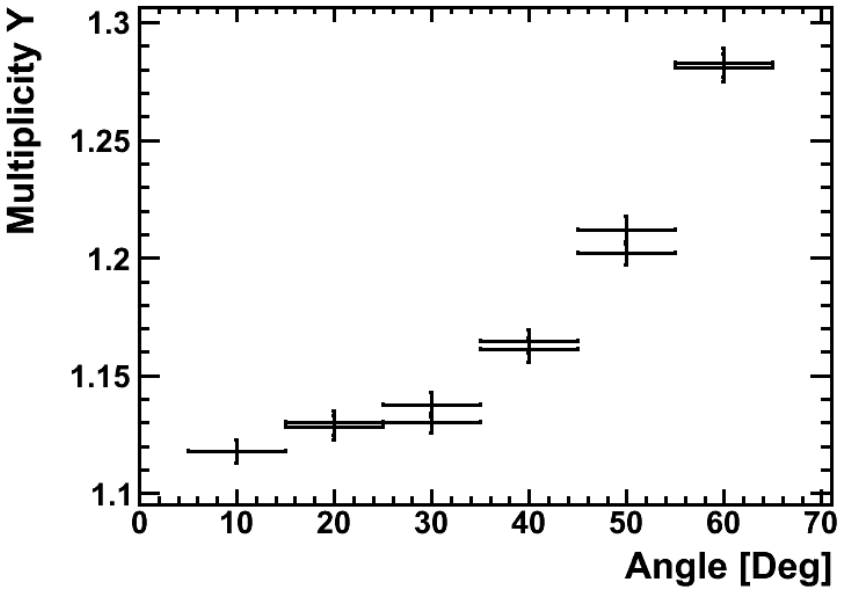
Multiplicity Y vs angle

CHIP 13



THRESHOLD: 2360

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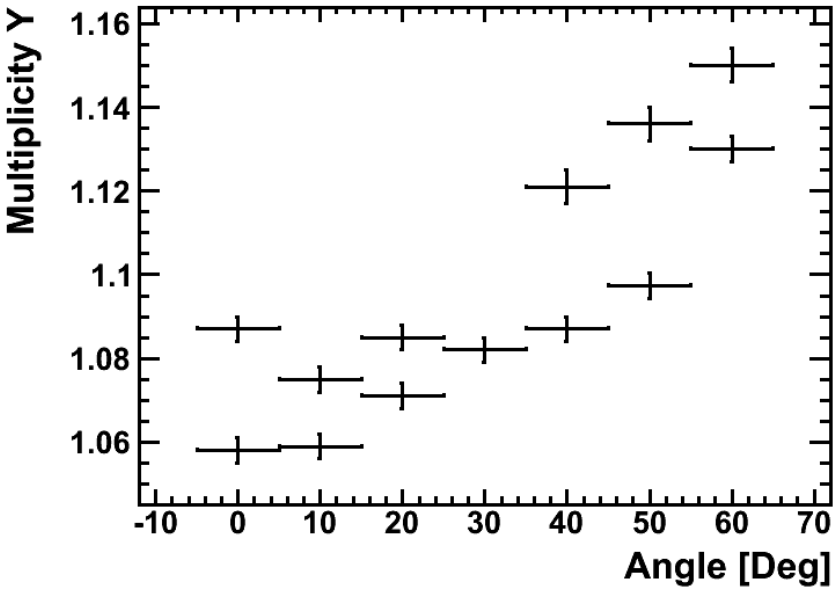

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Lattice isotropy

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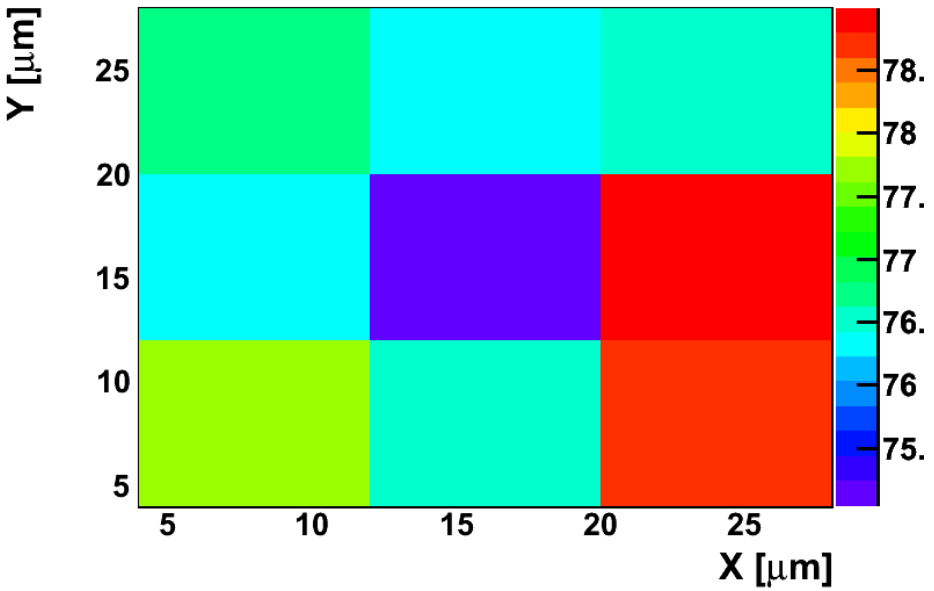

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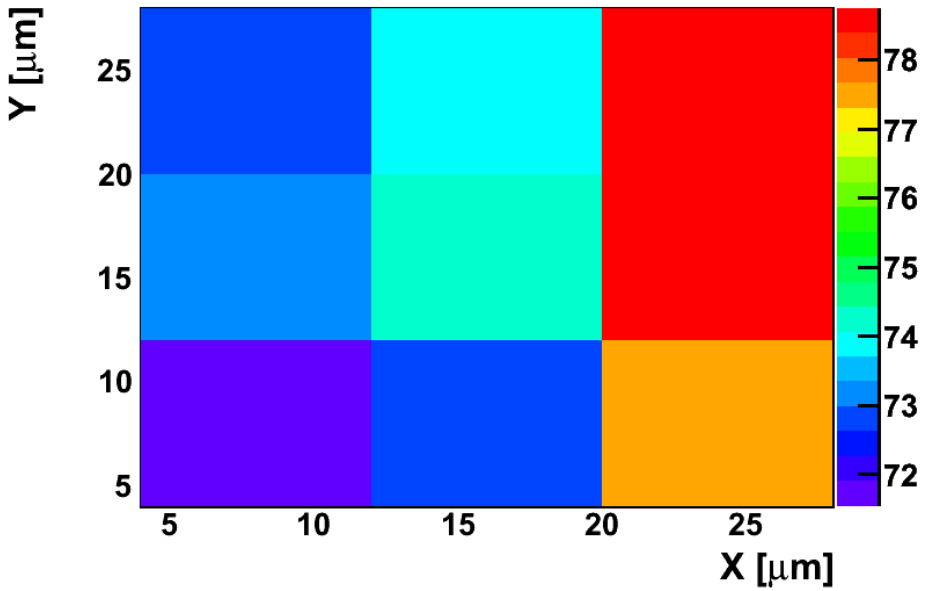

THRESHOLD: 2360

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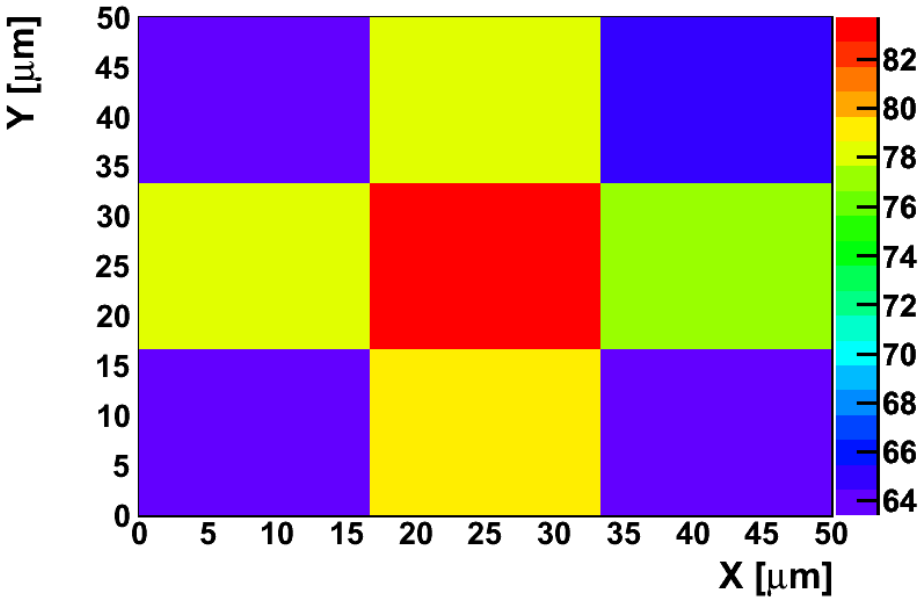
Pixel isotropy

CHIP 13



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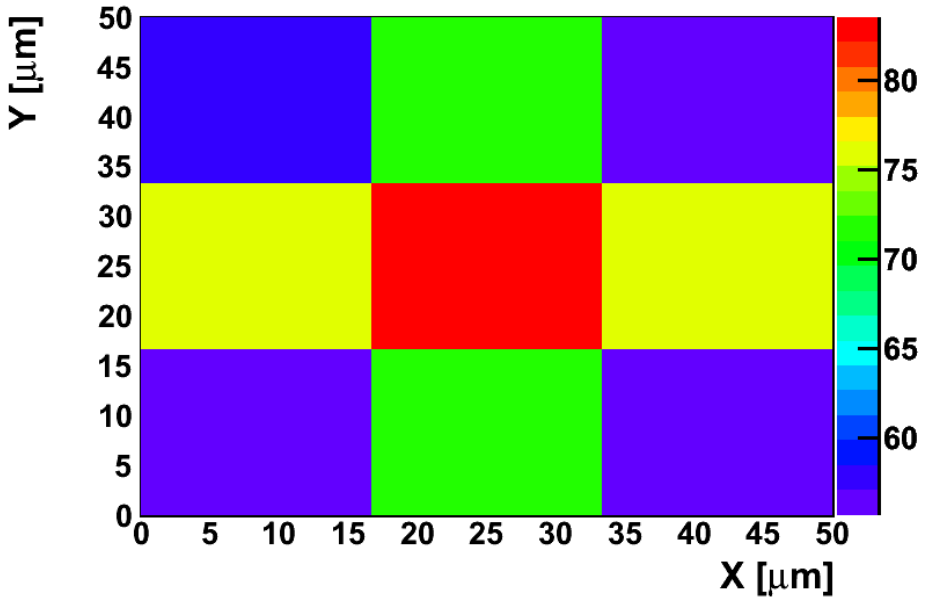

Before deconvolution the telescope resolution!
THRESHOLD: 2360

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Summary

- High Efficiency not reached due to high noise.
- Geometrical structure needs to be optimised.
- Design still needs some work.

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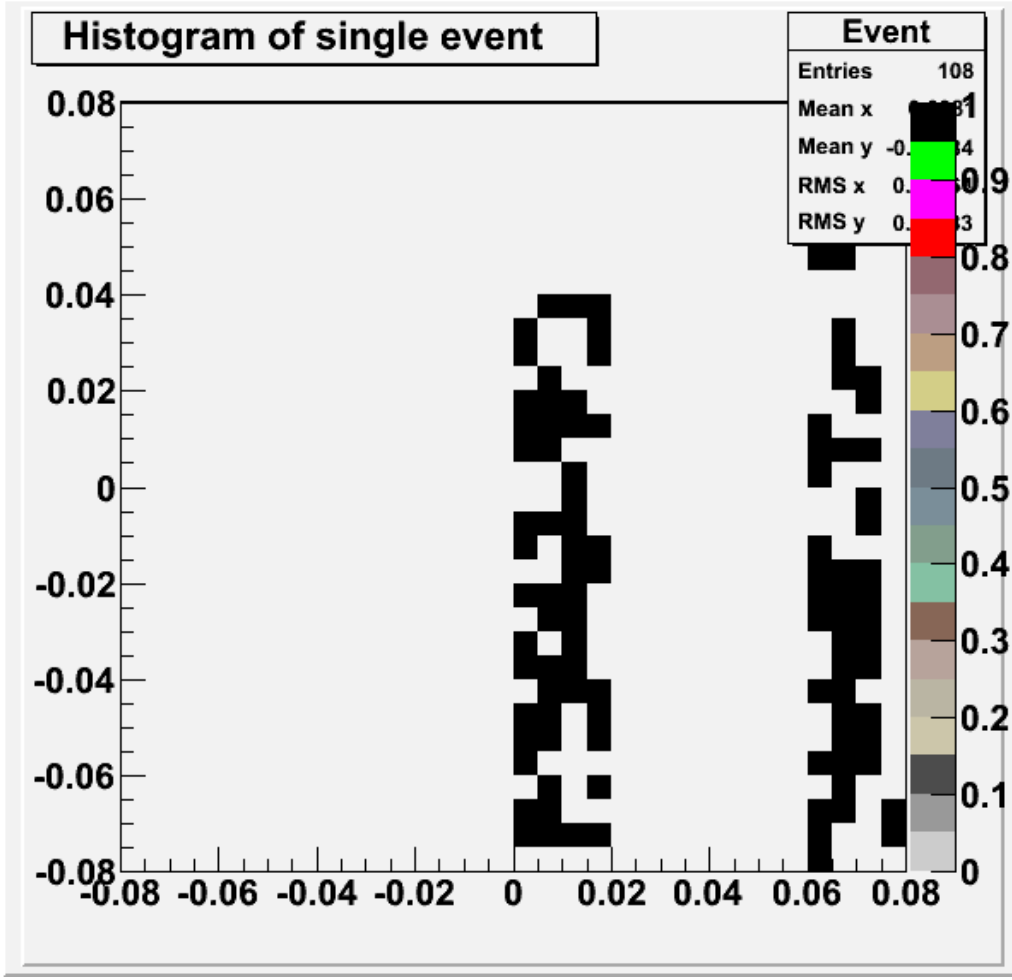
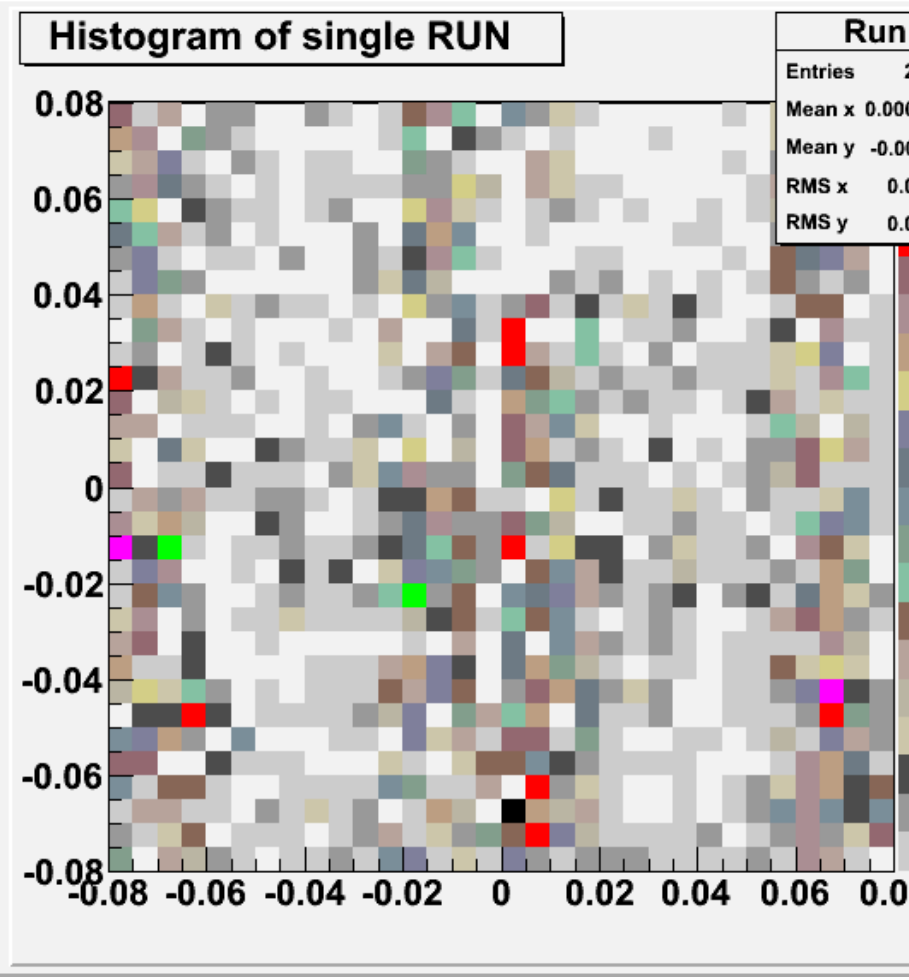
Backup

BACKUP

Backup





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