

Preliminary results on INMAPS

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Overview

Test beam facility

Triggering and pre selection

Analysis strategy

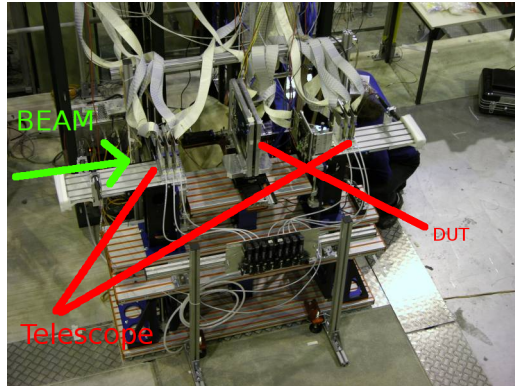
Results

Threshold studies.

Angular studies.

Test beam facility

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



Triggering and pre selection

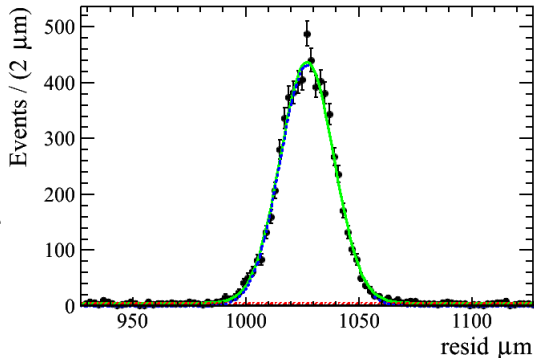
For off-line analysis:

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

Analysis strategy

1 Alignment

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



Analysis strategy

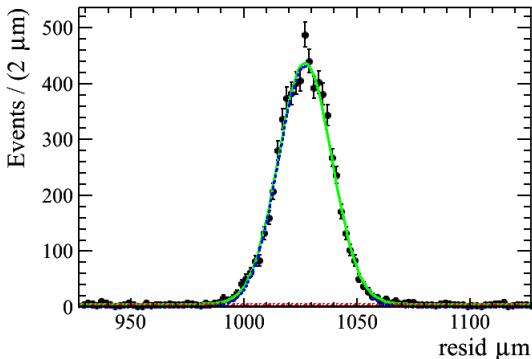
② Efficiency

- 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:

$$Eff = \frac{n + 0.5}{t + 1}, \text{ where}$$

n- number of hits

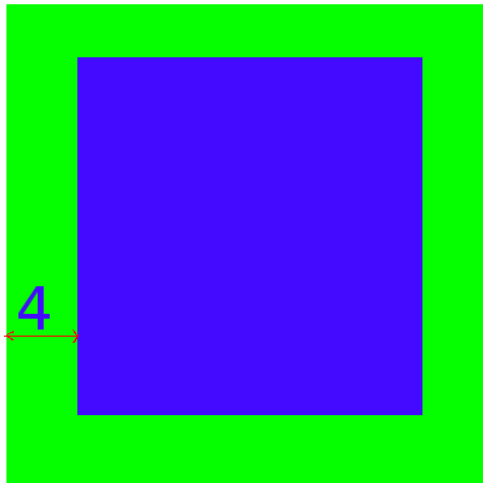
t- number of tracks



Analysis strategy

③ Fiducial cut

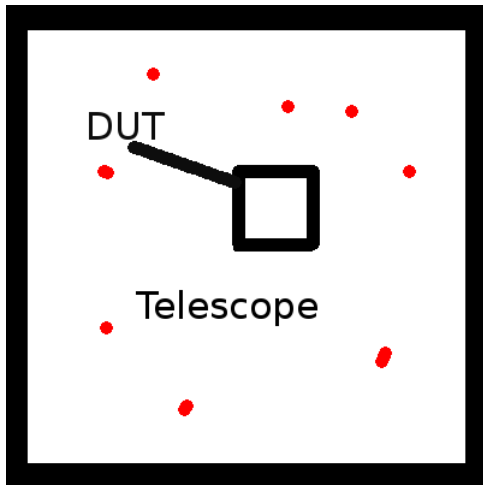
- Borders of DUT have been seen to be less efficient.
- 4 pixel fiducial cut around the DUT is used



Analysis strategy

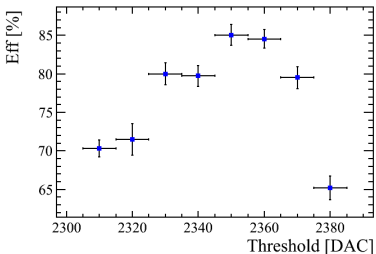
③ Noise rate

- 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.

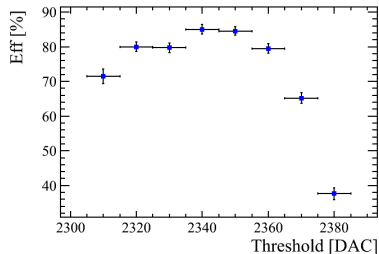


Efficiency vs threshold

CHIP 13



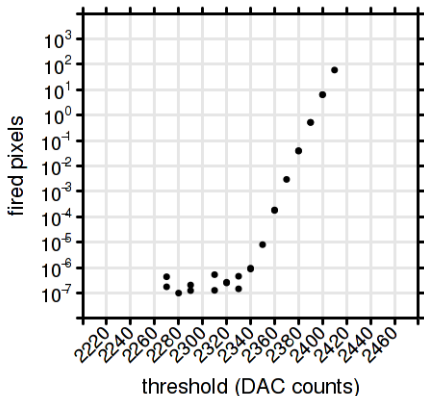
CHIP 14



Noise rate

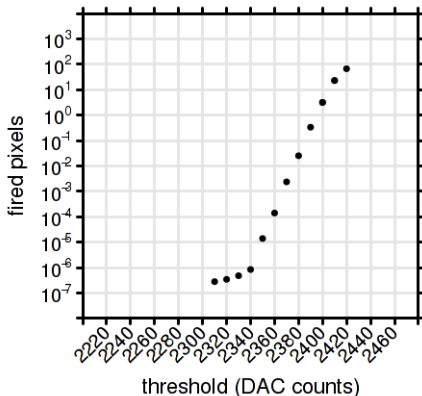
CHIP 13

chip #13, fired pixels vs. thr



CHIP 14

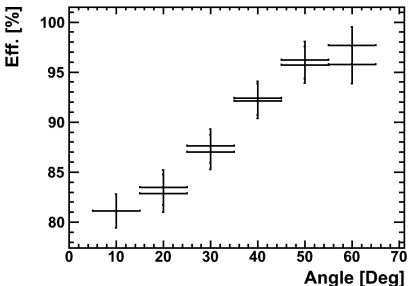
chip #14, fired pixels vs. thr



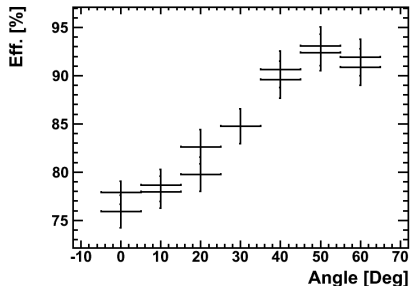
Thanks to Alberto.

Eff vs. angle

CHIP 13



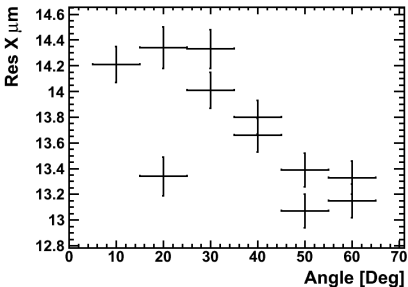
CHIP 14



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

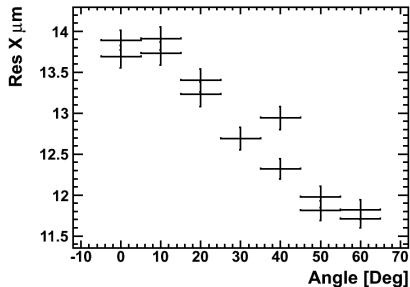
Resolution X vs angle

CHIP 13



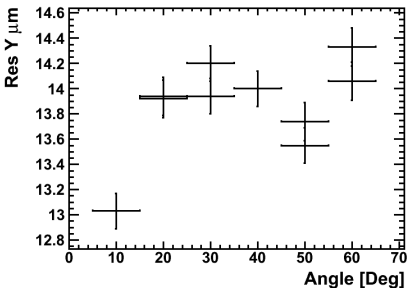
THRESHOLD: 2360

CHIP 14

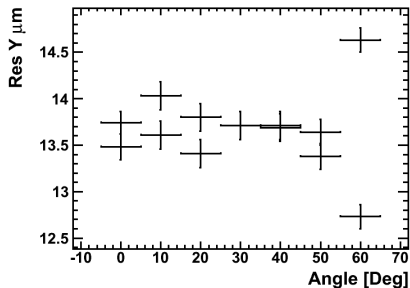


Resolution Y vs angle

CHIP 13



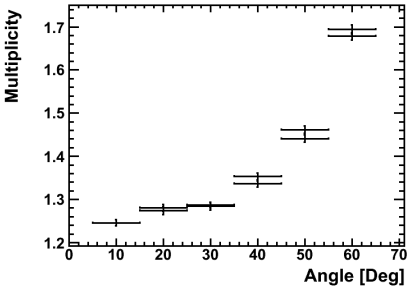
CHIP 14



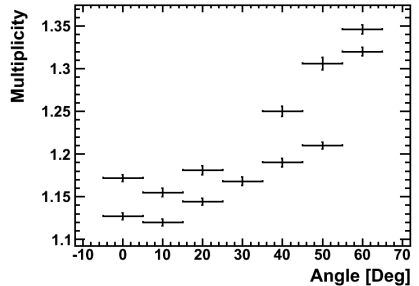
THRESHOLD: 2360

Multiplicity vs angle

CHIP 13



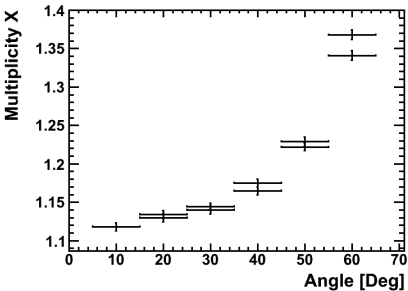
CHIP 14



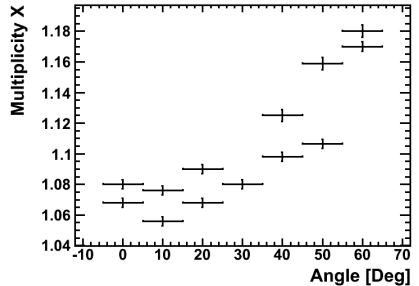
THRESHOLD: 2360

Multiplicity X vs angle

CHIP 13



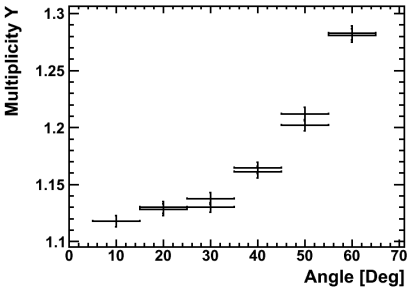
CHIP 14



THRESHOLD: 2360

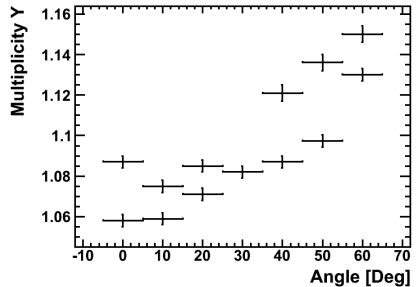
Multiplicity Y vs angle

CHIP 13



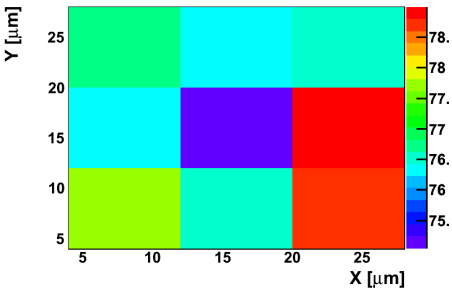
THRESHOLD: 2360

CHIP 14

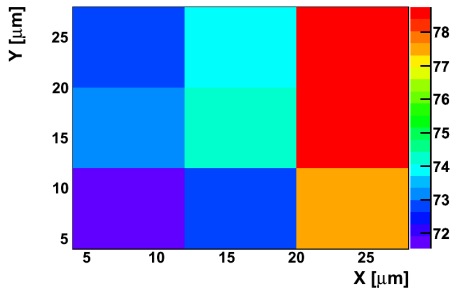


Lattice isotropy

CHIP 13



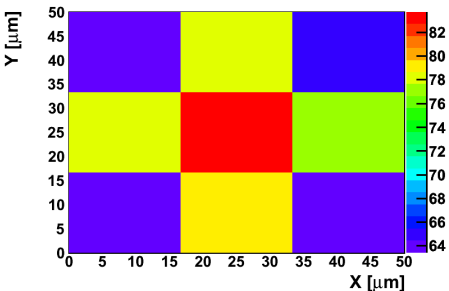
CHIP 14



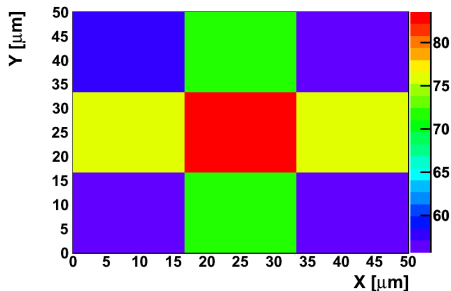
THRESHOLD: 2360

Pixel isotropy

CHIP 13



CHIP 14



Before deconvolution the telescope resolution!

THRESHOLD: 2360

Summary

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

Backup

BACKUP

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