Crosstalk Studies

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Outer Veto Meeting
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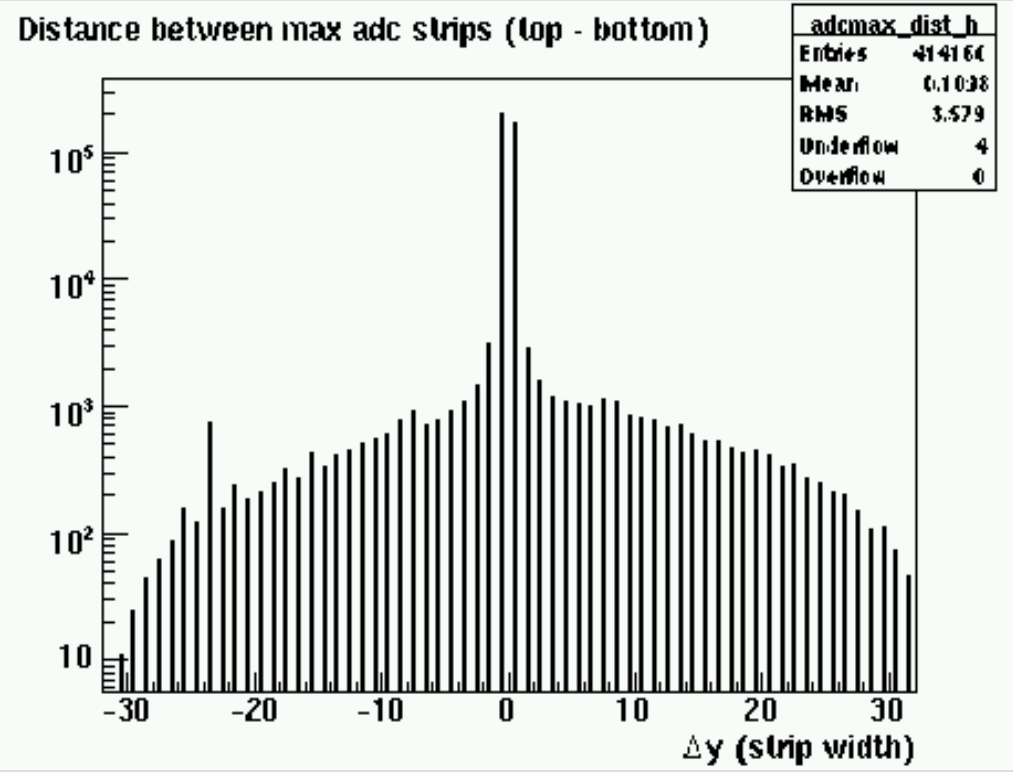
Data Sample

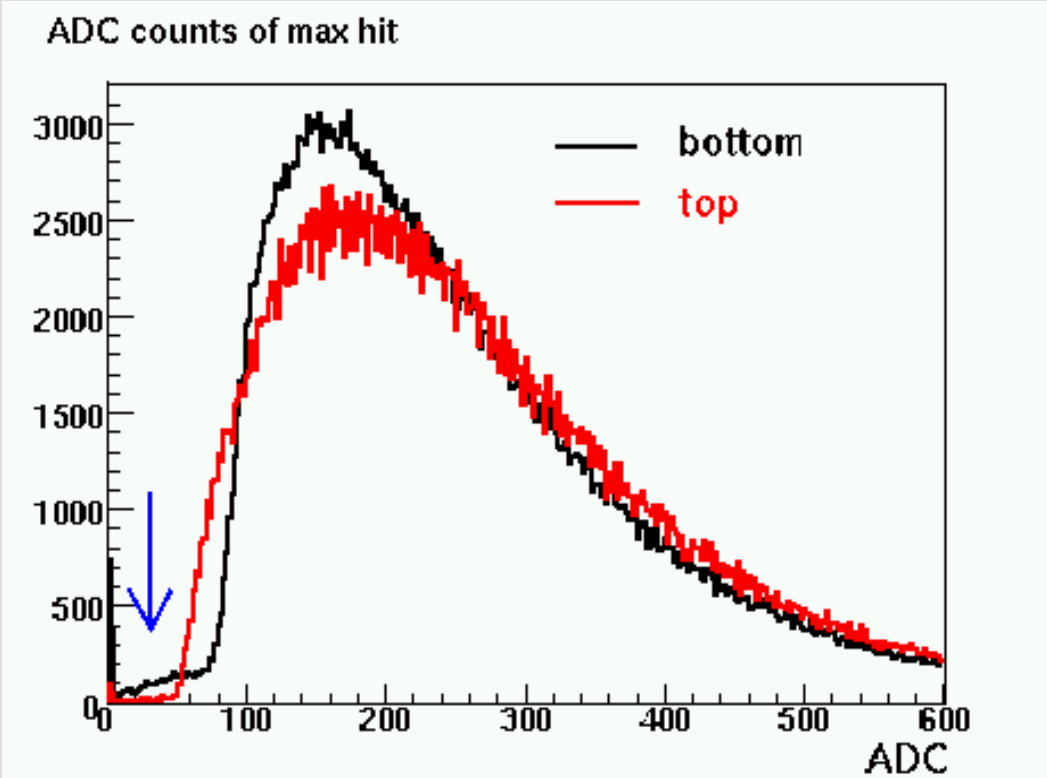
- Take data in triggera mode: only readout ADC values for all the pixels if at least 2 are above threshold (otherwise readout latch).
- Looked at 2 runs:
  - 2PE threshold: default
  - 1PE threshold: as cross check

- Find the maximum hit in each layer
  Select only adjacent strips between layers.



Data Selection

- Some maximum hits below threshold: events where 2 hits above threshold in same layer
- Cut events ADC < 30



- Why is the rising edge not around the same ADC for both layers? Here at 2PE ~ 70 ADC counts Effect off selection?

Crosstalk Measurement

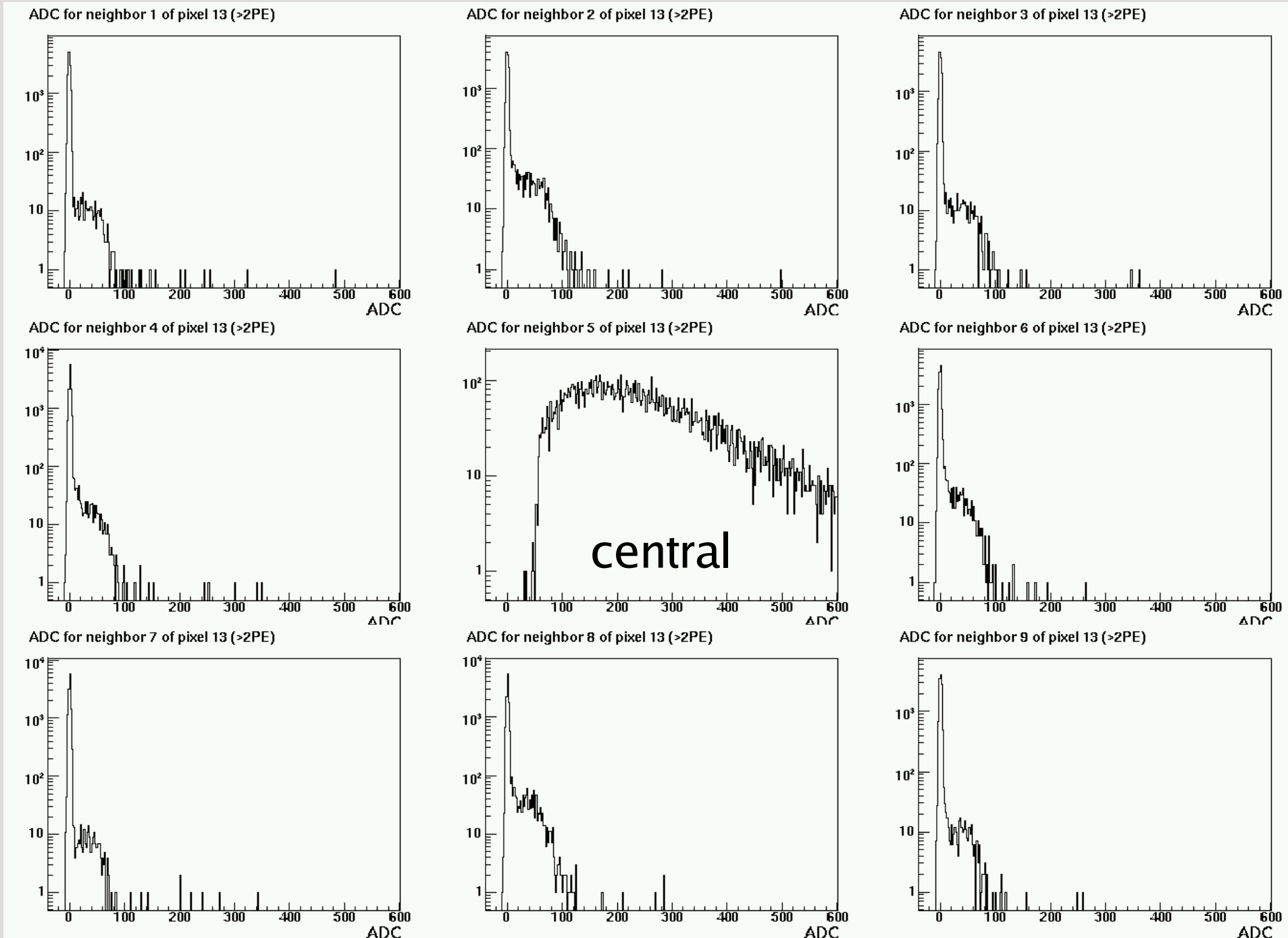
- Get the ratio of ADC counts in neighboring pixels with respect to the central pixel event by event
- The average of this distribution should correspond to fraction of light in that neighbor (i.e. crosstalk)
- Convention used for numbering neighbors:

1	2	3
4	5	6
7	8	9

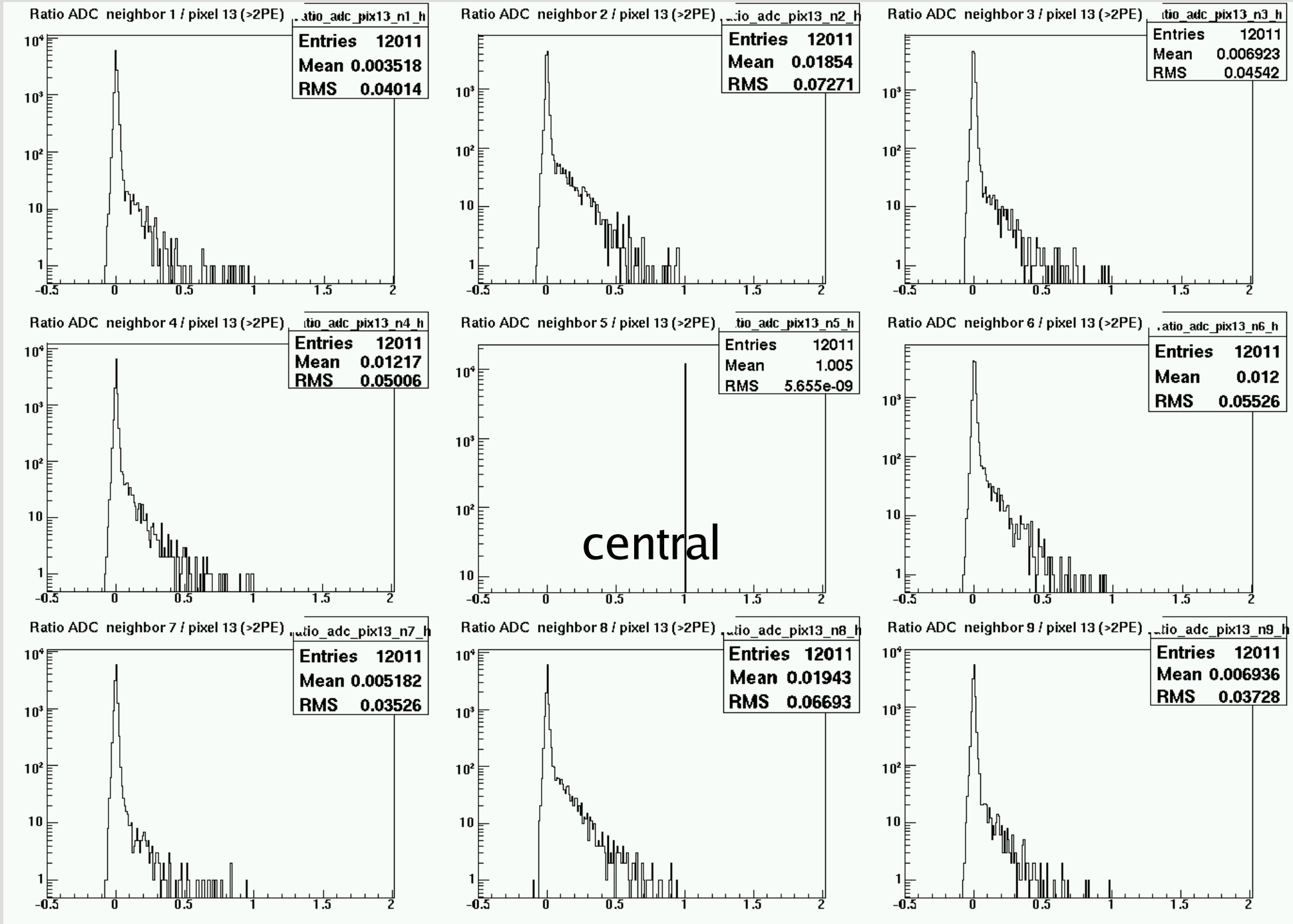
5: central pixel
even: nearest neighbors
odd: diagonal neighbors

- I always look at the face of the PMT

ADC distribution –channel 13

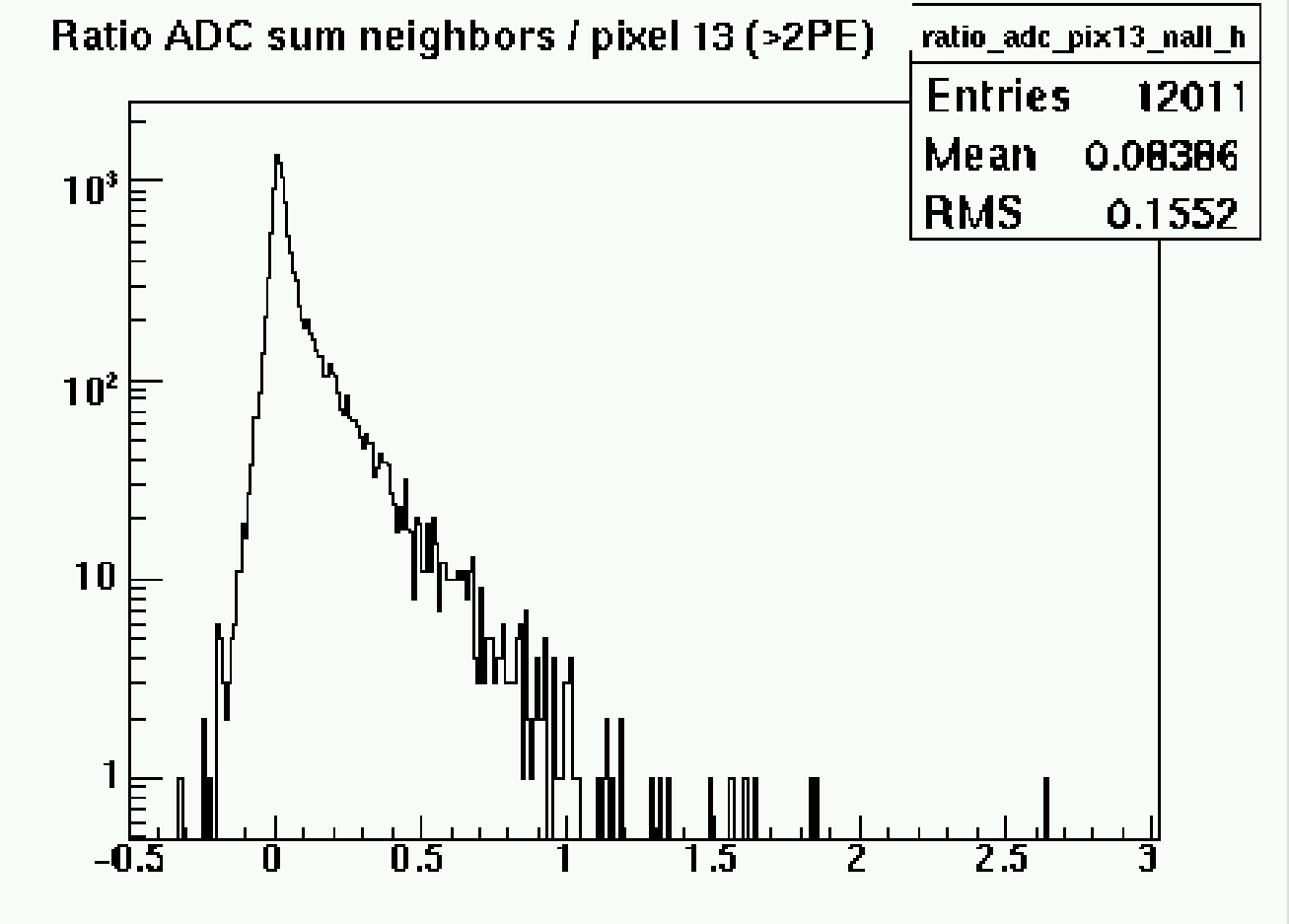


ADC ratios – chann el 13

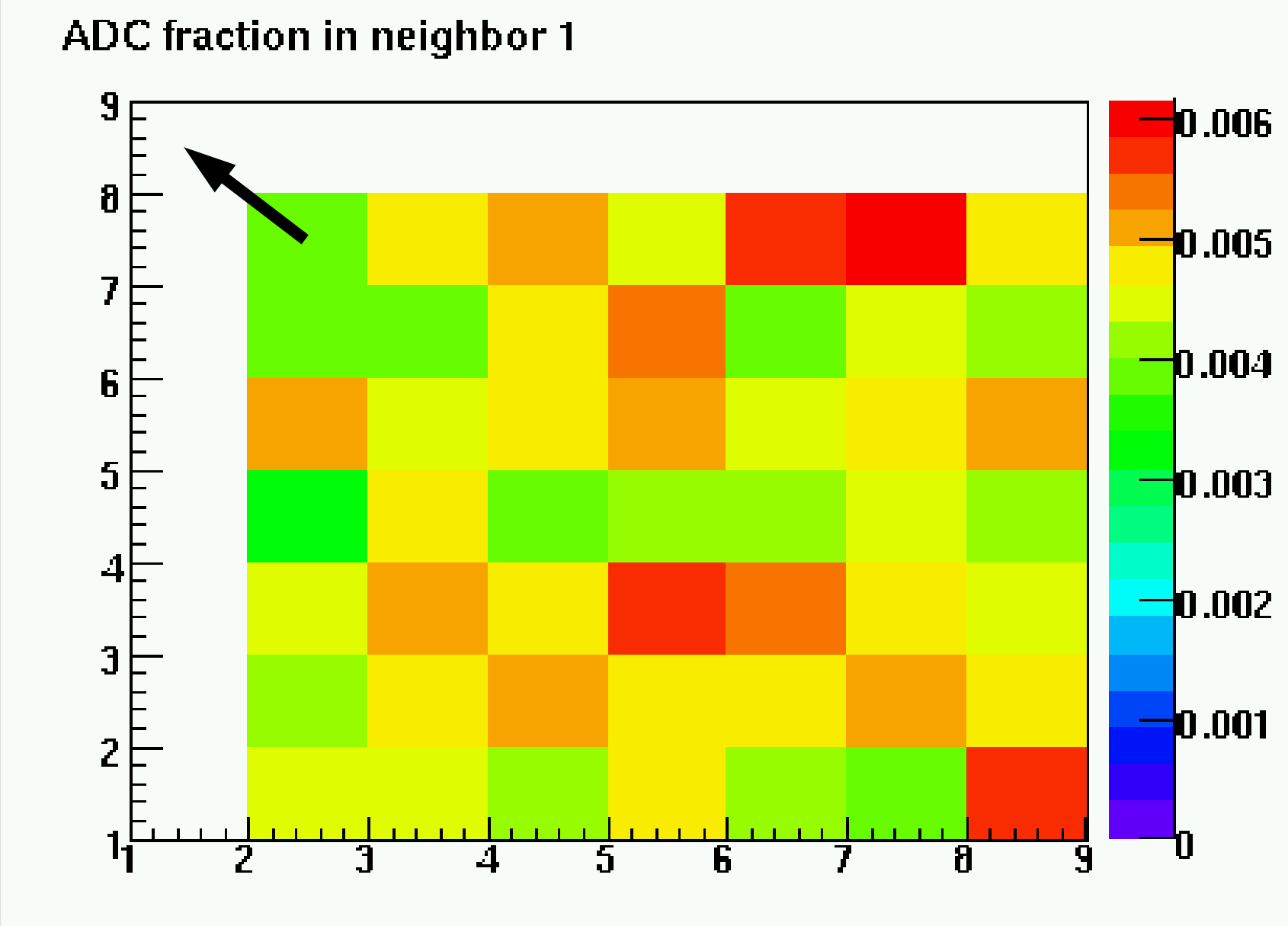


Total crosstalk – channel 13

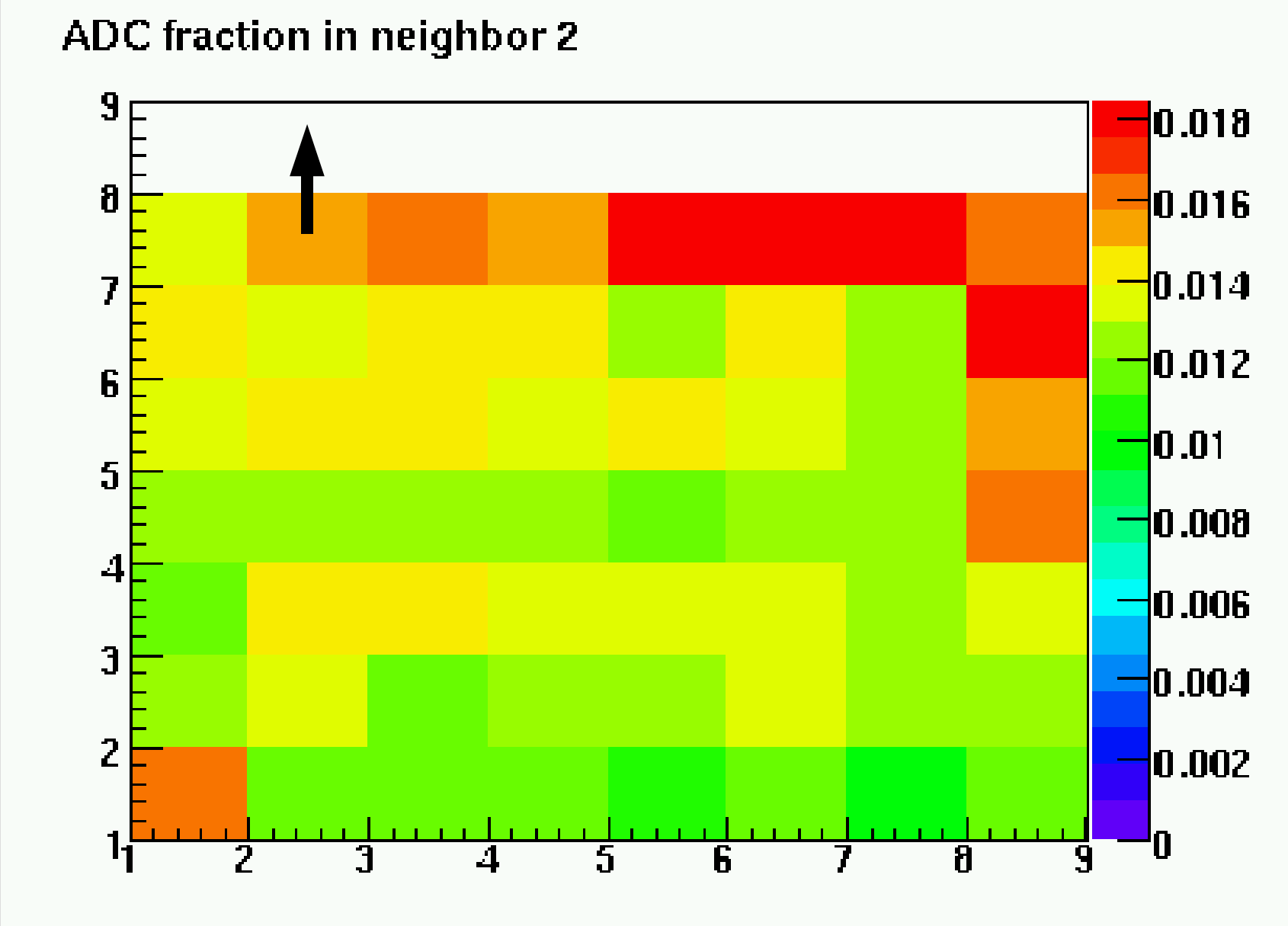
- Total crosstalk: ratio between sum of ADC of all 8 neighbors and ADC in central pixel



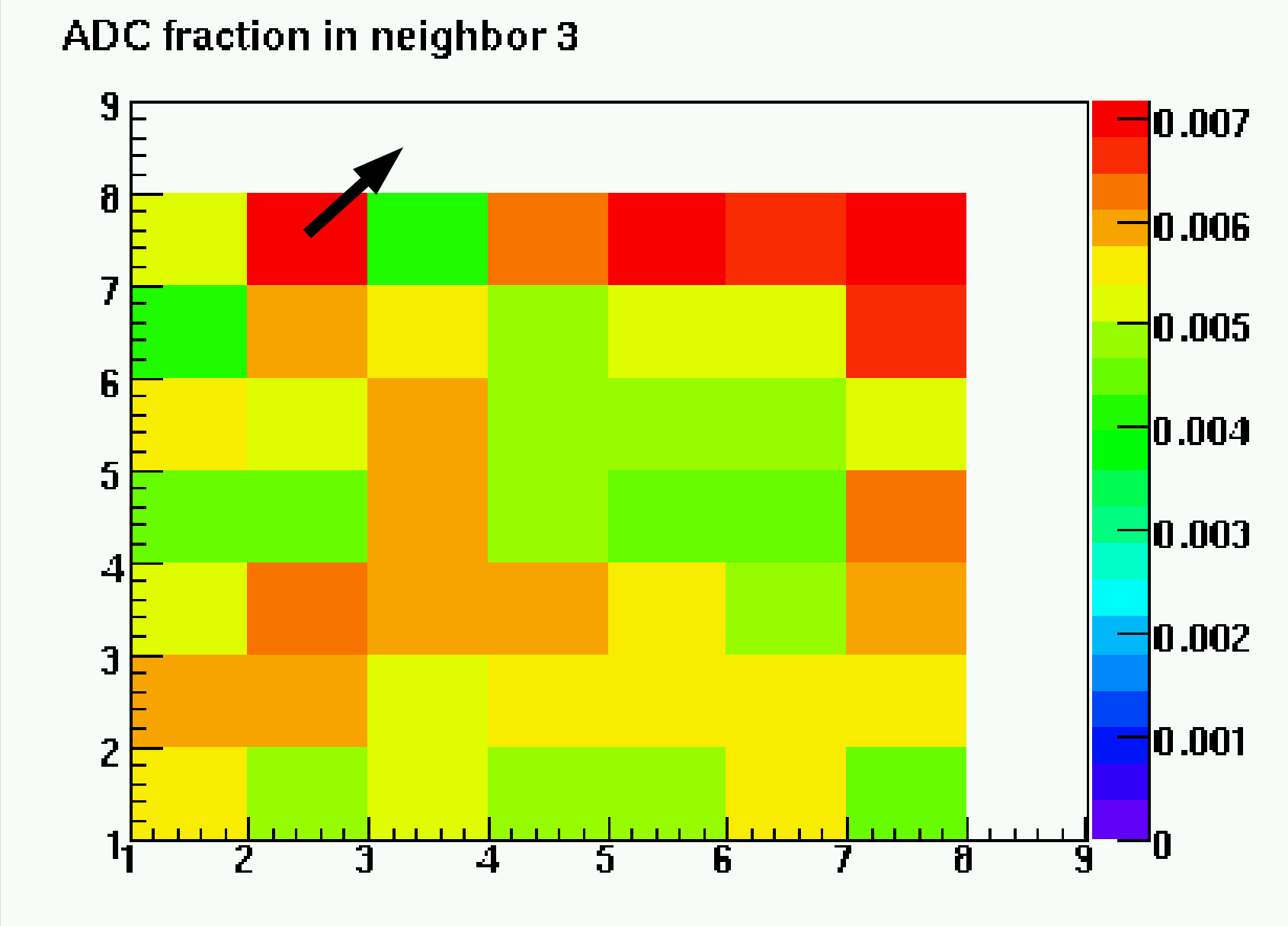
Crosstalk – neighbor 1



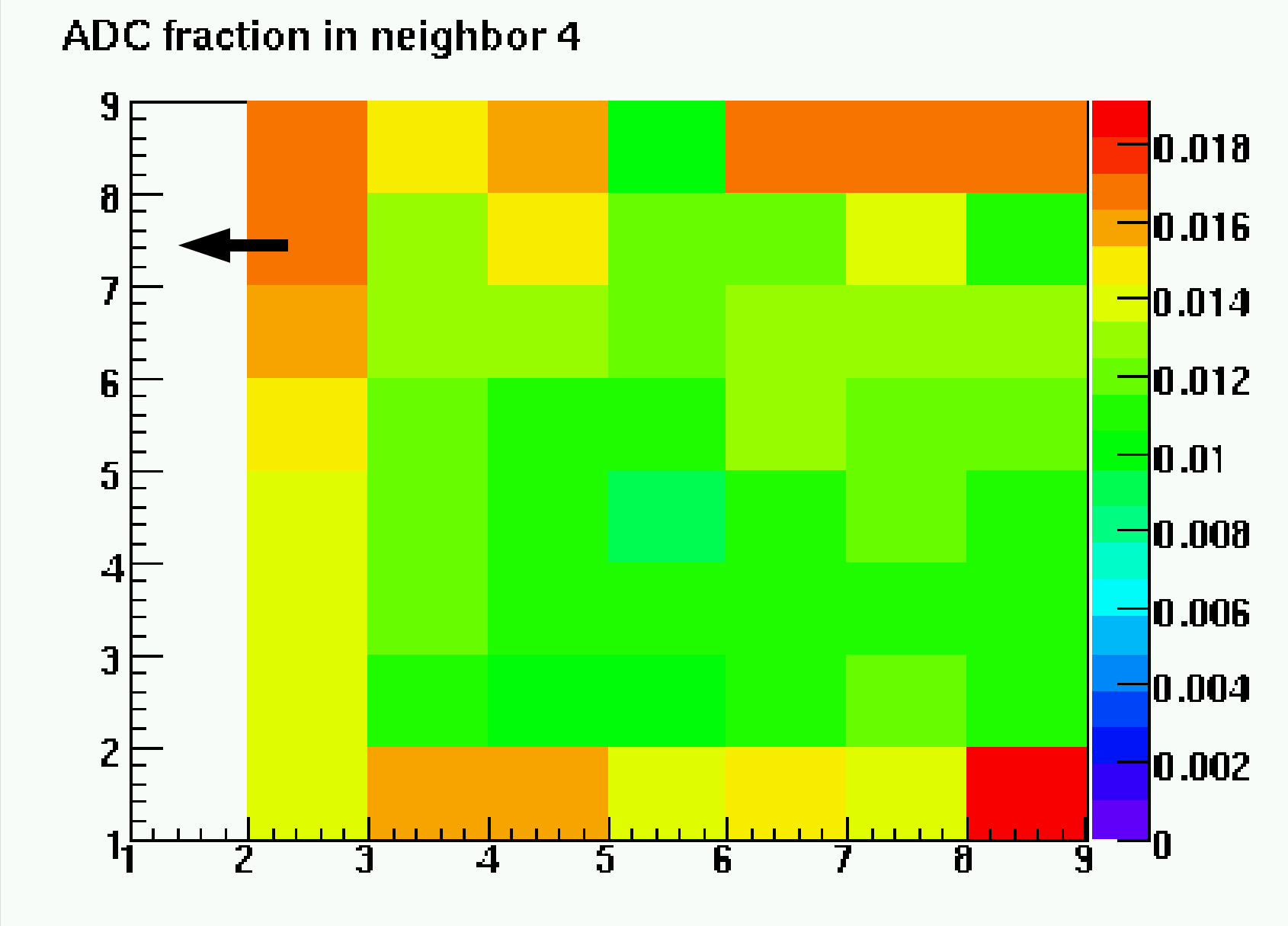
Crosstalk – neighbor 2



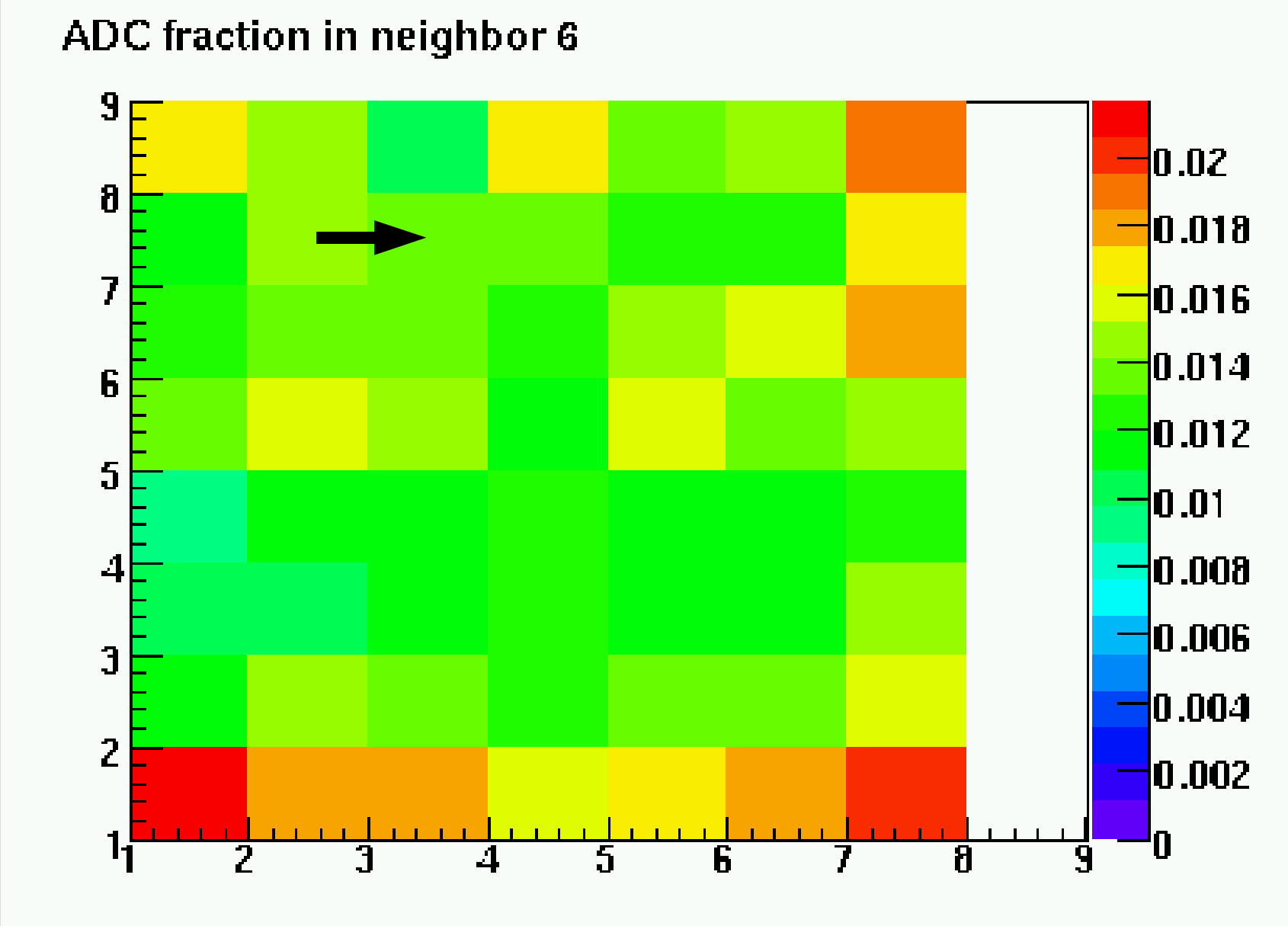
Crosstalk – neighbor 3



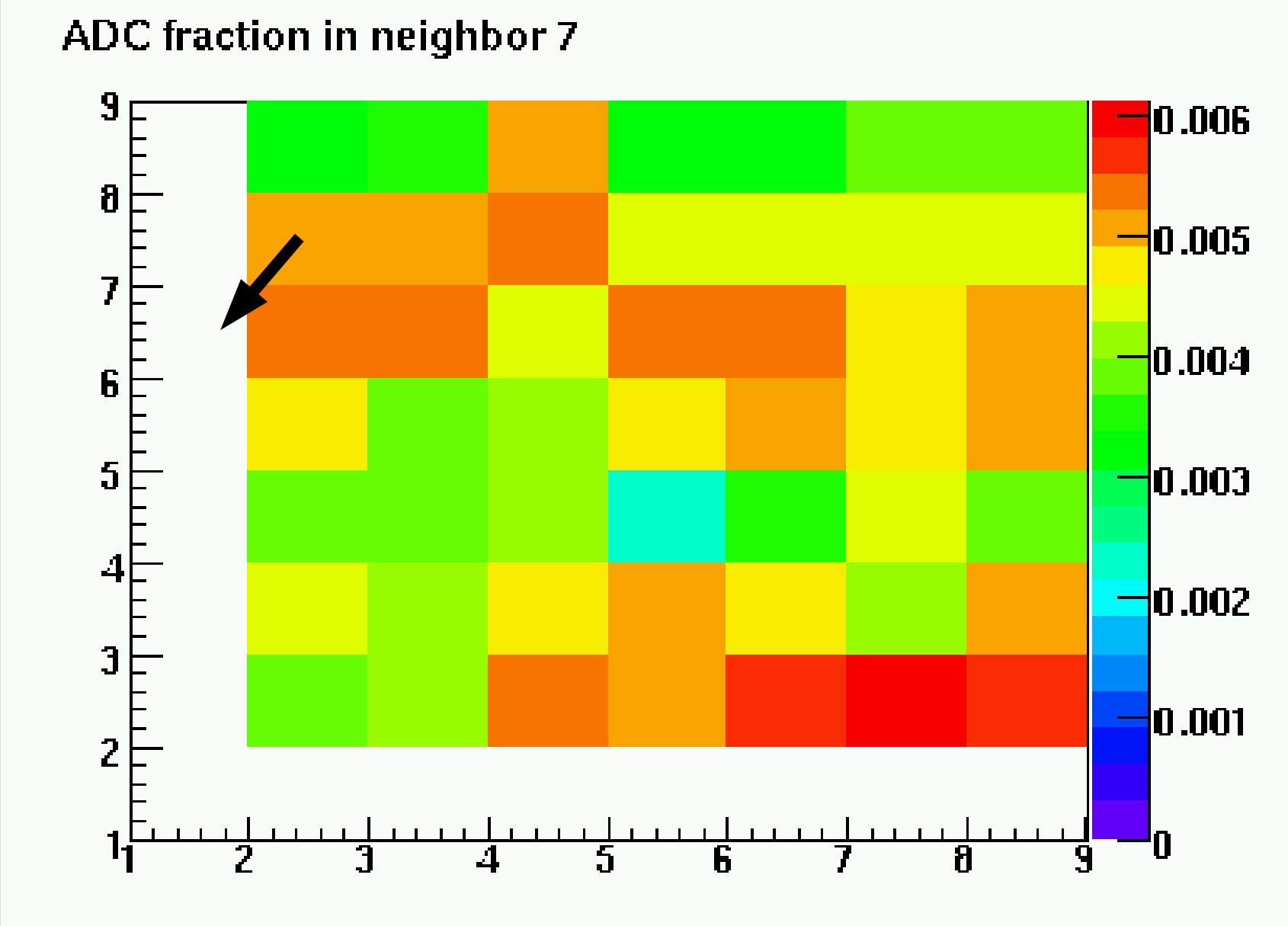
Crosstalk – neighbor 4



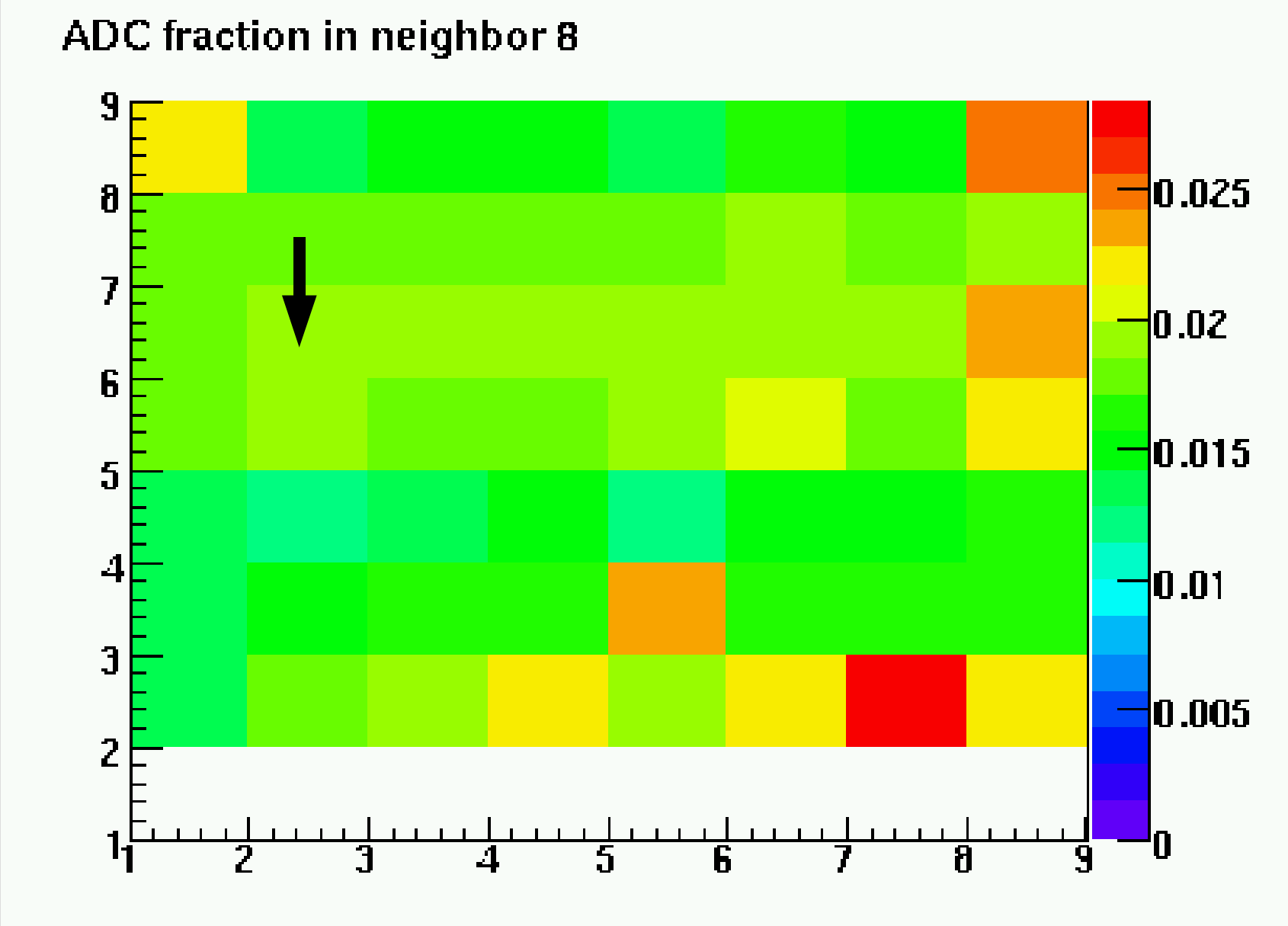
Crosstalk – neighbor 6



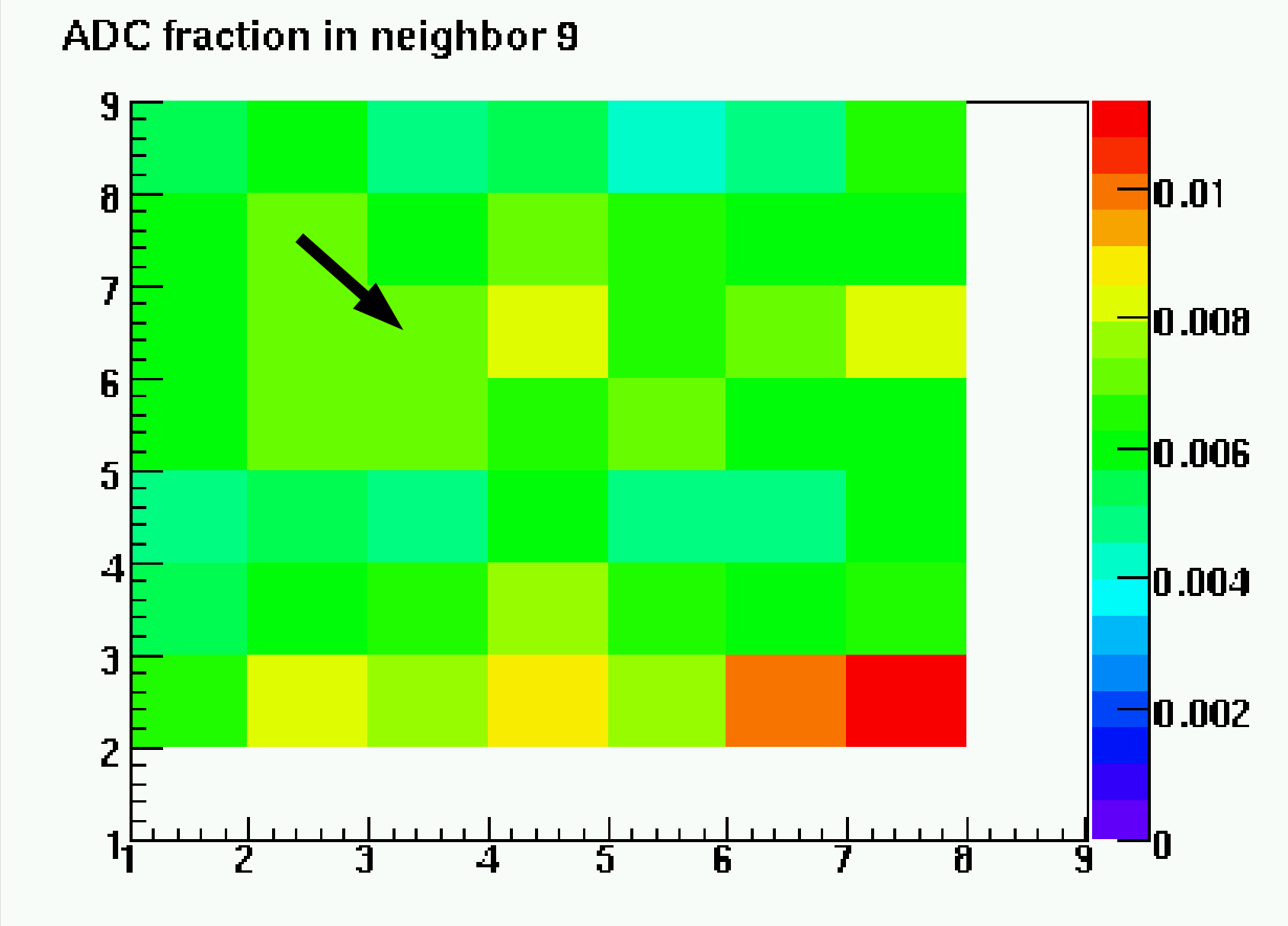
Crosstalk – neighbor 7



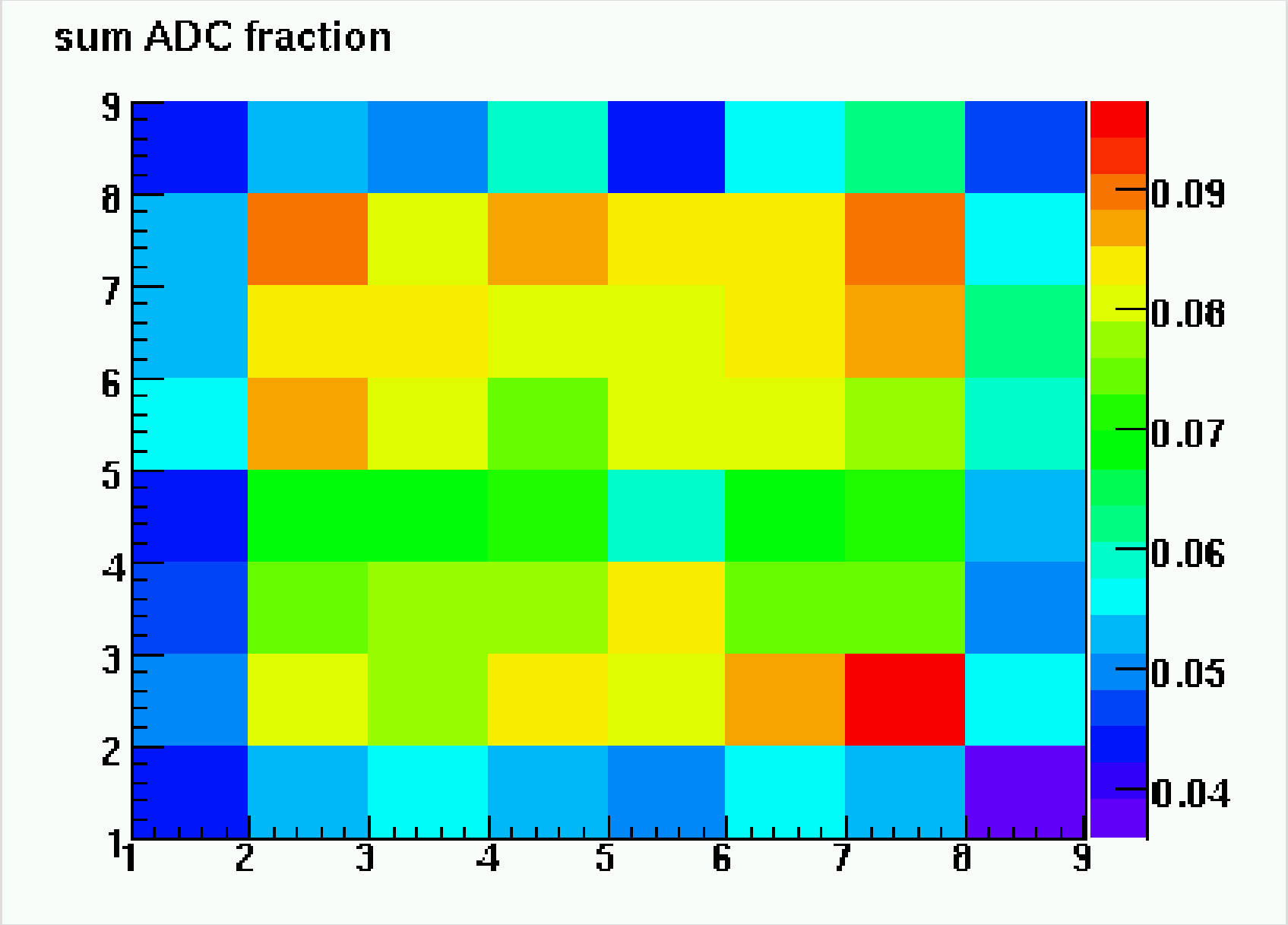
Crosstalk – neighbor 8



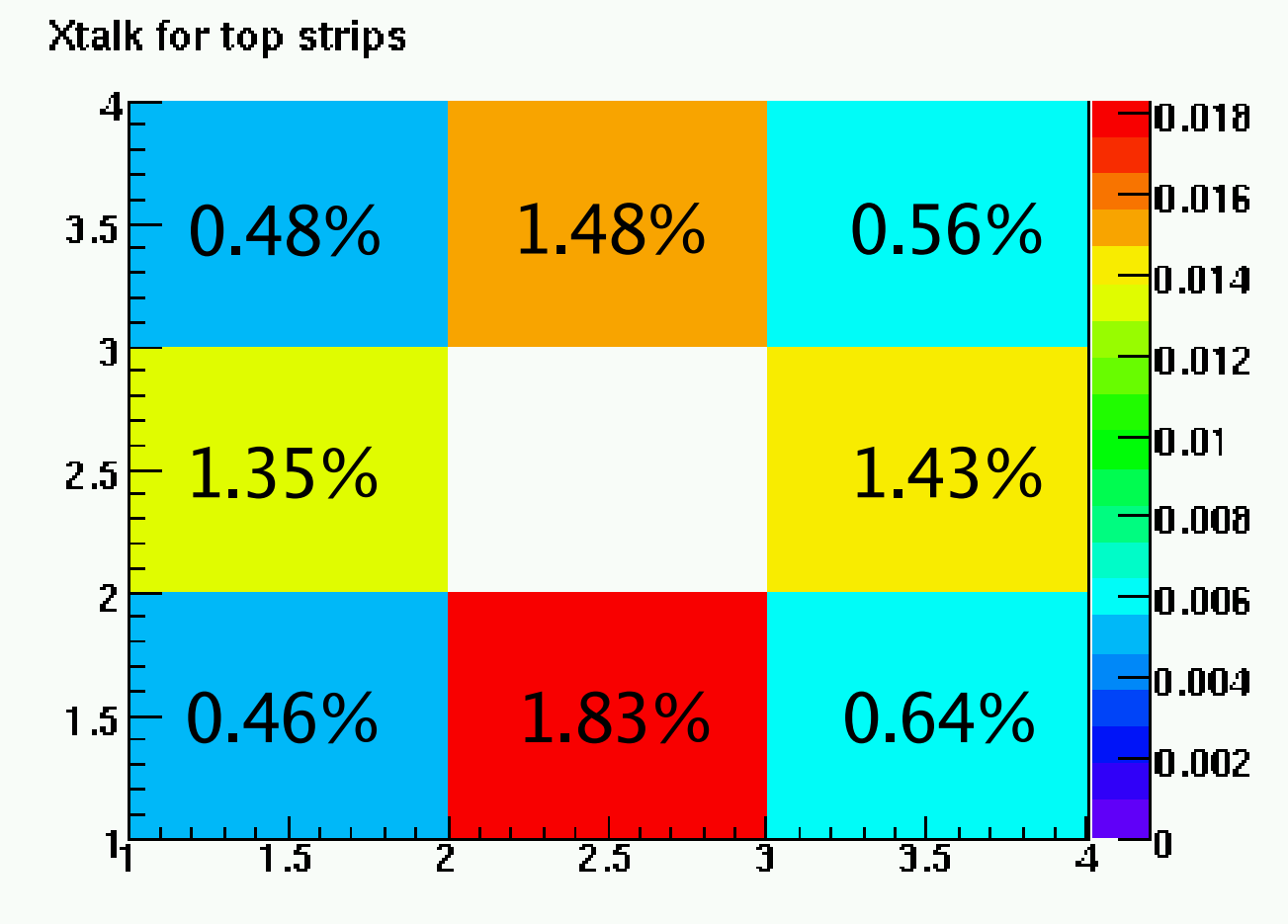
Crosstalk – neighbor 9



Crosstalk – total



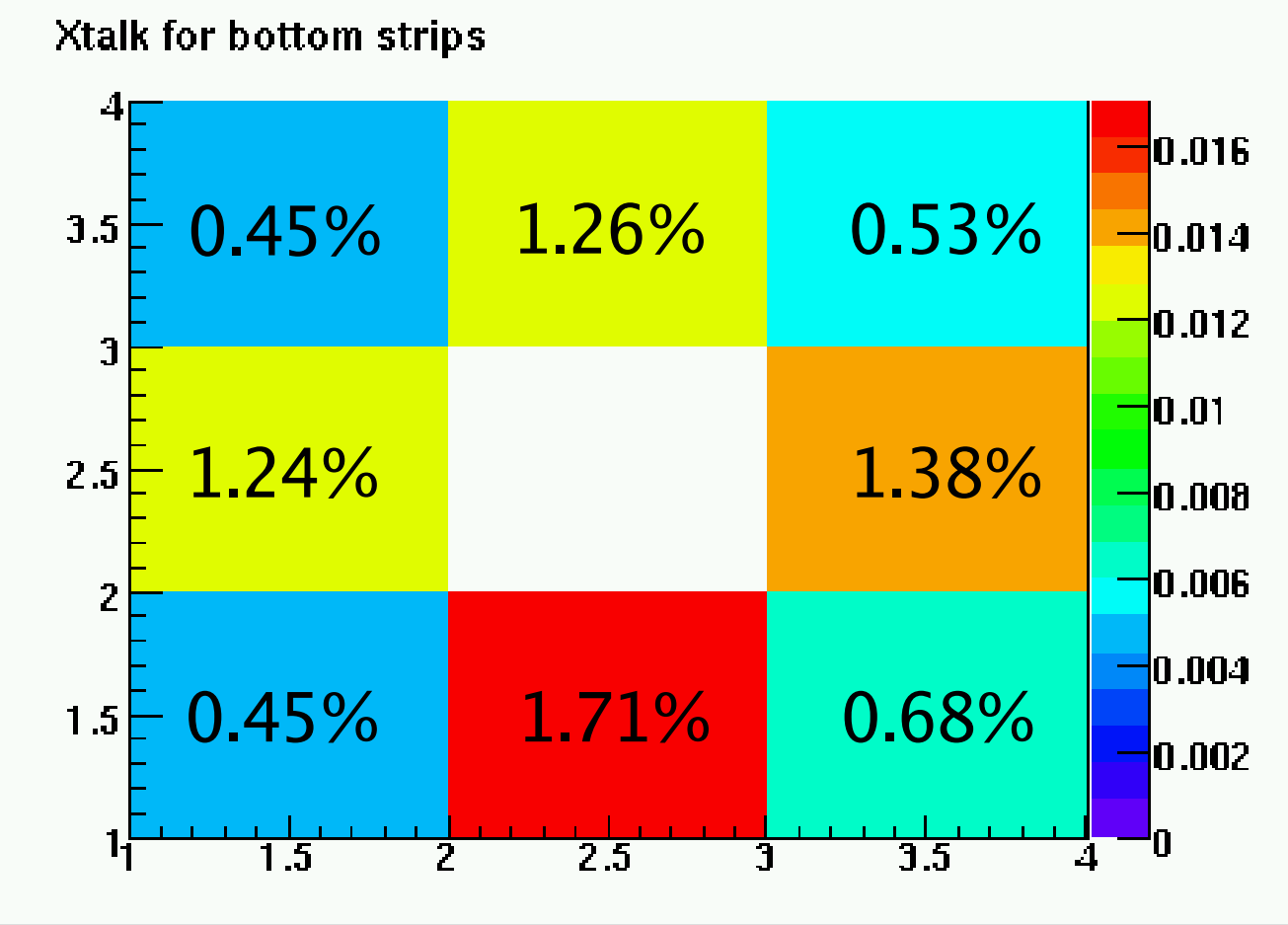
Crosstalk – top layer



Total: 7.02%

(total includes also edge pixels)

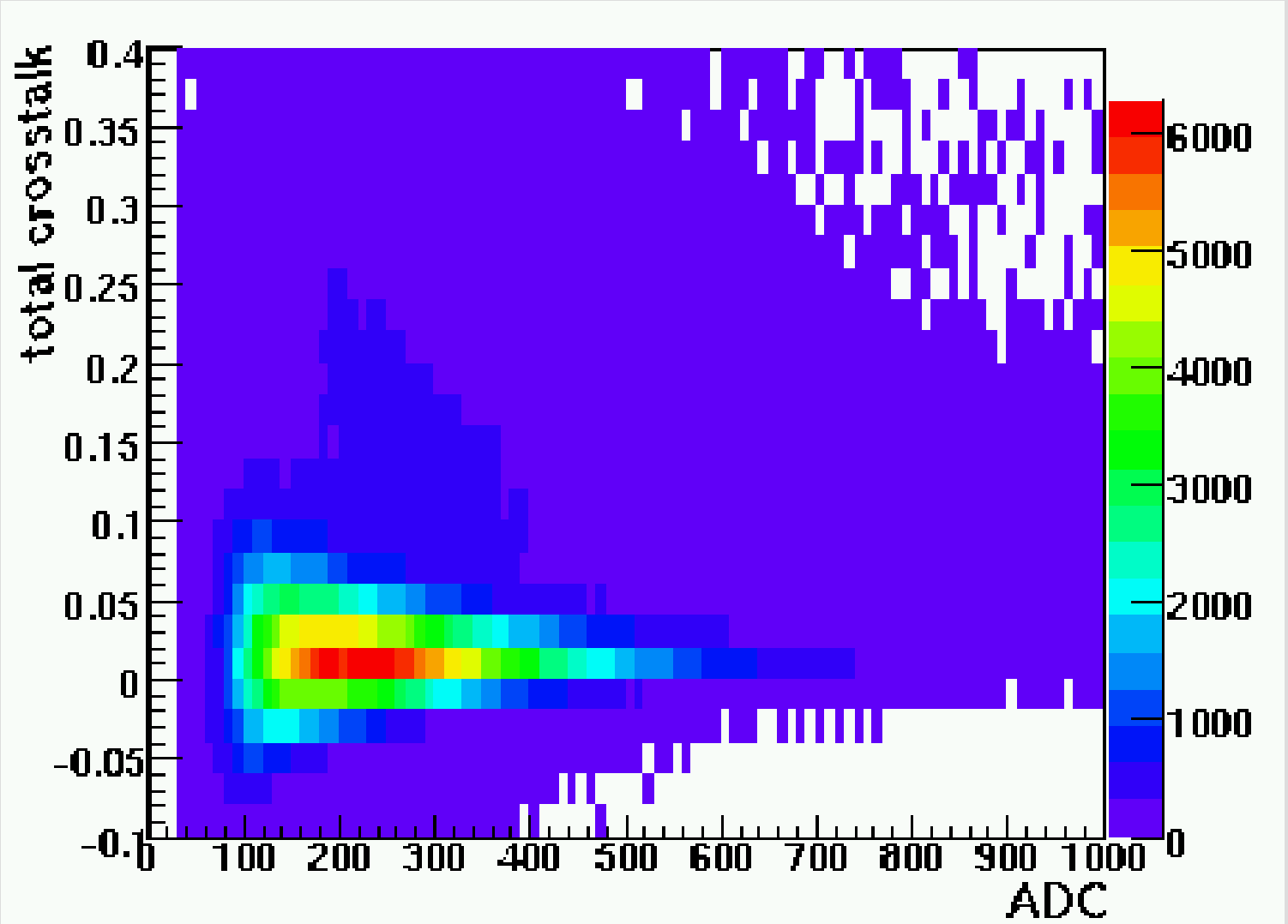
Crosstalk – bottom layer



Total: 6.44%

(total includes also edge pixels)

Crosstalk vs ADC



More checks

- Selecting events this way limits to crosstalk hits with a ratio < 1: biased measurement?
- Calculate probability to observe xtalk hit larger than central hit: not so small for 1PE threshold (more next time)
- Run with 1 PE threshold: results look similar (details next time)
- Are there events where 2 hits contribute to same “neighboring” pixel?
- Maybe select events with very high adc count in one hit, study crosstalk in neighboring hits in other layer.