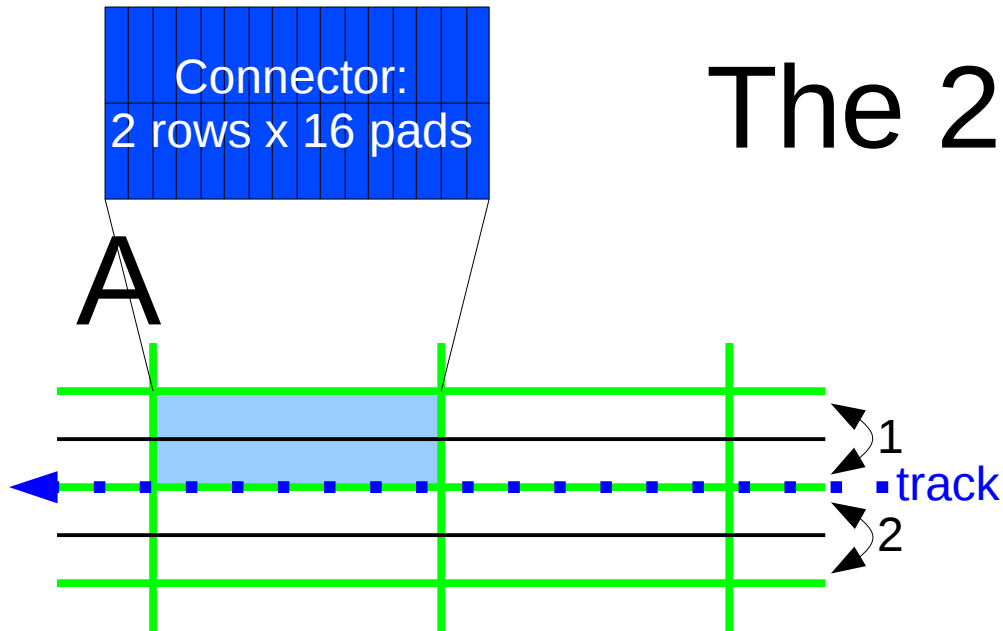


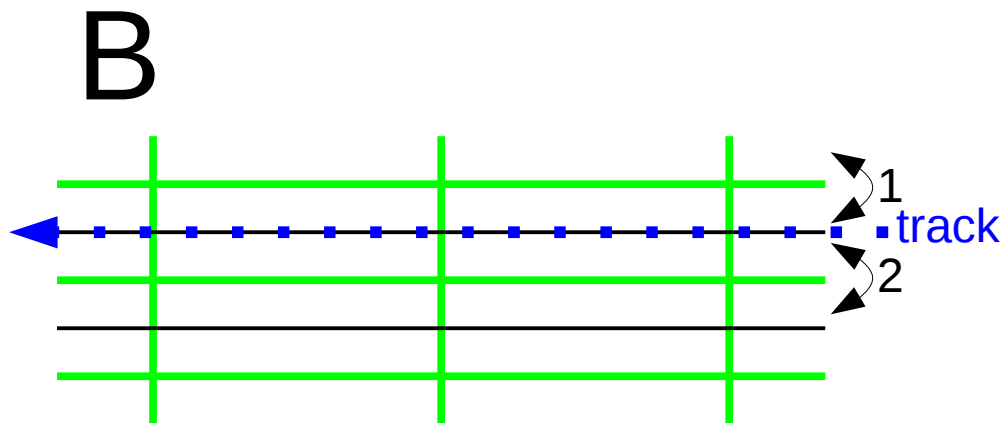
Study of possible cross-talk in cables using test beam data

- Tracks perpendicular to the long side of the pads, with low diffusion, only give signal on 1 or 2 pad rows
- We use this data to study correlation between the faces of the cable from a connector
- We should see the worst case where all the pads on one side of the connector get a signal, and none on the other side.

The 2 cases



- Case A:
Cross-talk in cable:
correlations expected

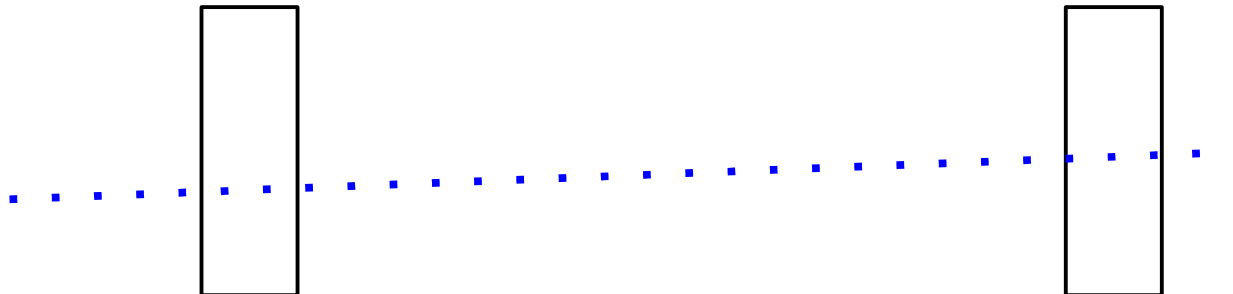


- Case B:
No cross-talk correlation
expected between
different cables

1 and 2 are the two symmetric situations on the two sides of the track. The notation A, B, 1 and 2 are used in the result plots.

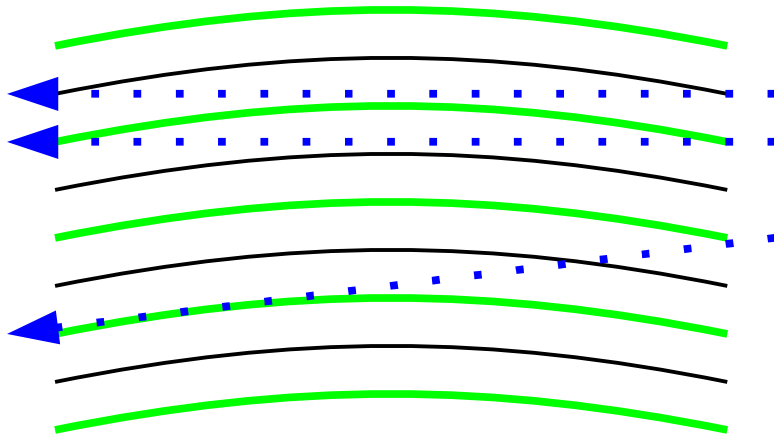
Track selection 1

- In a first step, we clean the data using the same trigger as for previous studies to get clean single electron events, and select only the signal from the track
 - Require signal in two regions at the 2 ends of the track
 - Cut on number of clusters for multiple tracks
 - Keep only the pads around the track



Track selection 2

Selecting tracks going between two pad rows



- Very poor resolution with pad direction perpendicular to normal configuration
 - Bended geometry
- => Fitting not very reliable

Track selection 2

- Simple Method:

Calculate the average pad row for all the pads in the track

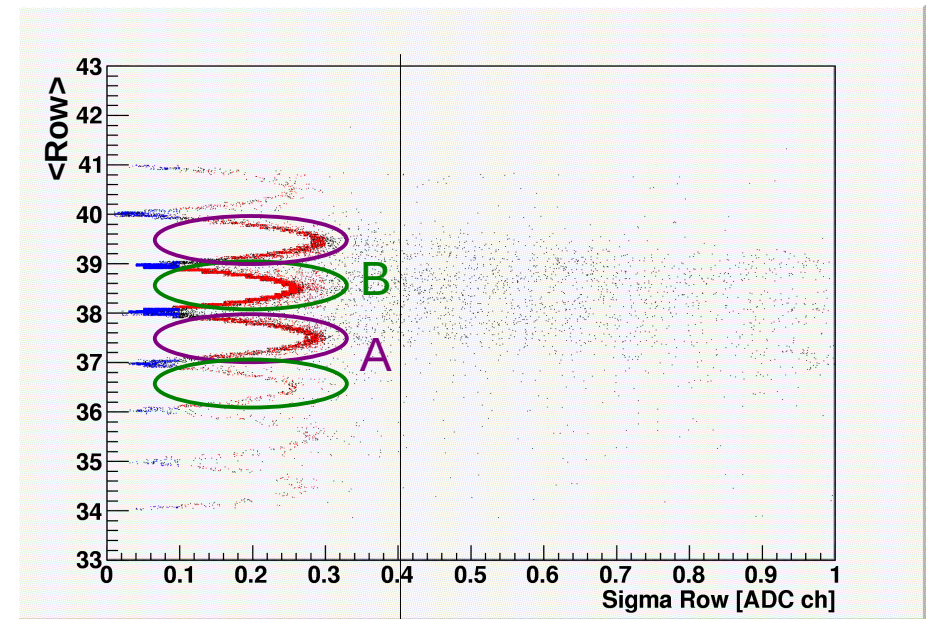
- Pros:

- Very simple and robust

- Cons:

- Approximate
- Doesn't get any information about angle

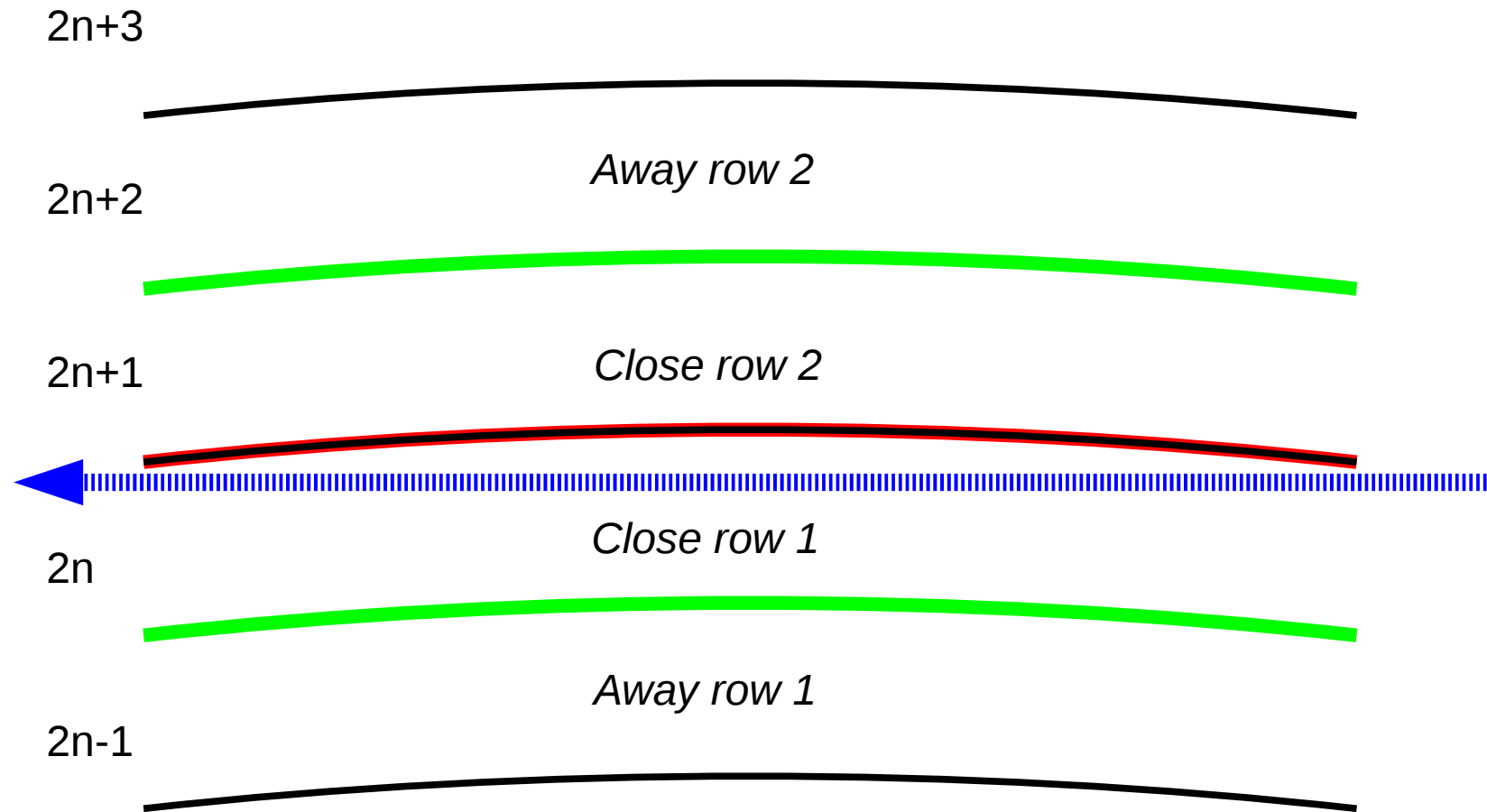
- Selected tracks in red (loose cut)



Cutting tracks with wide distribution (large angle)

A more sophisticated selection method developed by Ryô has shown the same results.

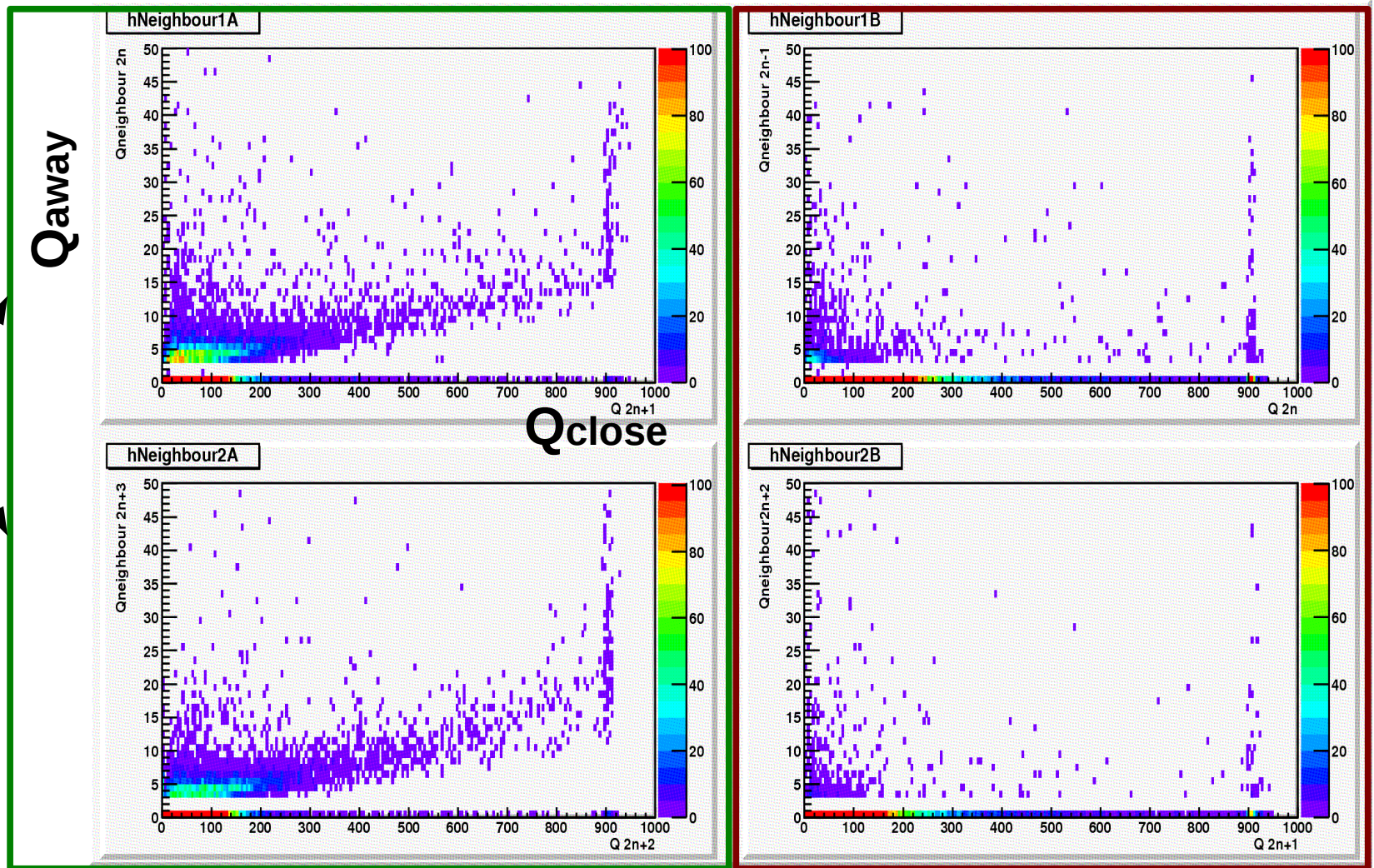
Geometry definition



Results: charge correlation

Case A

Case B

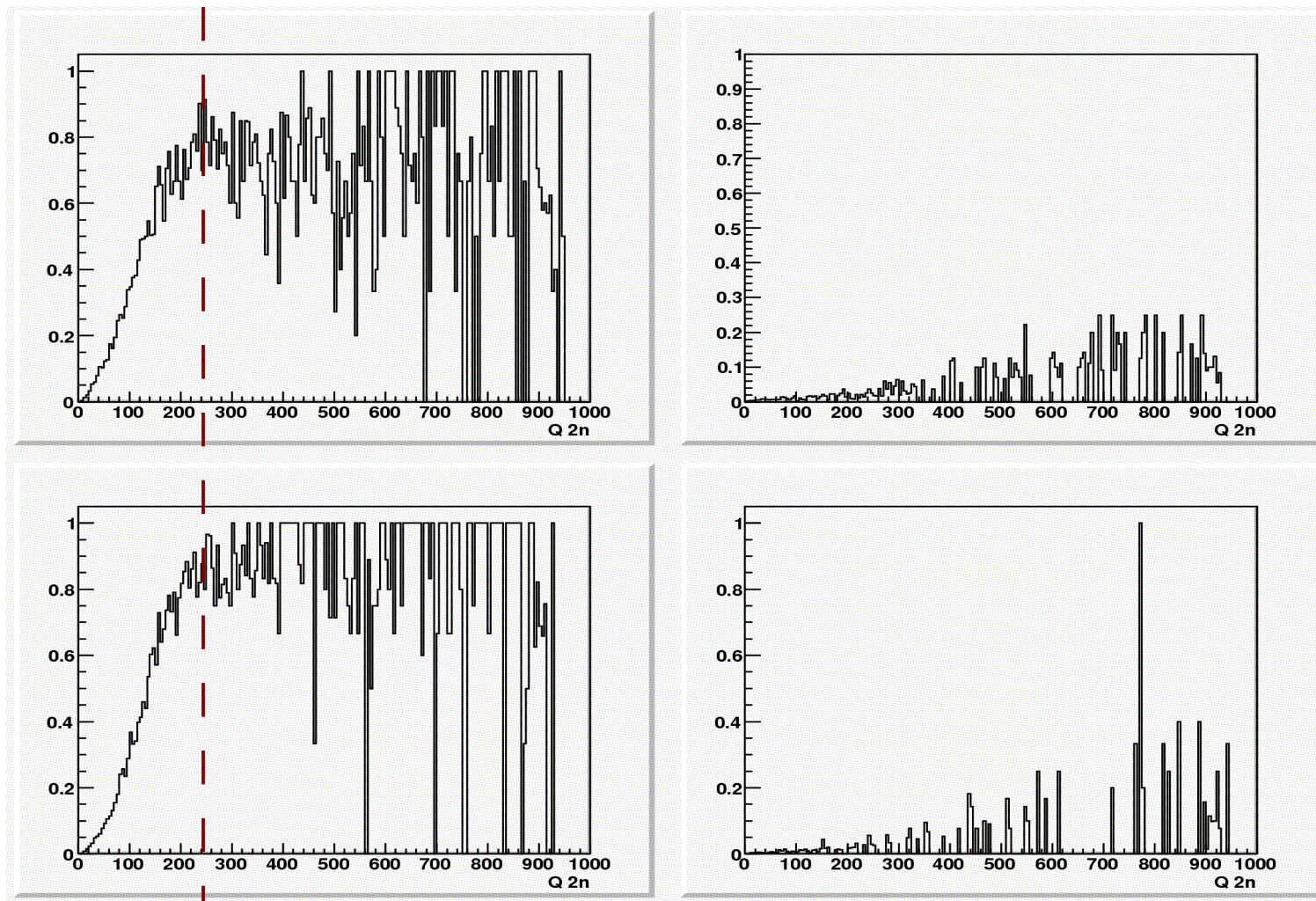


*Symmetric Cases:
2 sides of the track*

More “away” signal in case A than in case B:
Cross-talk in the cable

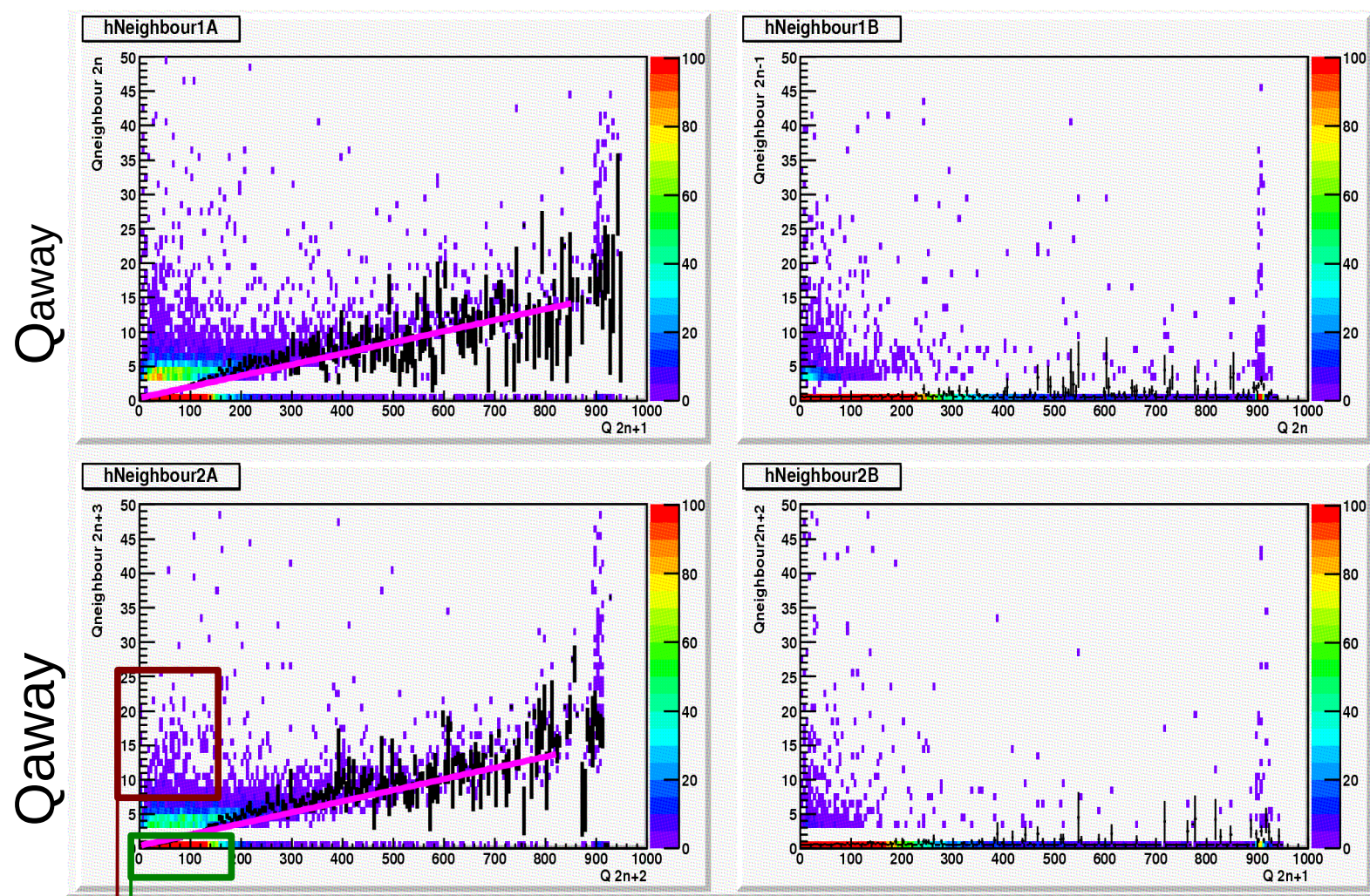
Results: Probability of effect

Probability to observe a signal in the away row
if a signal of amplitude Q is measured in the close row



Above 200 ADC ch, crosstalk is systematic

Results: amount of cross-talk signal



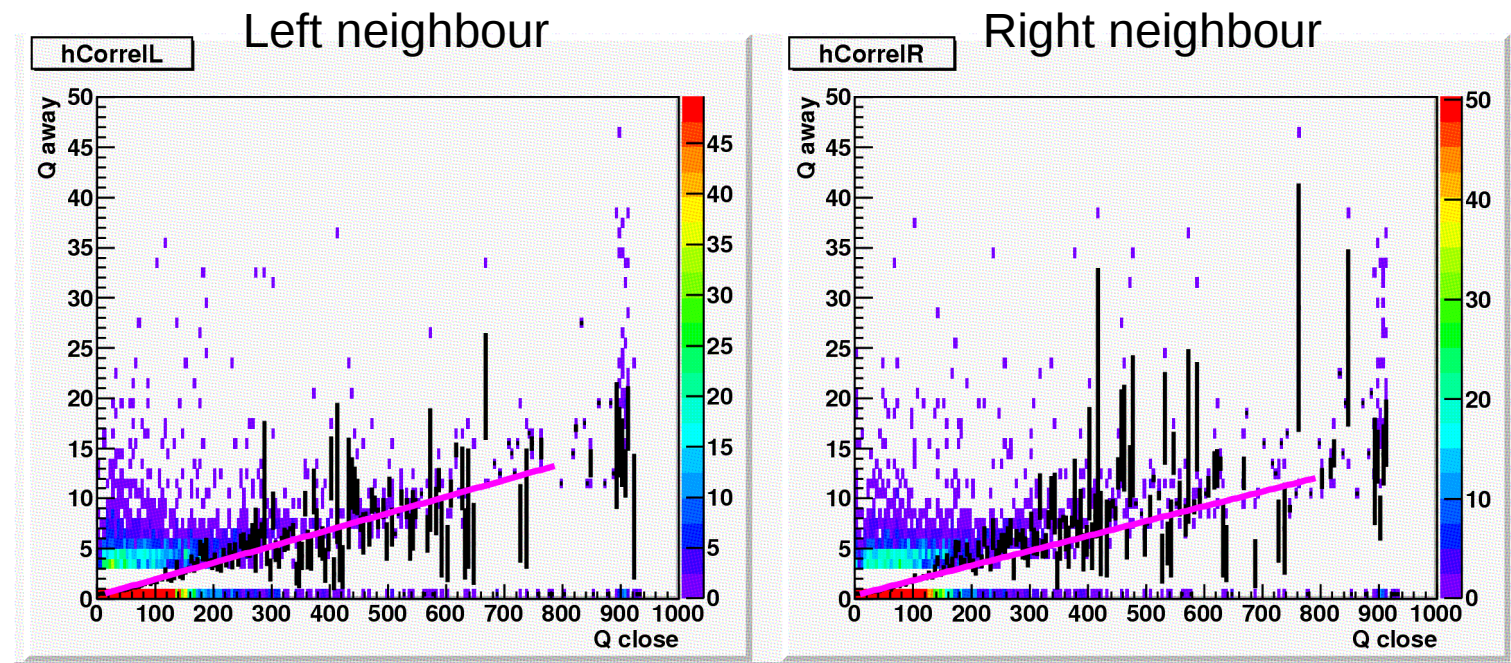
Cross-talk signal around 2% of high charge pad

Low signal cut away by zero suppression

Higher signal possibly from other neighbour in the cable

Two neighbour cables

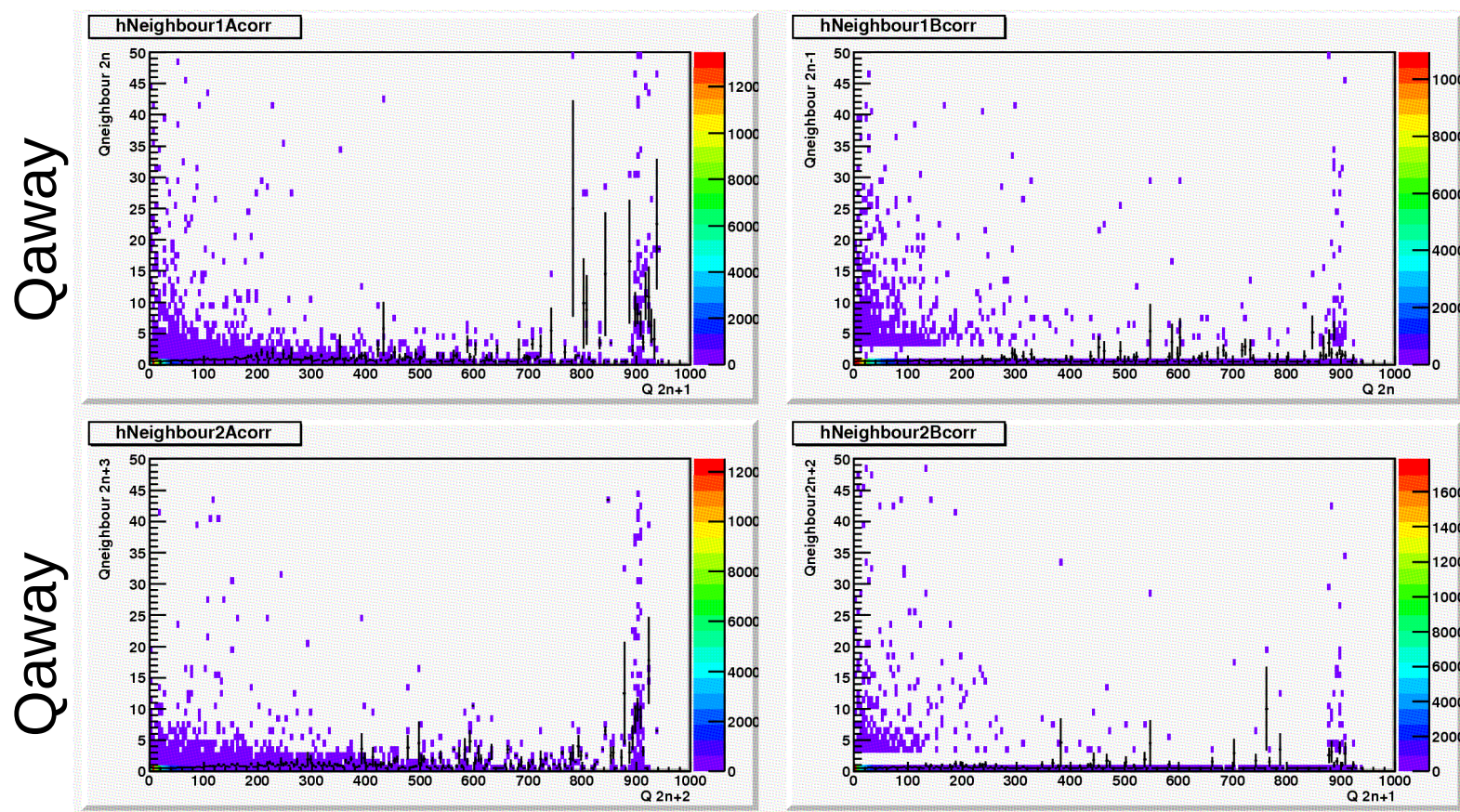
The wires in the kapton cable have two equivalent neighbours.
The cross talk signal in each neighbour should be similar



We do observe the same crosstalk in each situation

Charge correction

- $Q_{\text{corrected}} = Q - 0.017 \cdot (Q_{\text{neighbour1}} + Q_{\text{neighbour2}})$
- No difference left between cases A and B:



Conclusion

- We clearly observe a difference of signal between track geometries where the only difference is the position relative to the connector
 - This signal must come from cross-talk in the cable
- The signal created by cross-talk can be measured to be below 2% of the main signal
- This value is of the order of what was expected, and it might be possible to correct for it