

EPICAL-2

Dead Pixels

Analysis Meeting

Fabian Pliquett

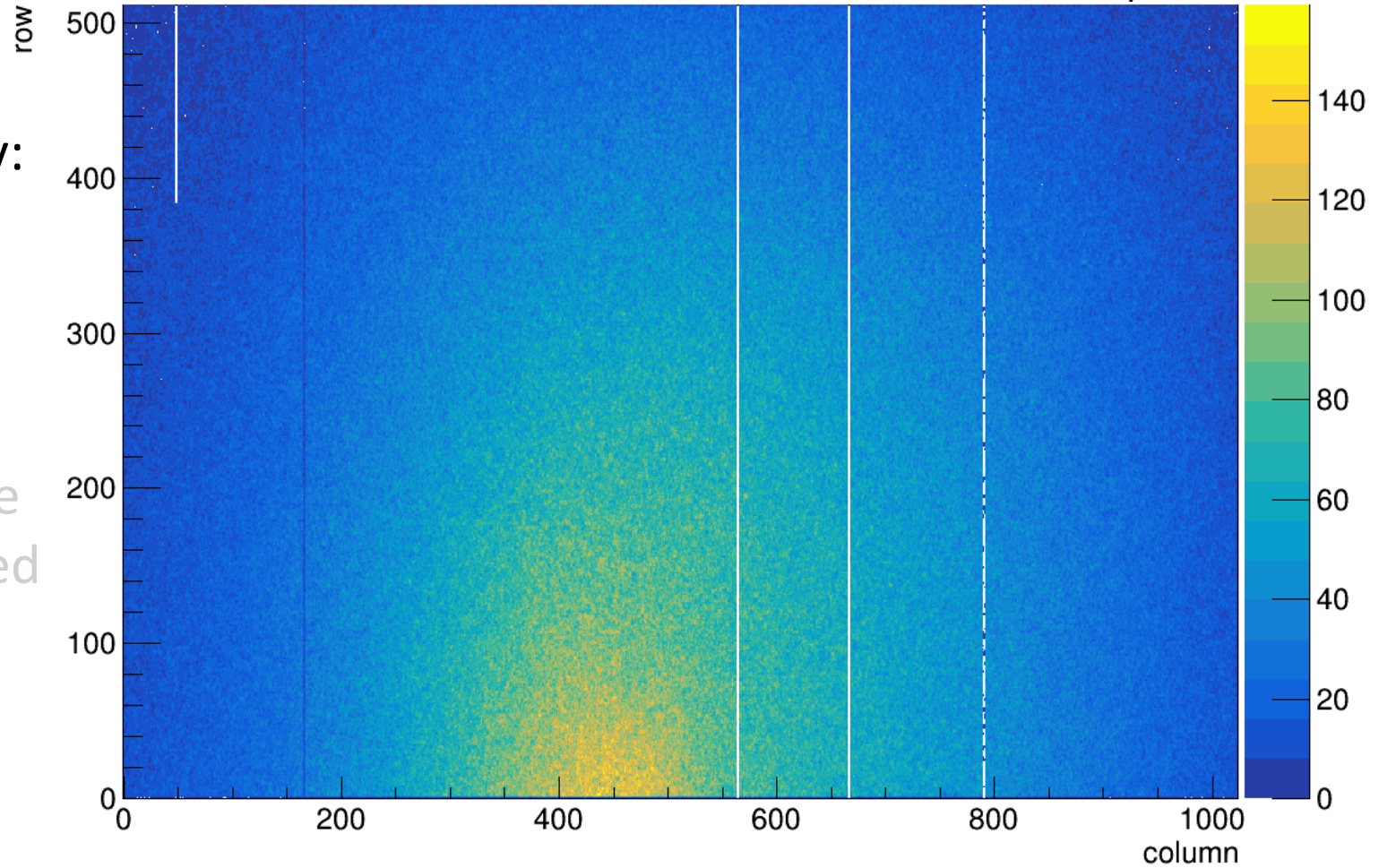
14.10.2020

Beam Runs – Dead Pixels

run 1413
chip 33

Looking at hit maps mostly whole
(double) columns behave differently:
⇒ procedure to find (partly) dead
(double) columns

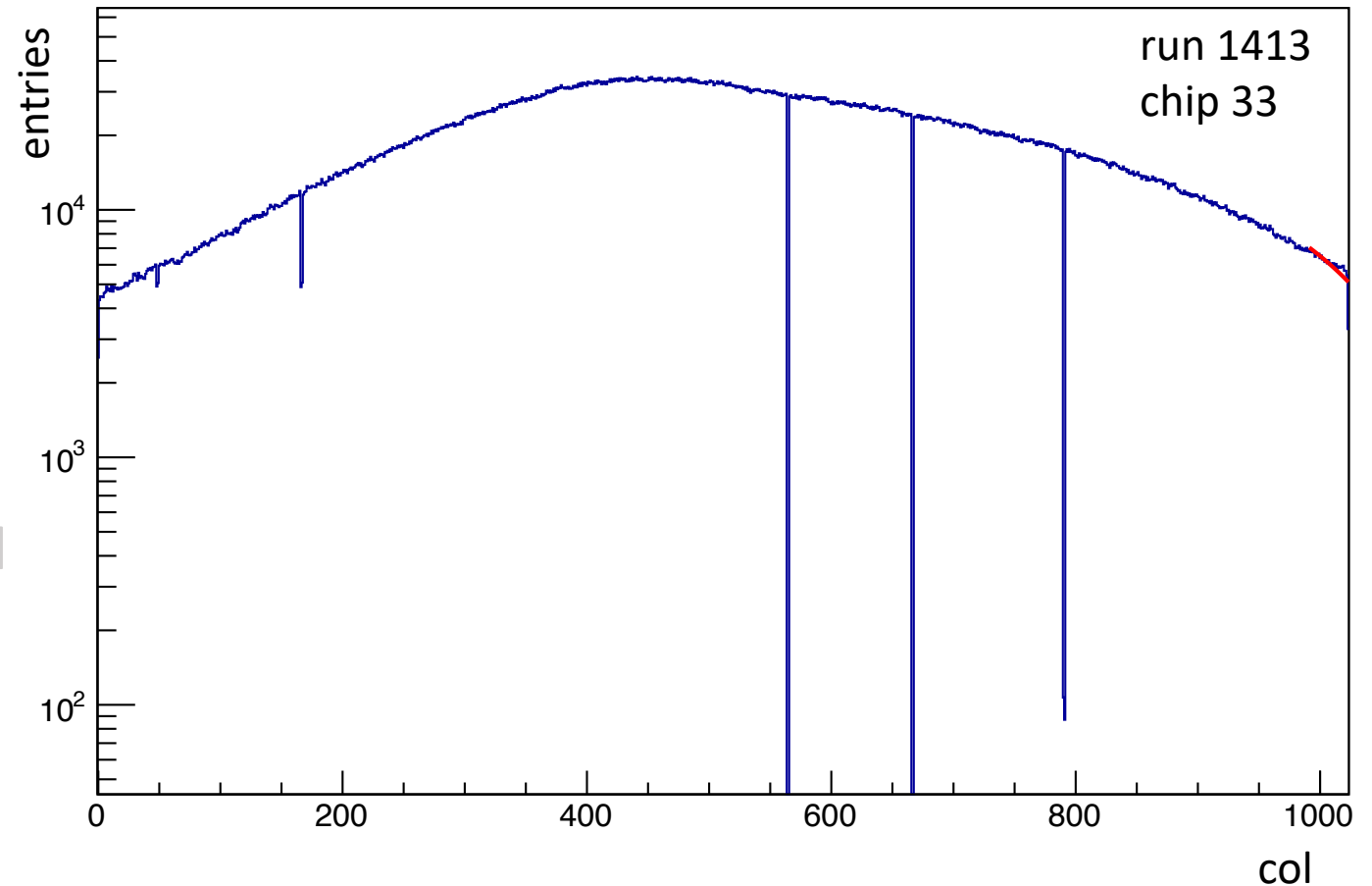
1. project 2D hit maps on columns
2. fit first order polynomial in range
3. calculate deviation from expected value in terms of sigma
4. mask column if deviation is outside of accepted range



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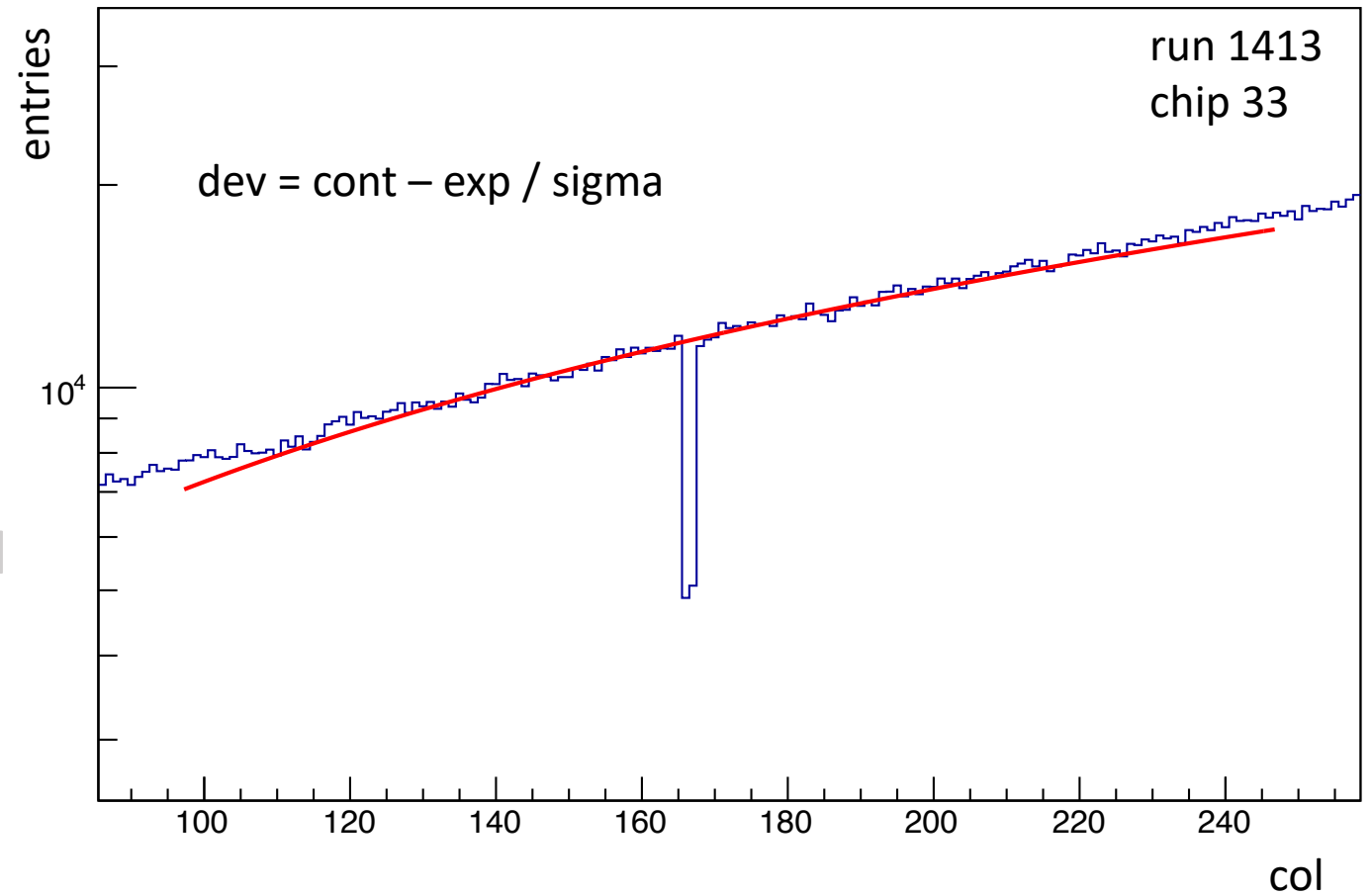
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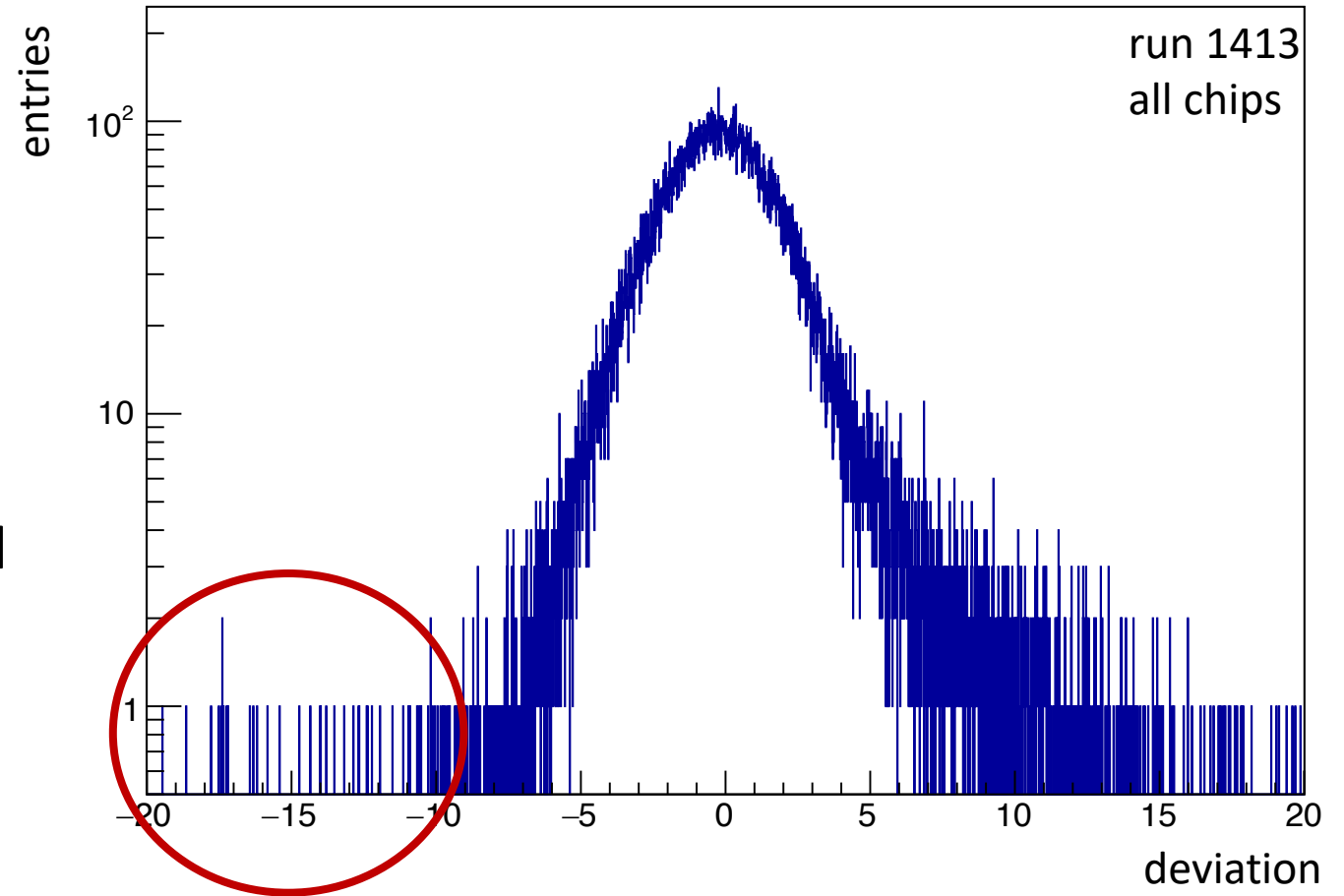


Beam Runs – Dead Pixels

columns with zero/very low
number of hits in underflow

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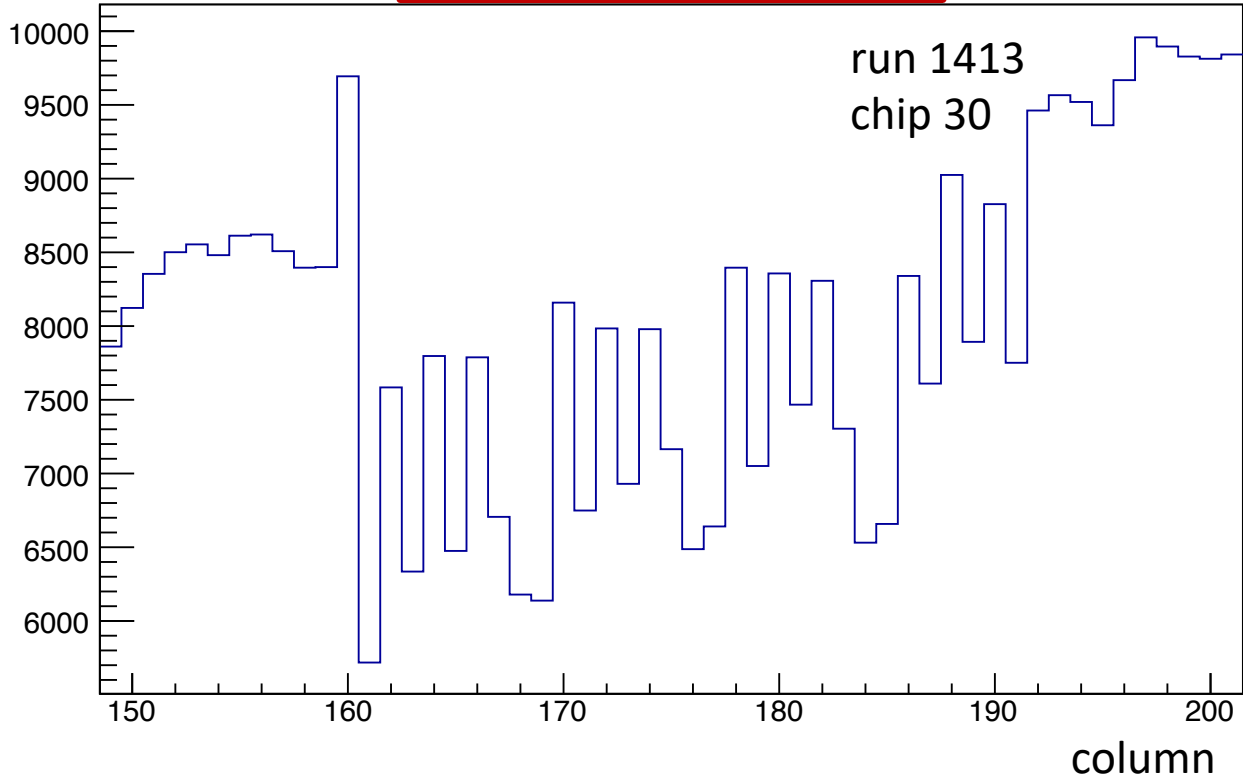
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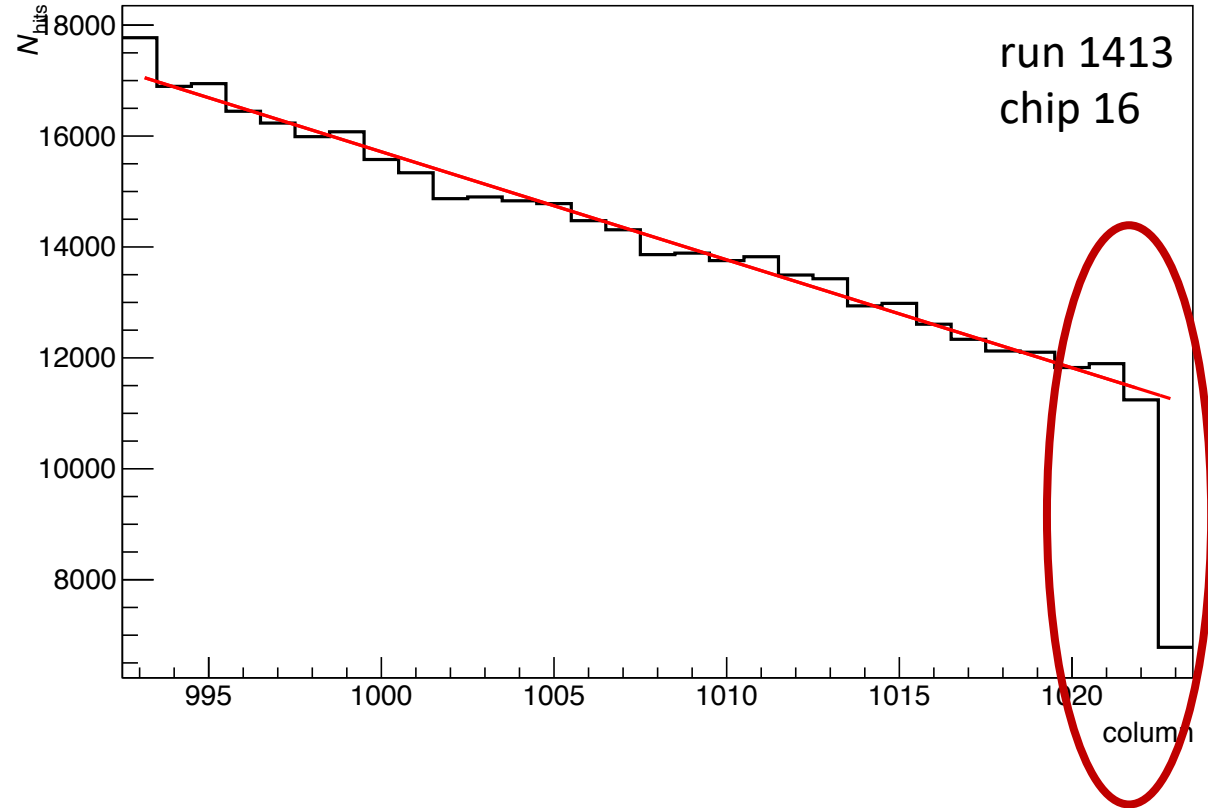
corresponding to edge of detector/bad readout region

Beam Runs – Dead Pixels

bad readout region



edge effects

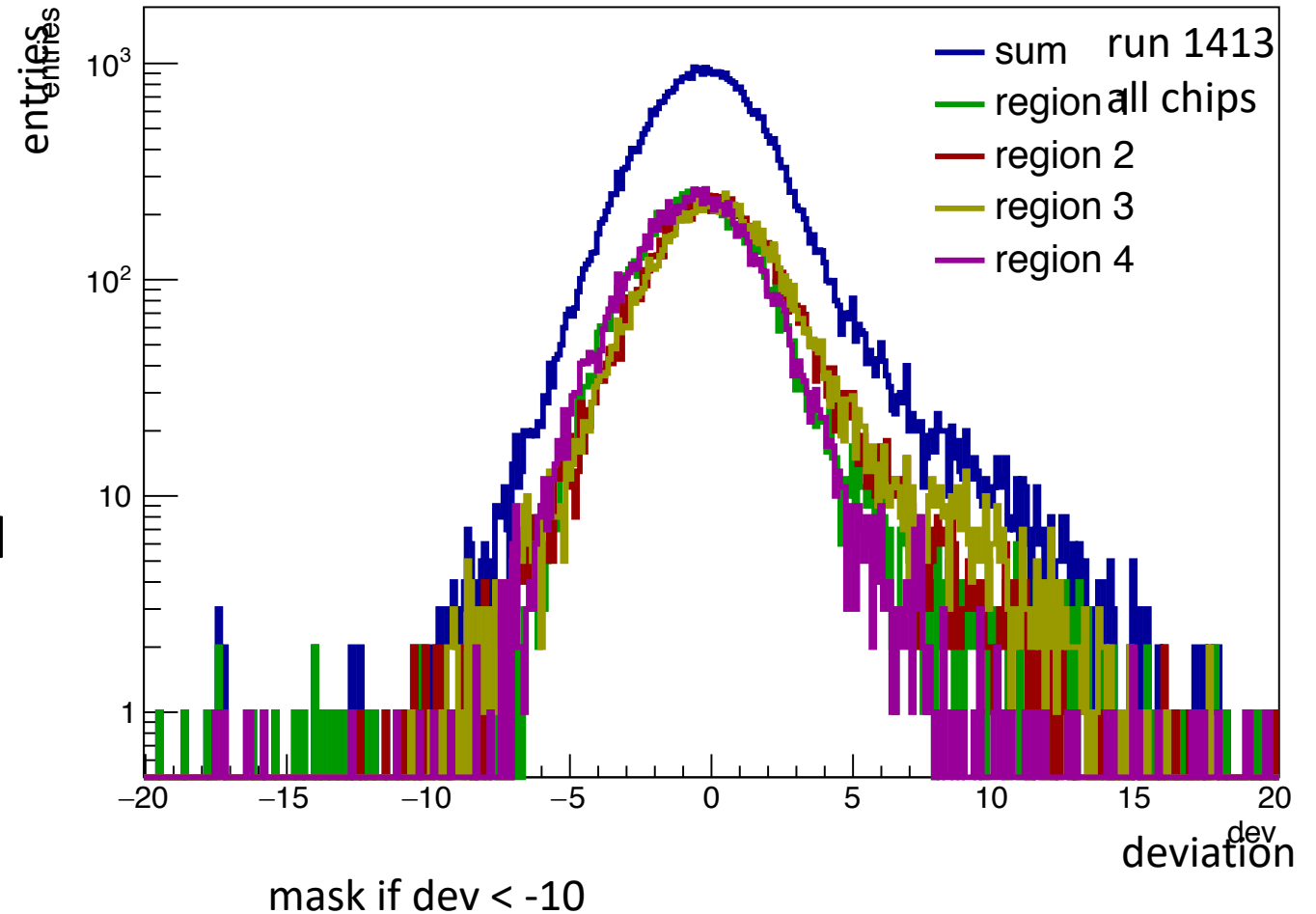


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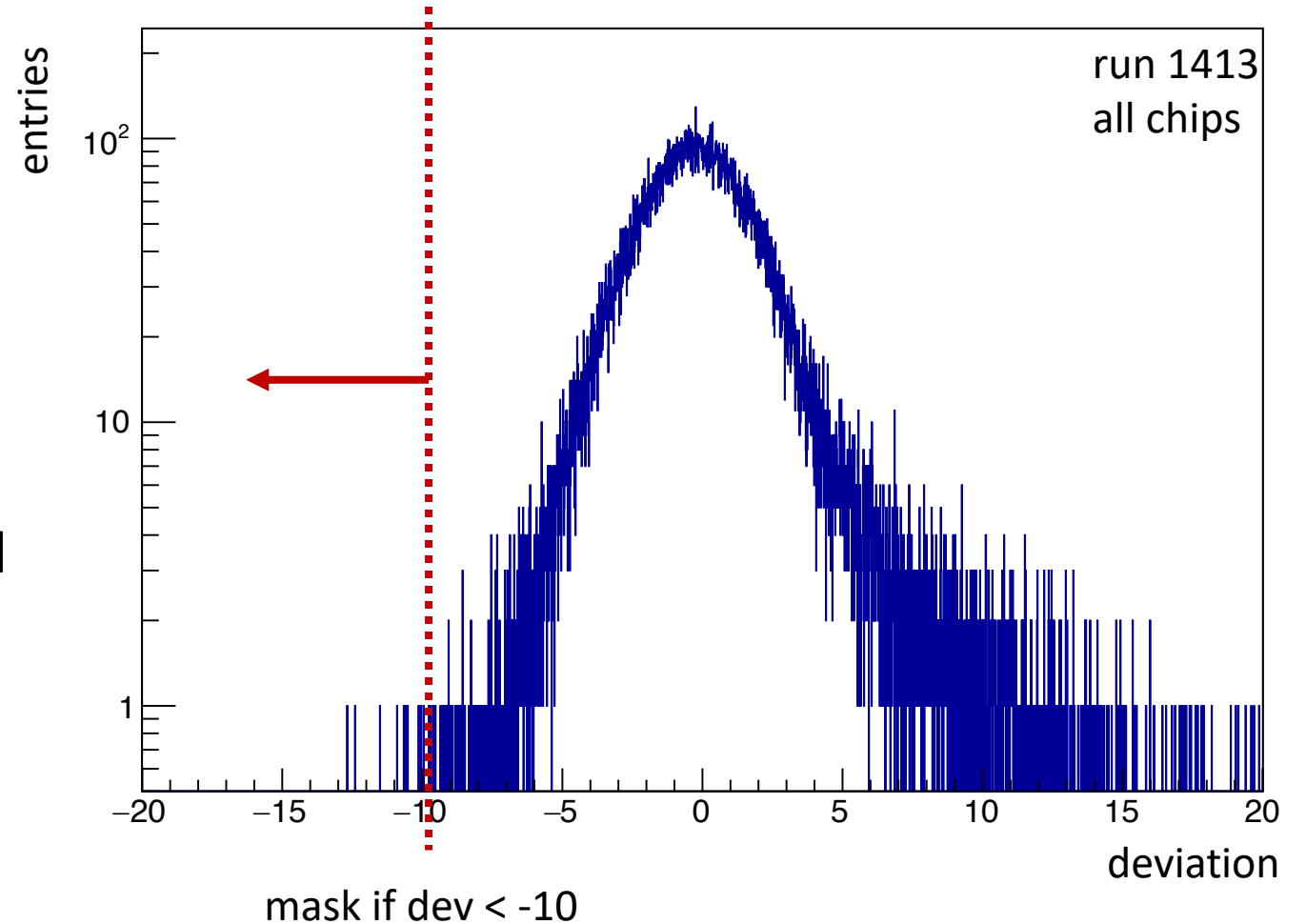


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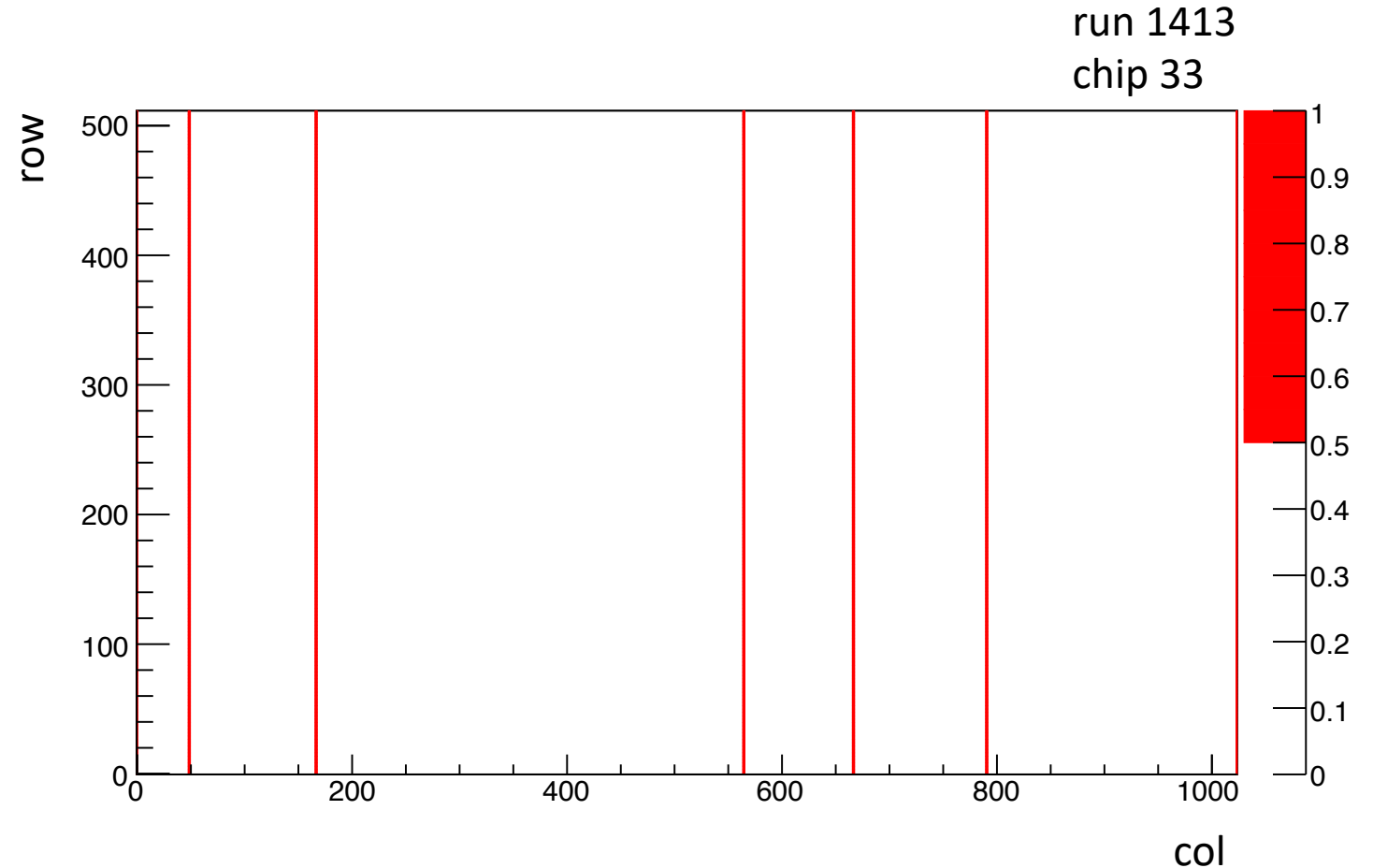
columns with zero/very low number of hits in underflow



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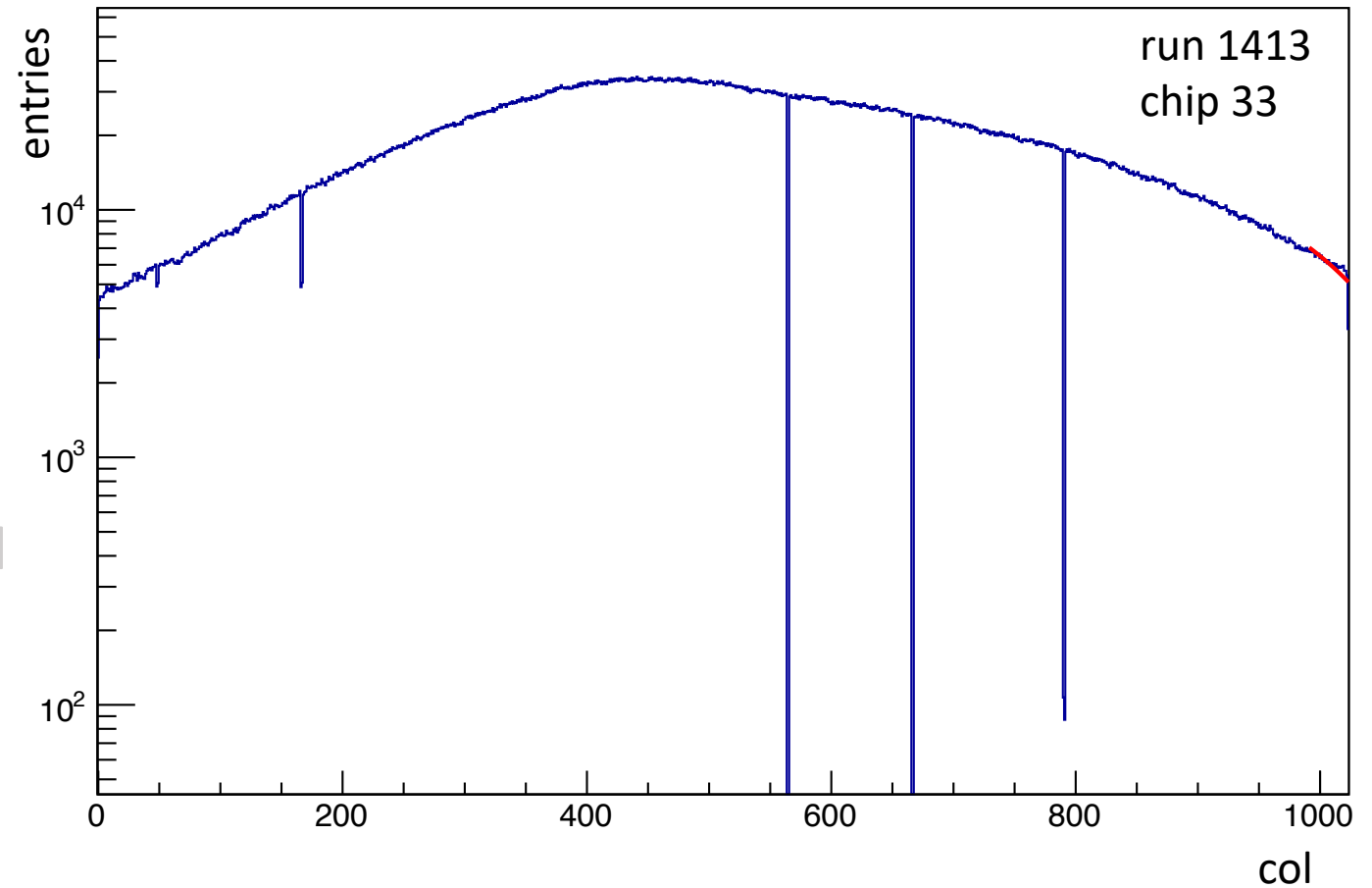
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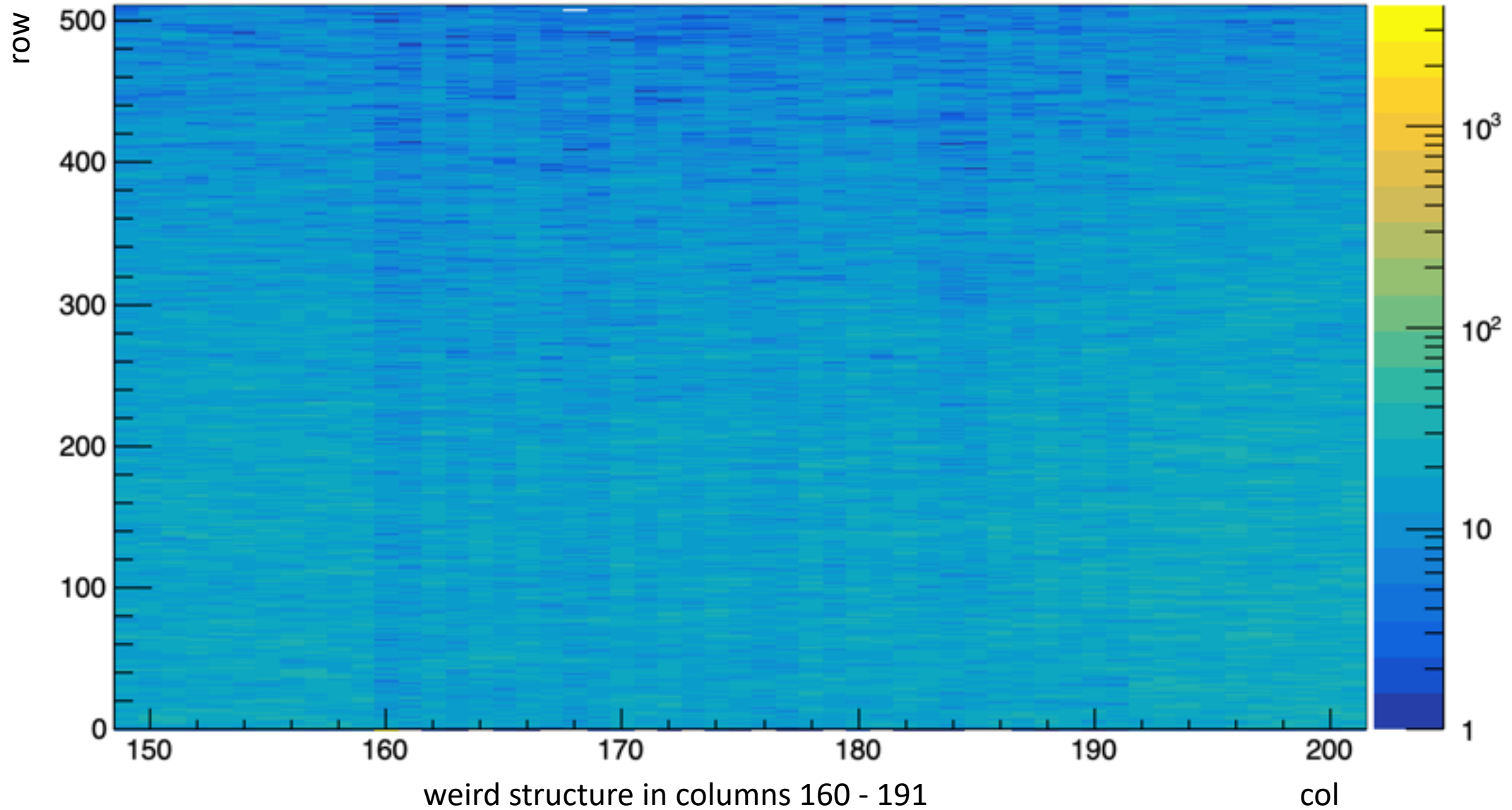
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Bad Readout Region

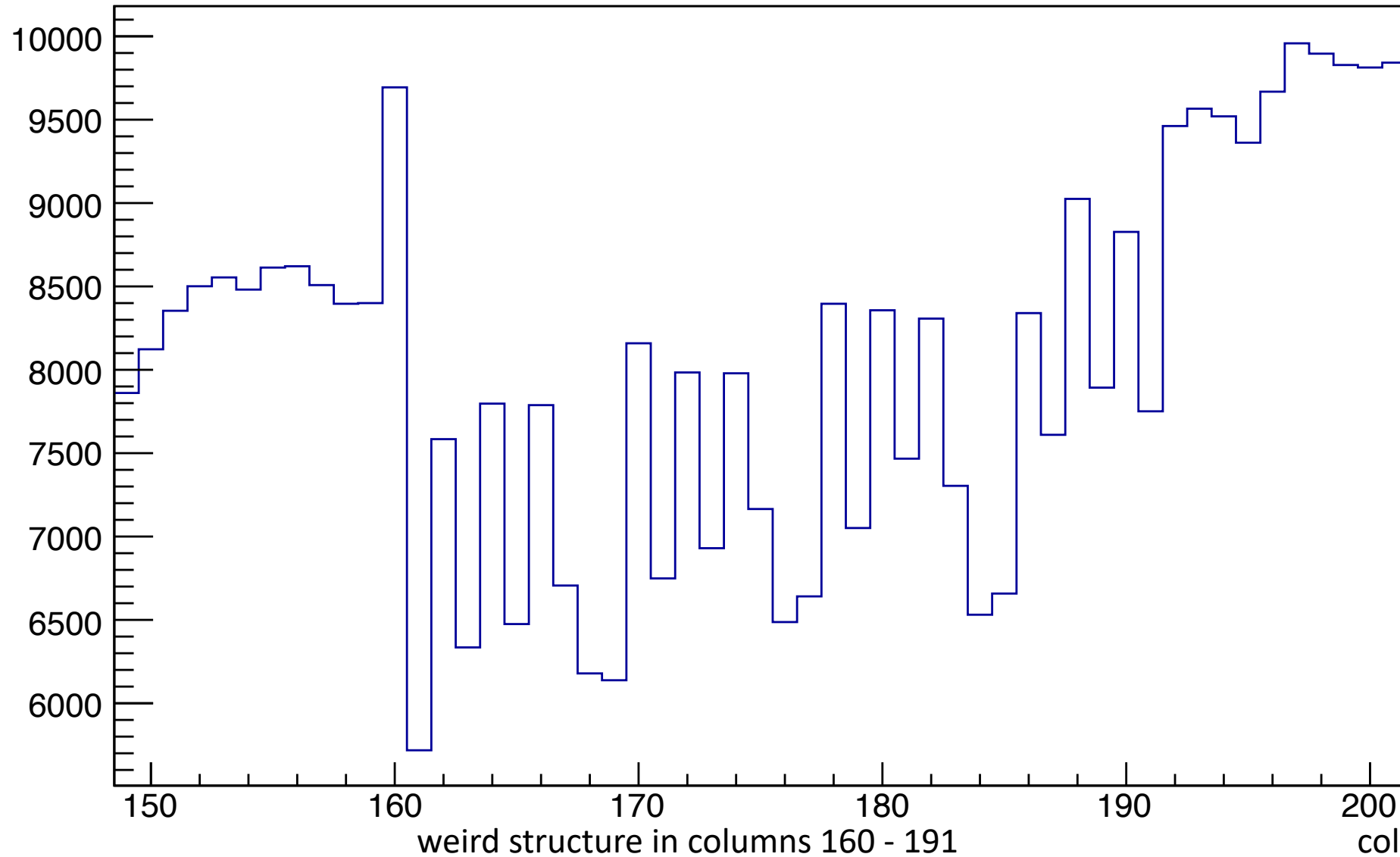
Findings in Hit Maps

run 1413
chip 30



Findings in Hit Maps

run 1413
chip 30



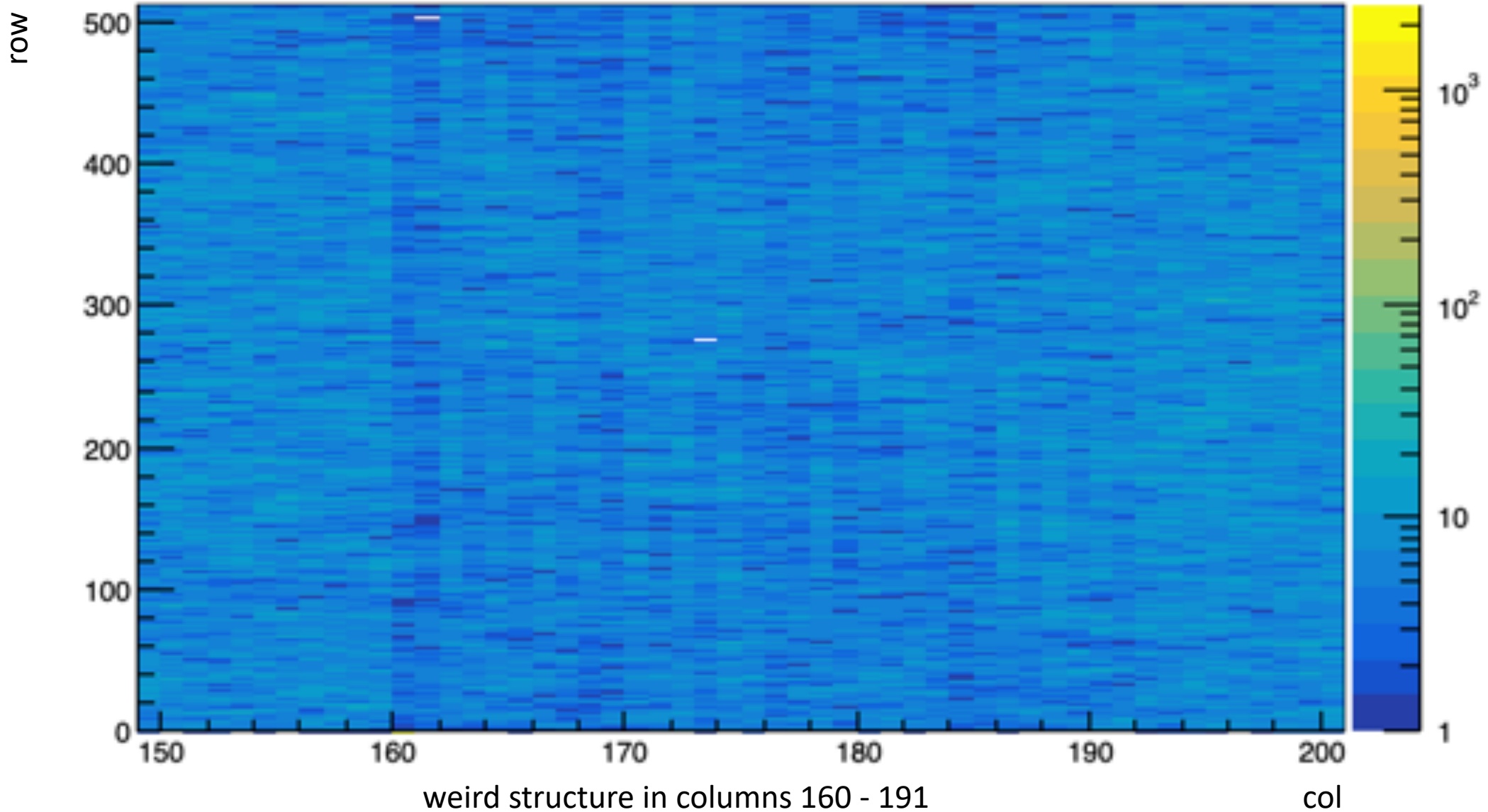
Large-scale time dependence?

structure also seen in first (1222) and last runs (1462, reversed setup, beam from back) of data taking

Findings in Hit Maps

structure also in first and last runs

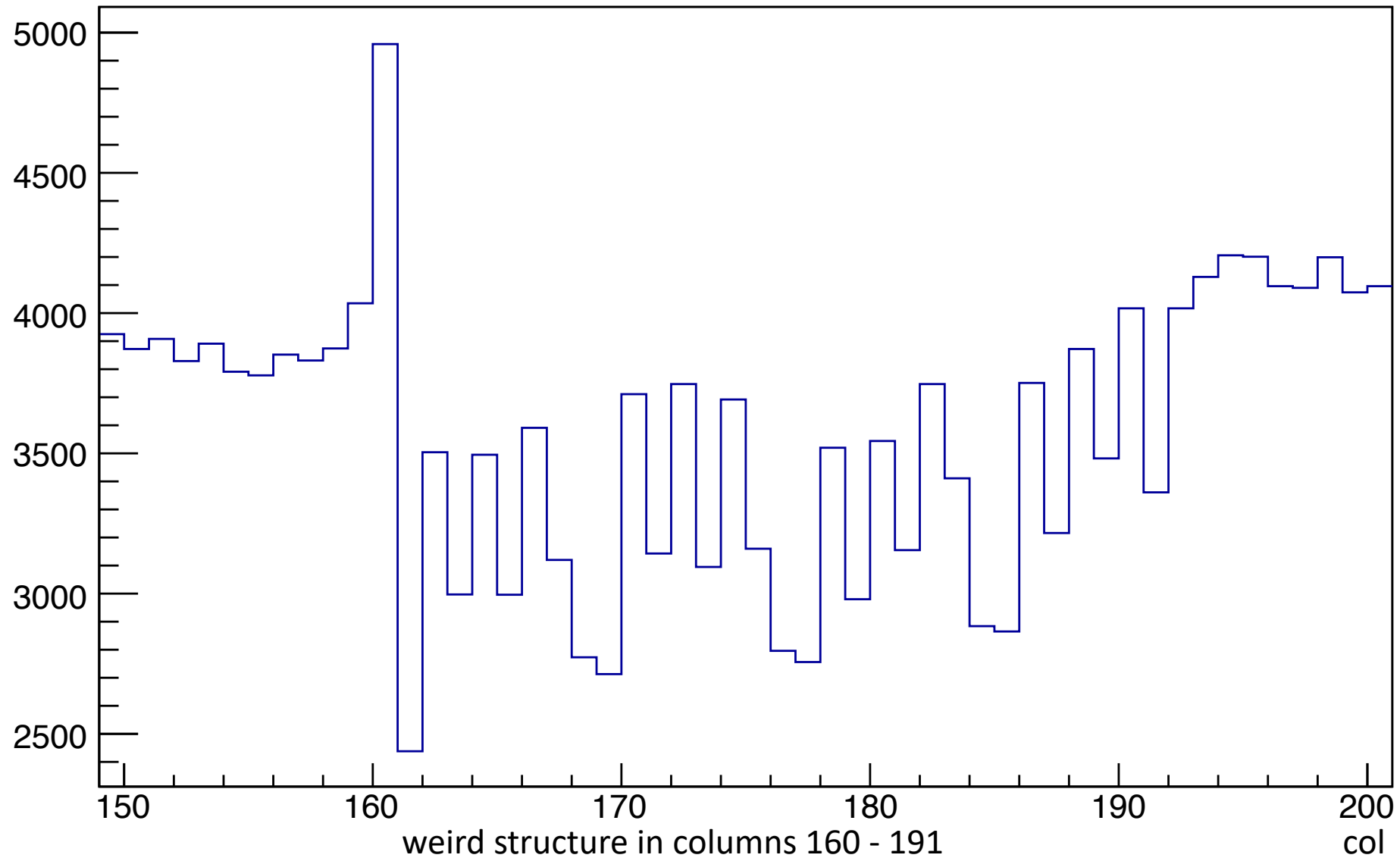
run 1222
chip 30



Findings in Hit Maps

structure also in first and last runs

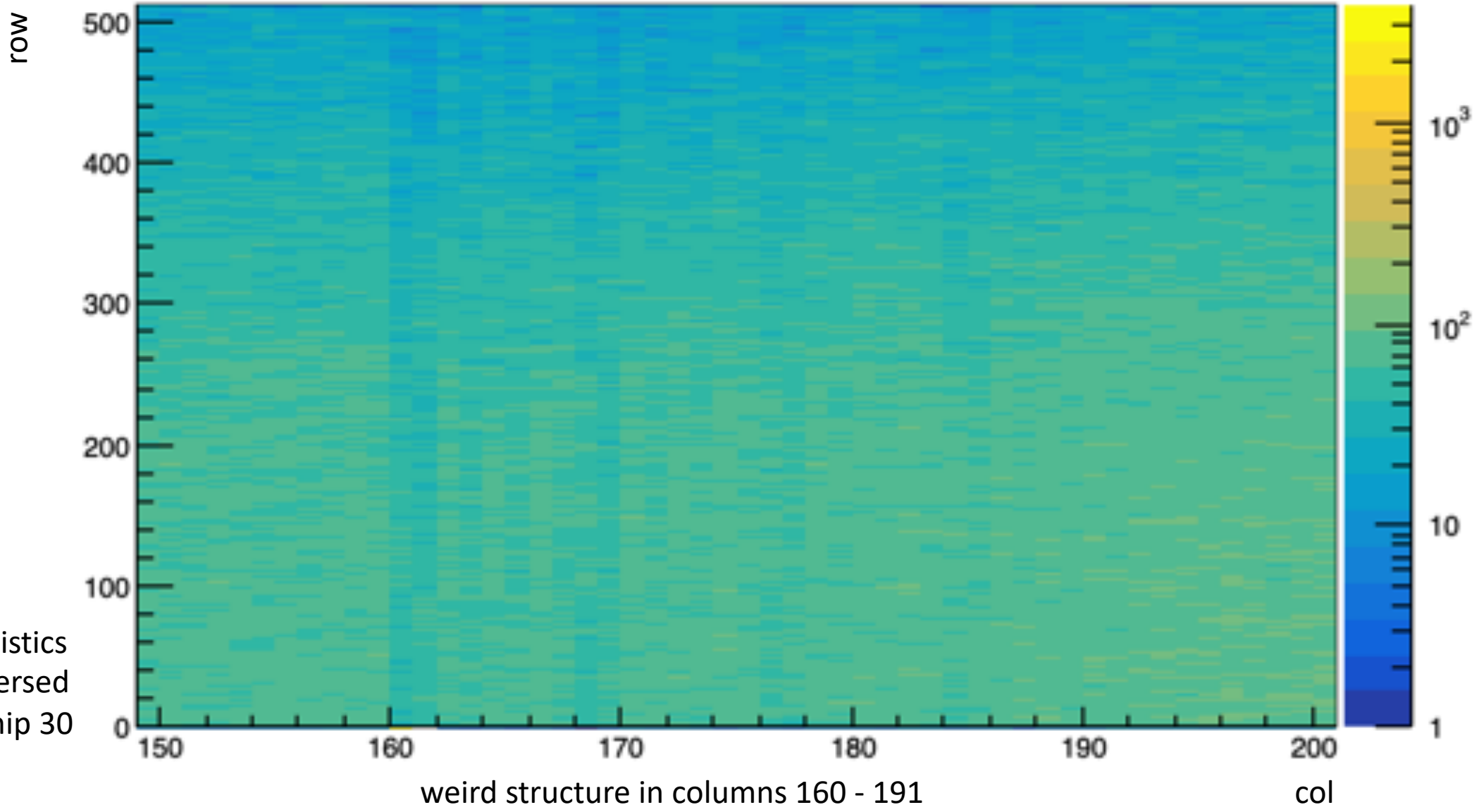
run 1222
chip 30



Findings in Hit Maps

structure also in first and last runs

run 1462
chip 30



higher statistics
due to reversed
setup -> chip 30
(layer 7)

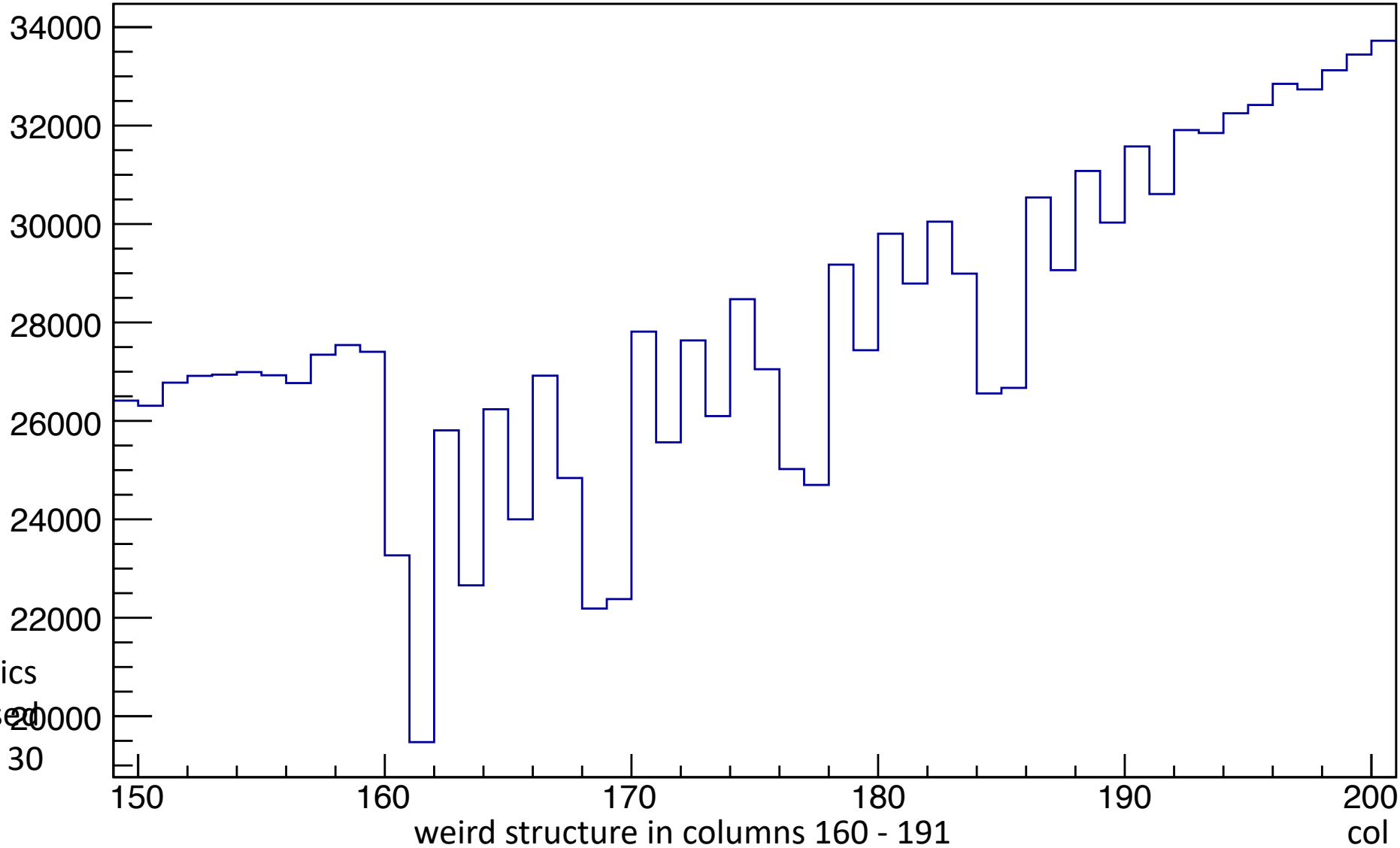
weird structure in columns 160 - 191

Findings in Hit Maps

structure also in first and last runs

run 1462
chip 30

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(layer 7)



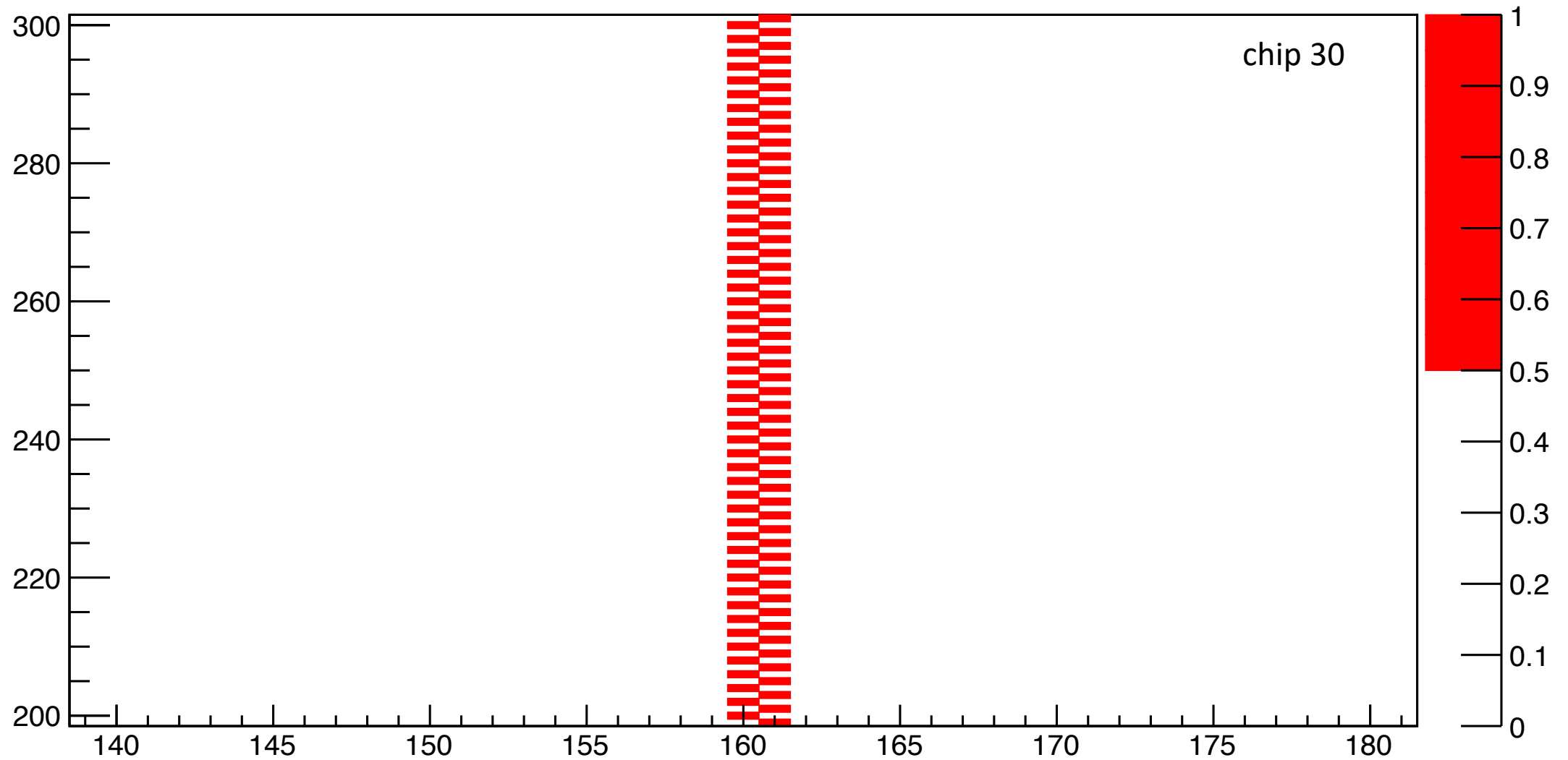
Anything peculiar in classification?

chip 30 classified as BRONZE due to back bias and power tests
but SILVER and GOLD in number of dead and noisy pixels, resp.

in total 857 dead and 5 noisy pixels

strange alternating masking pattern for dead pixels
in columns 160/161

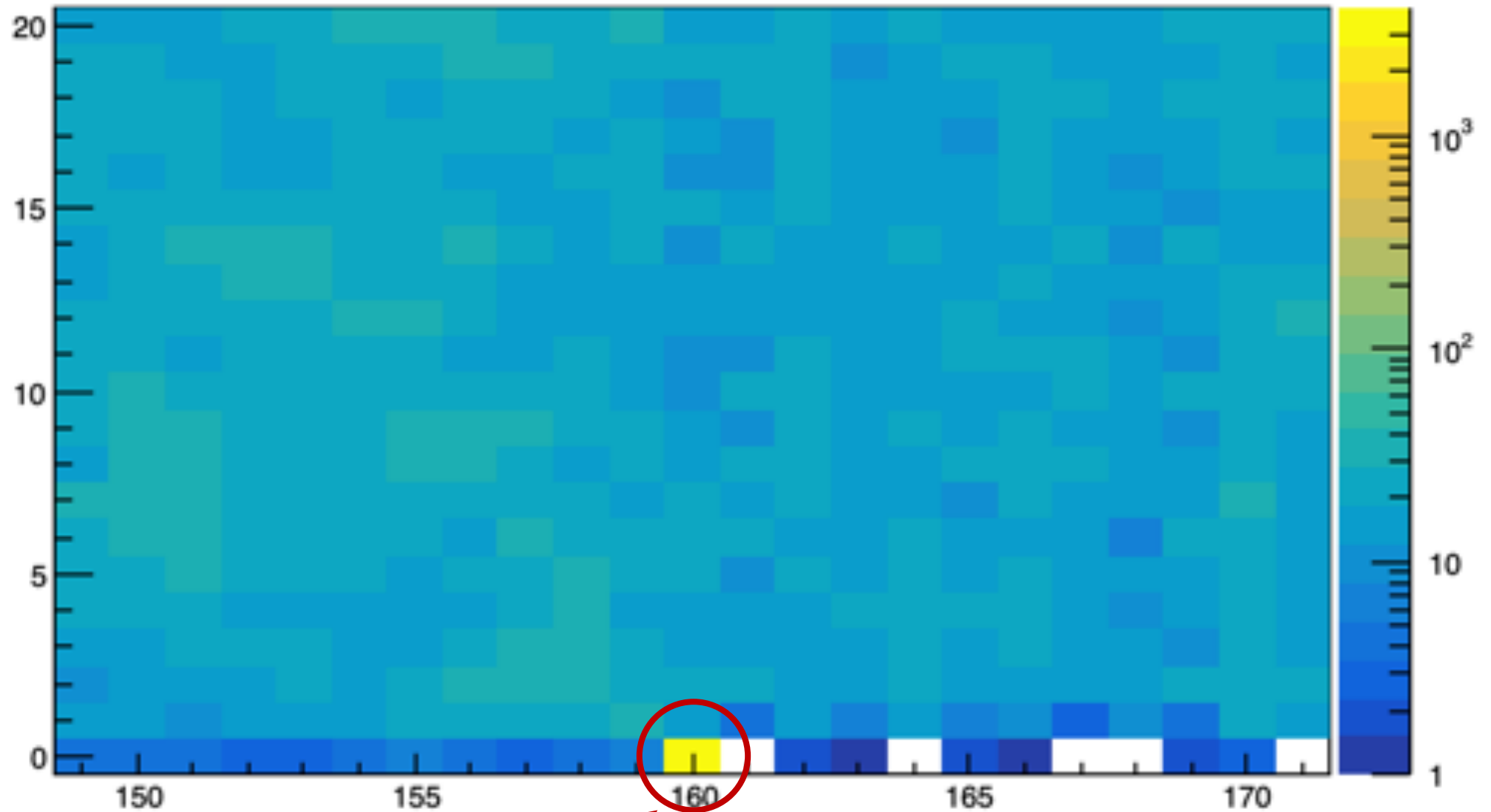
Dead Pixel Mask Classification



One noisy pixel in column 160

- pixel in row 0 column 160 is noisy: in run 1413 roughly 4000 hits
- > explains higher number of hits in column 160
- > if you subtract 4000 hits in column 160 in the projection (slide 10) it follows the same pattern

Noisy Pixel in Hit Map



noisy pixel

Dead Pixels