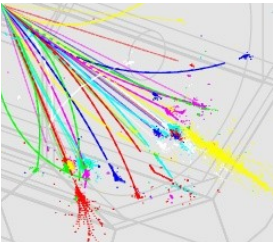
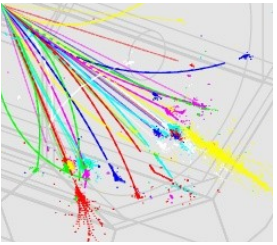


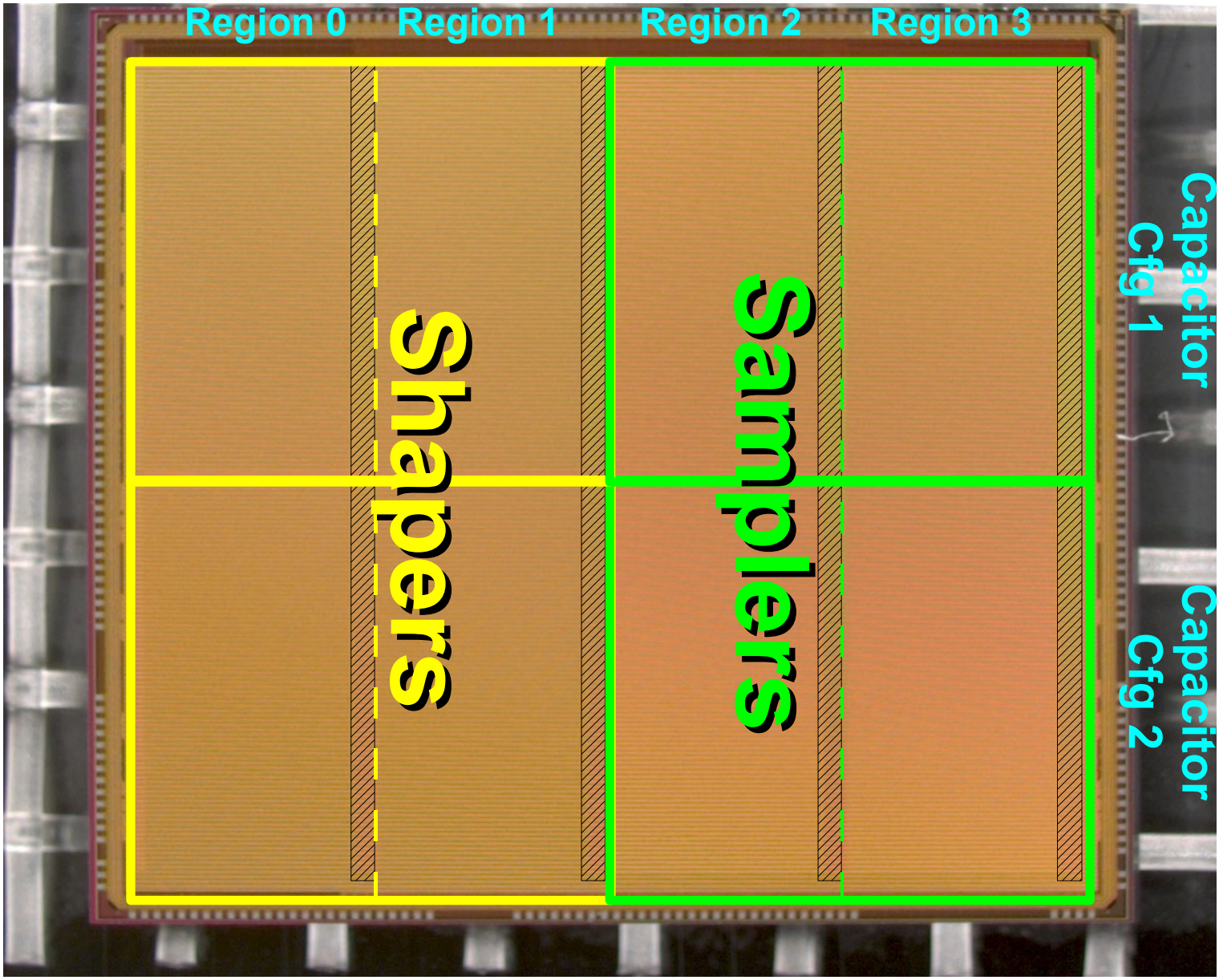
Sensor Studies

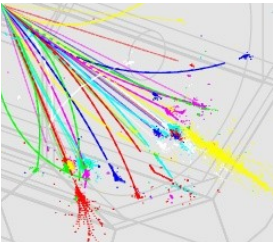
RAL 29.02.2008

M. Stanitzki



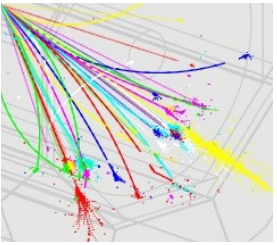
Orientation





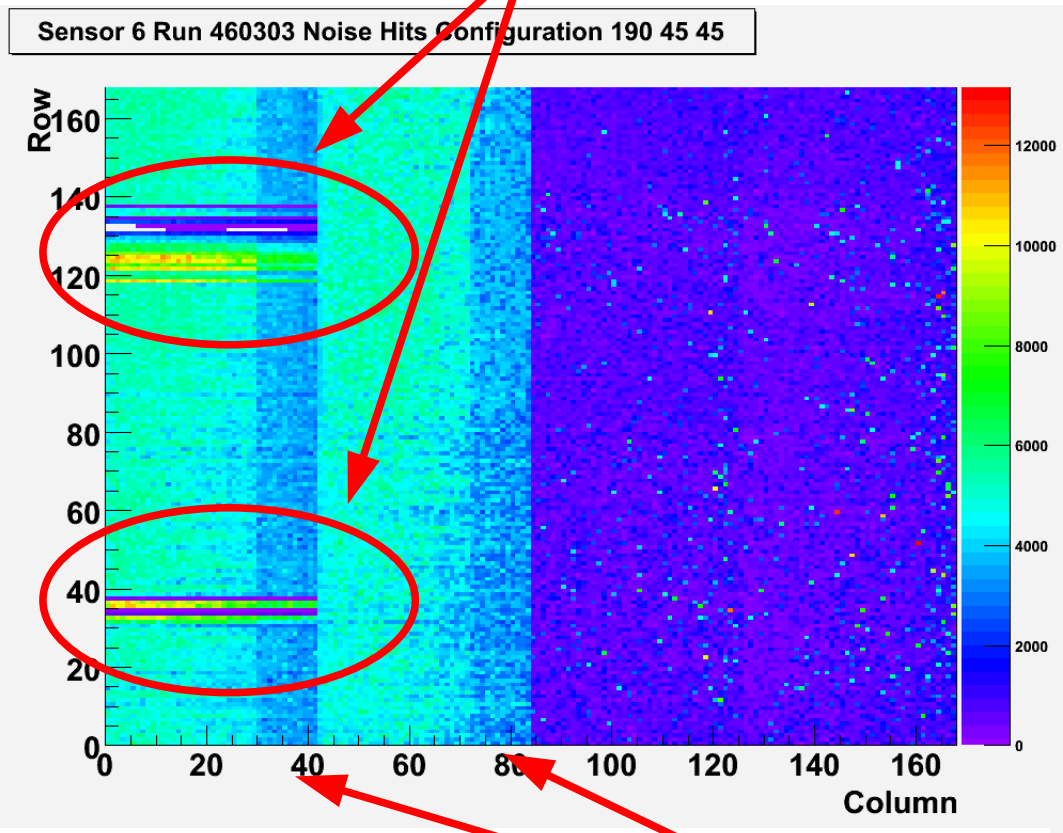
The setup

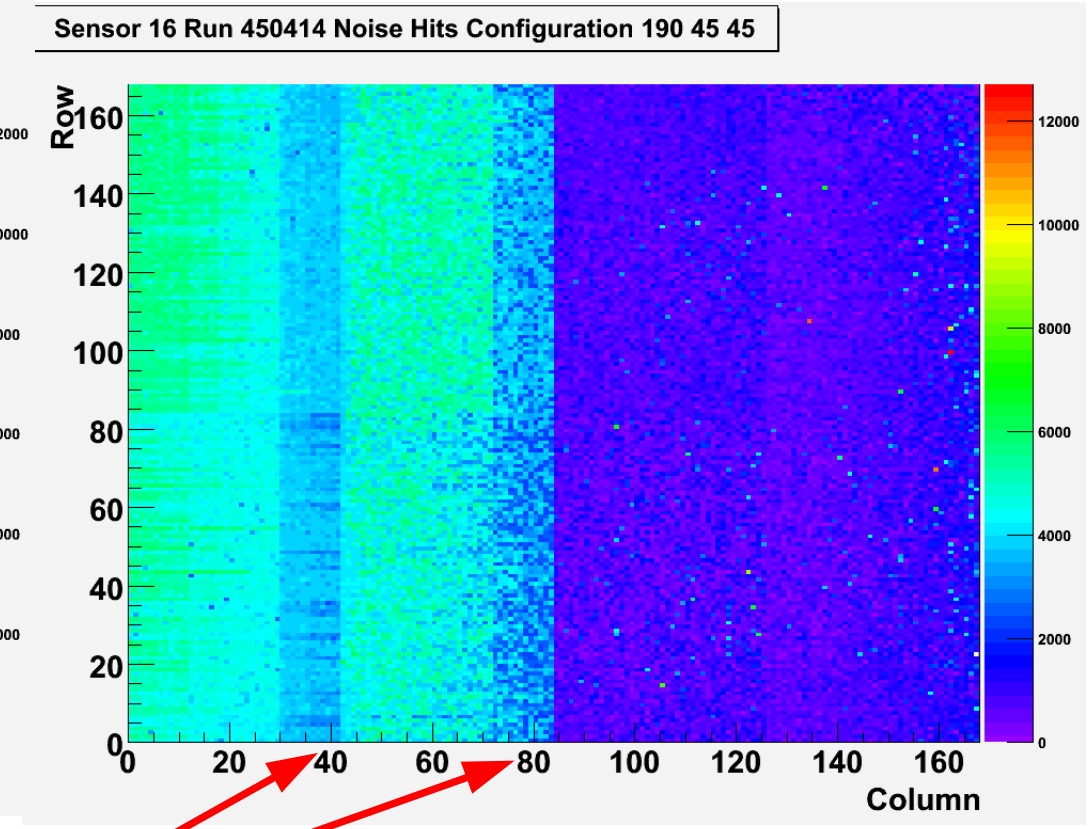
- PPD
  - calicedaq1
  - sensor 6
- TD
  - calicedaq2
  - sensor 16
- mpsThresholdscan -v199
  - 0-1000
  - 2000 Bunchtrains each
- Two runs for sensor 16 to cross-check results



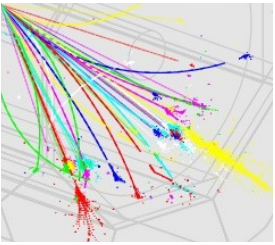
The Noise

Corruption

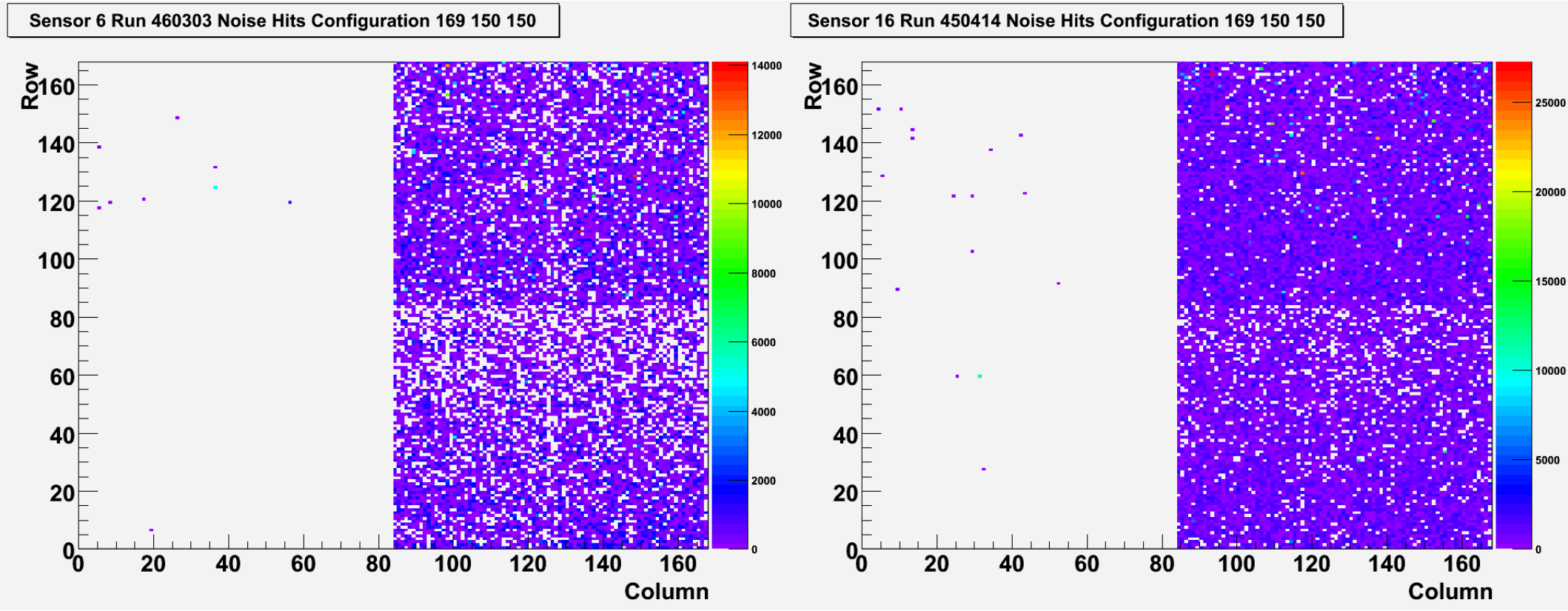


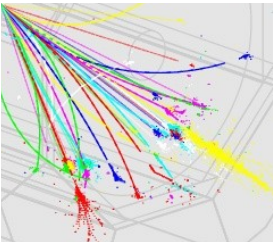


Full Buffers
19 Buffers,
7 patterns per row and regions

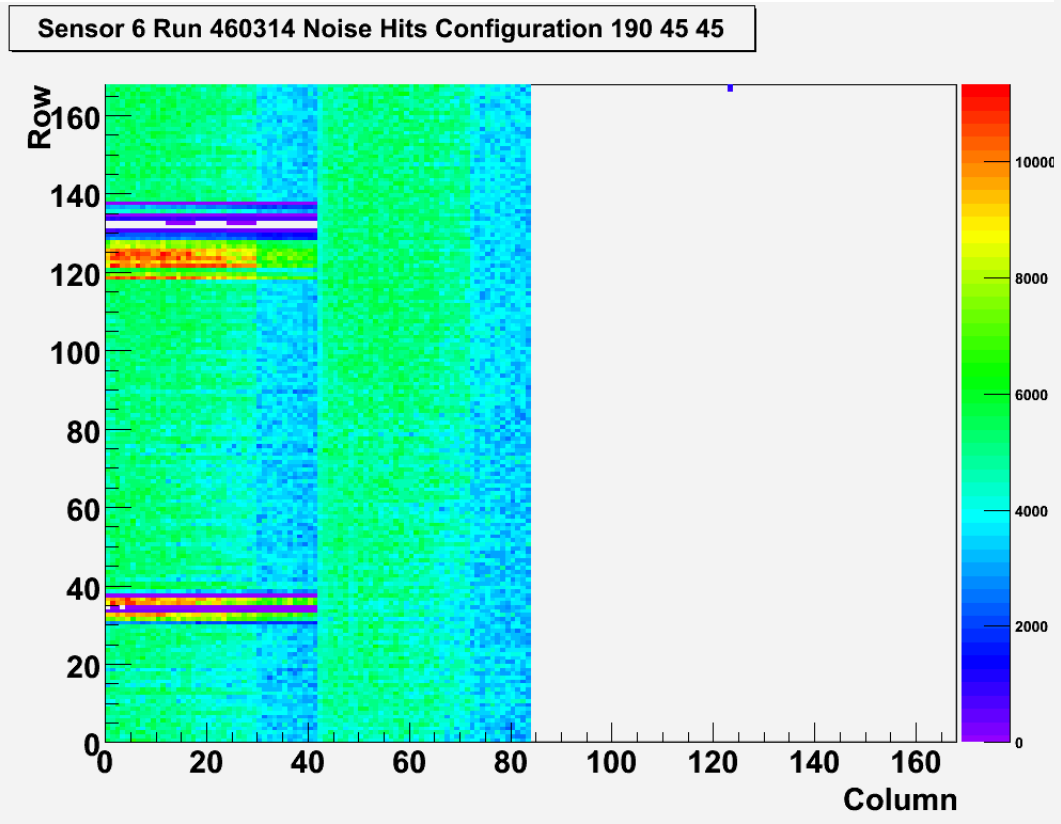


More Noise

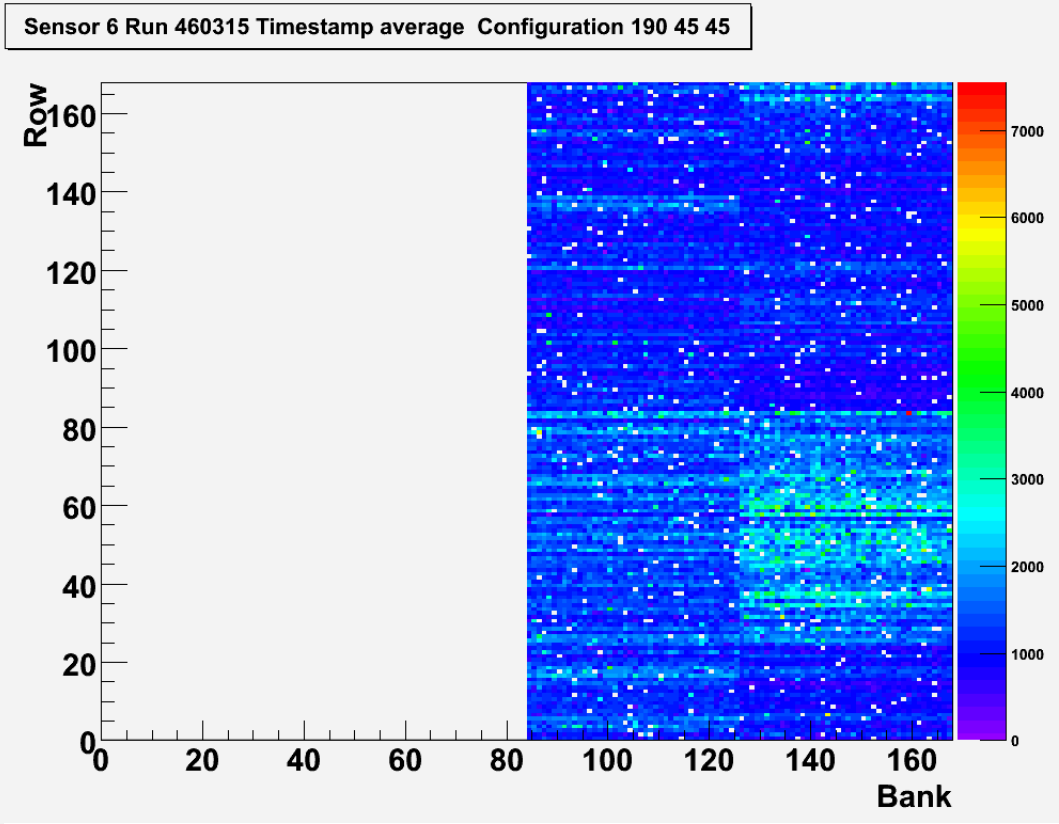

Sensor 6 Run 460303 Noise Hits Configuration 169 150 150
Row
Column
Sensor 16 Run 450414 Noise Hits Configuration 169 150 150
Row
Column



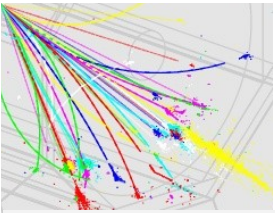
Switching off one side



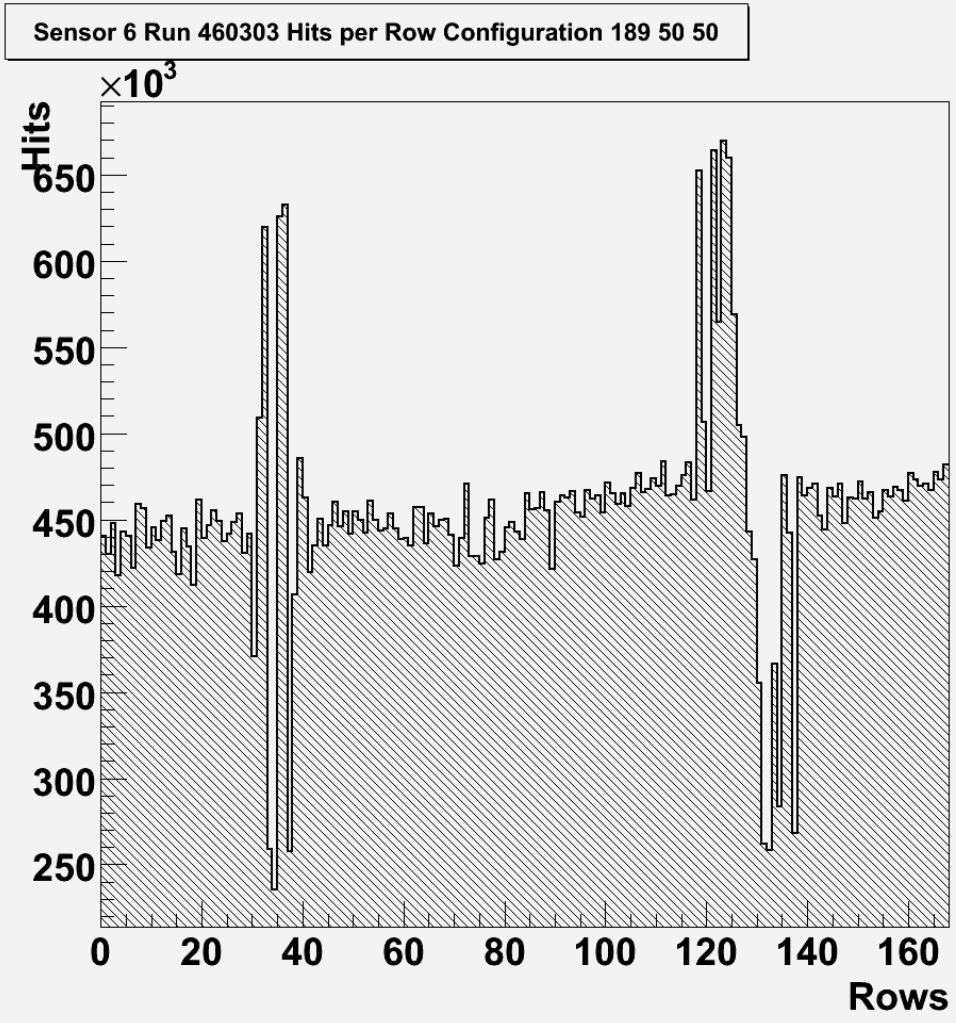
Samplers Off

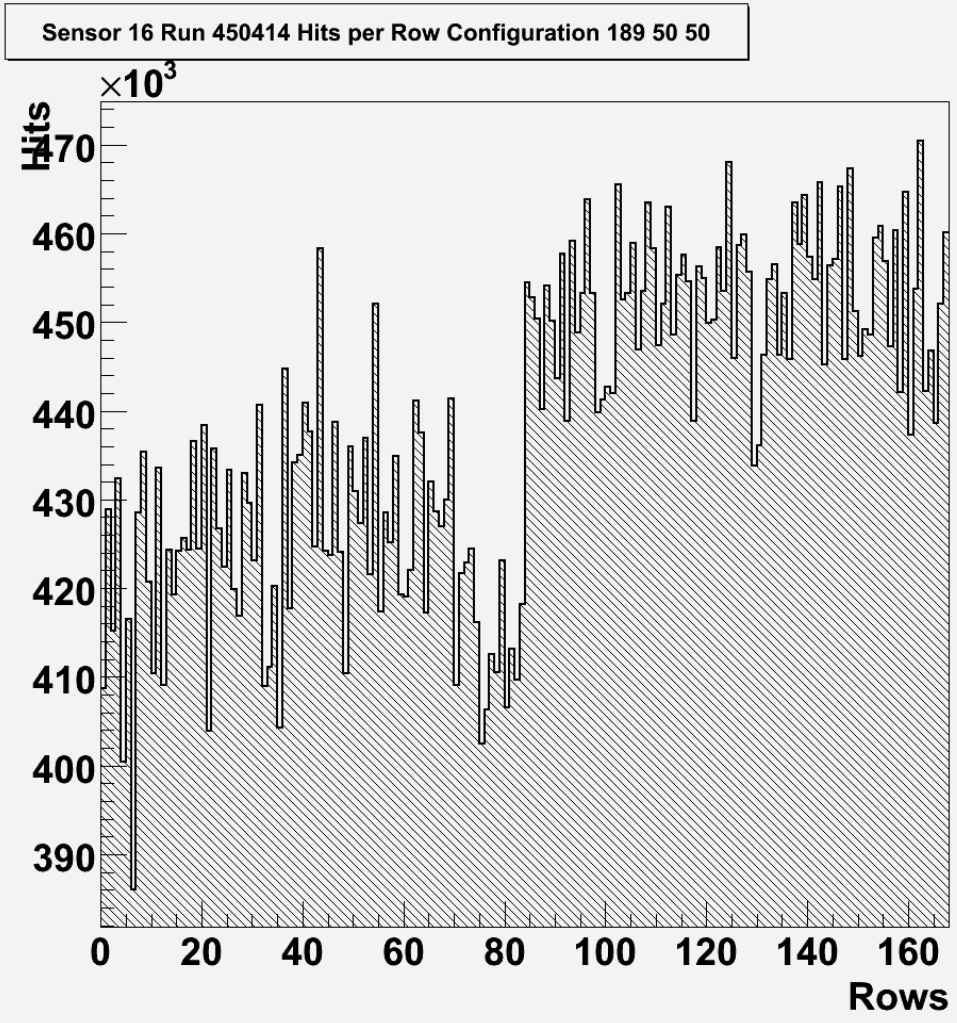


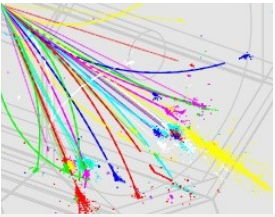
Shapers Off



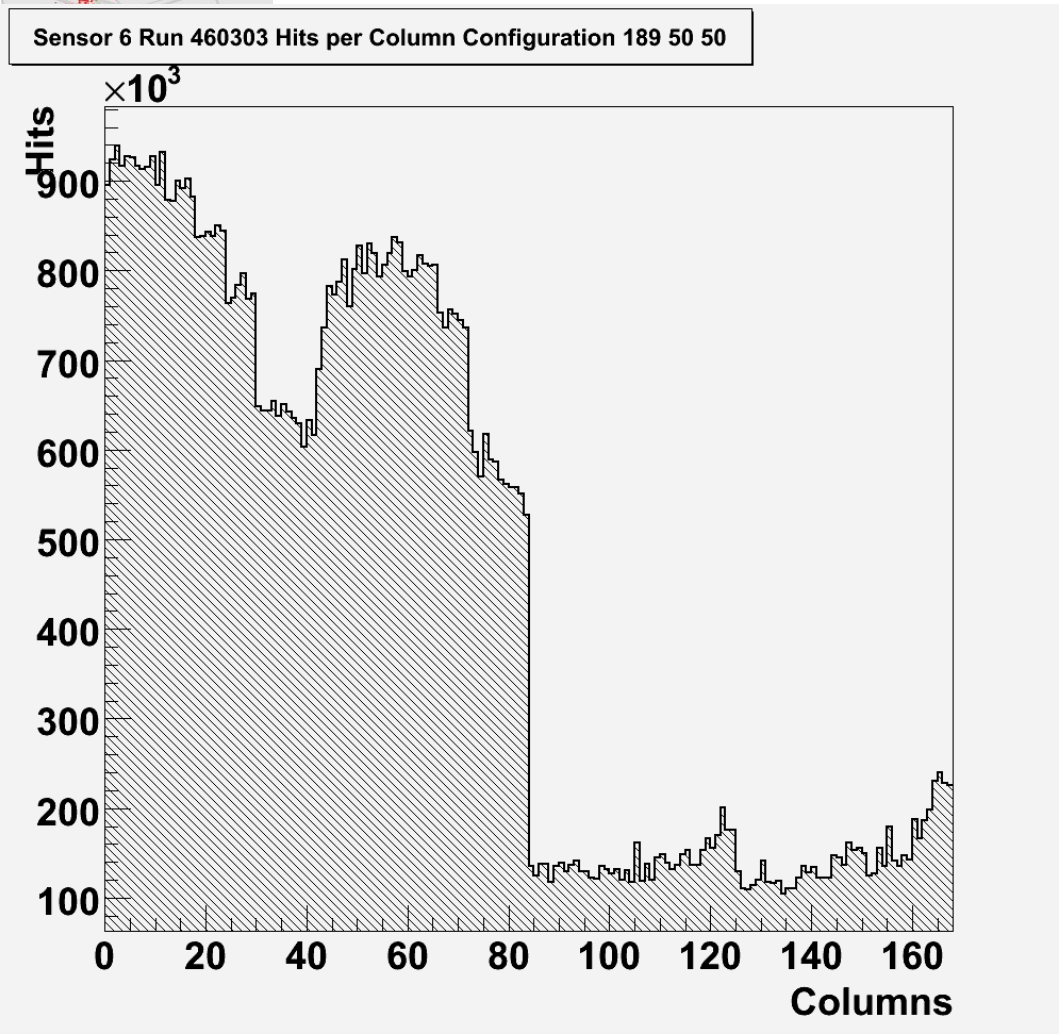
Rows

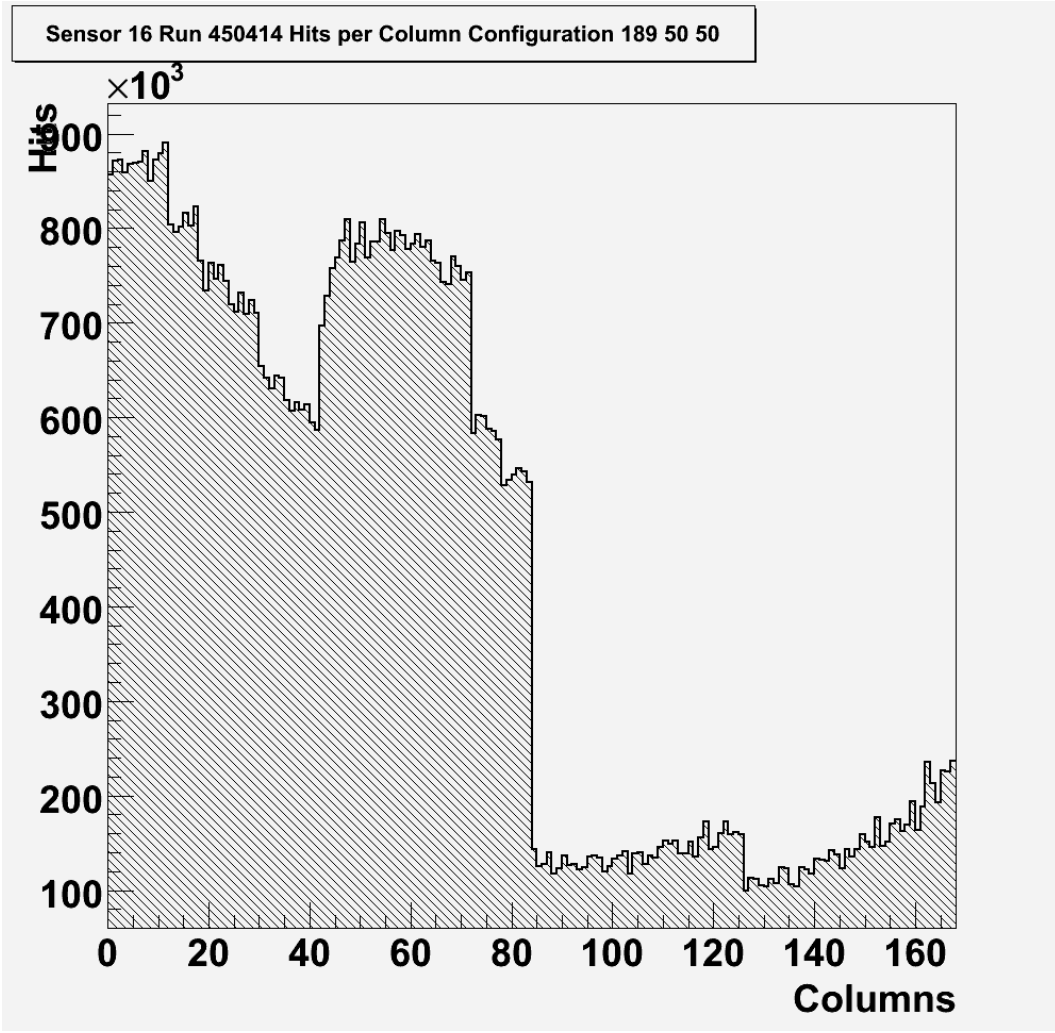

Sensor 6 Run 460303 Hits per Row Configuration 189 50 50
×10^3
Hits
650
600
550
500
450
400
350
300
250
0
20
40
60
80
100
120
140
160
Rows

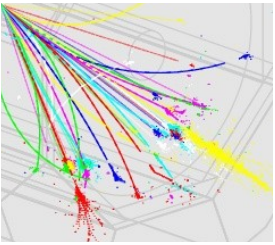

Sensor 16 Run 450414 Hits per Row Configuration 189 50 50
×10^3
Hits
470
460
450
440
430
420
410
400
390
0
20
40
60
80
100
120
140
160
Rows



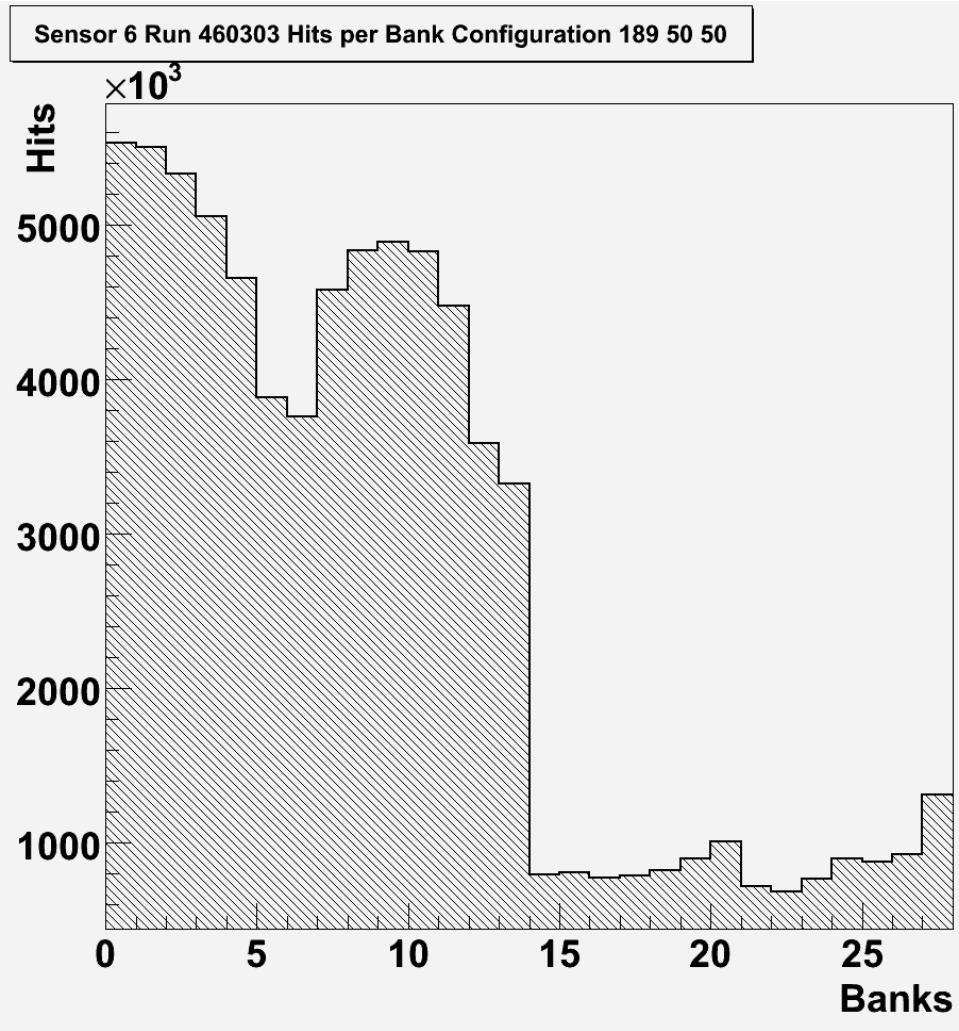
Columns

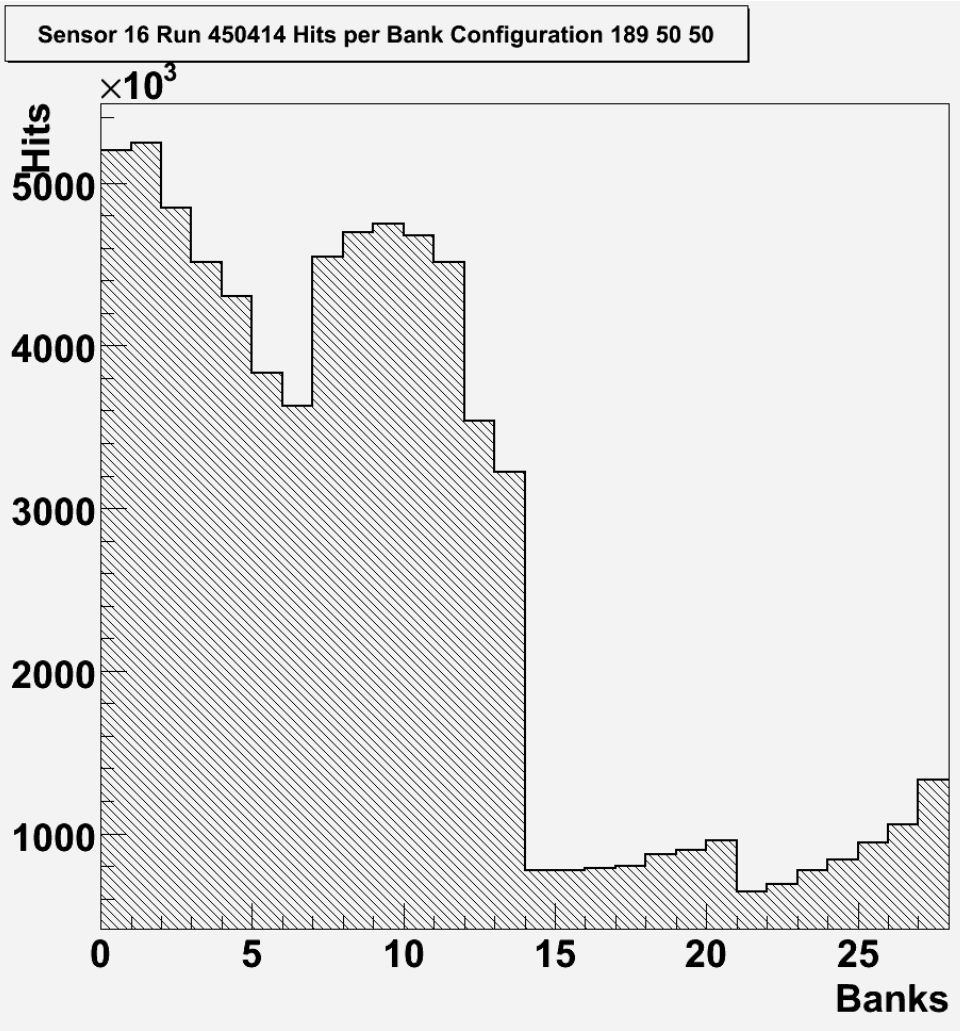

Sensor 6 Run 460303 Hits per Column Configuration 189 50 50
×10^3
Hits
900
800
700
600
500
400
300
200
100
0
20
40
60
80
100
120
140
160
Columns

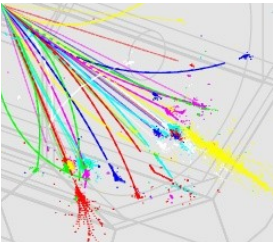

Sensor 16 Run 450414 Hits per Column Configuration 189 50 50
×10^3
Hits
800
700
600
500
400
300
200
100
0
20
40
60
80
100
120
140
160
Columns



Banks

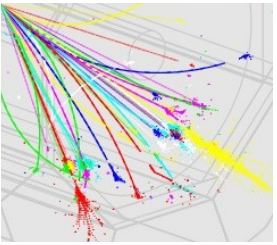

Sensor 6 Run 460303 Hits per Bank Configuration 189 50 50
×10^3
Hits
5000
4000
3000
2000
1000
0
5
10
15
20
25
Banks


Sensor 16 Run 450414 Hits per Bank Configuration 189 50 50
×10^3
Hits
5000
4000
3000
2000
1000
0
5
10
15
20
25
Banks

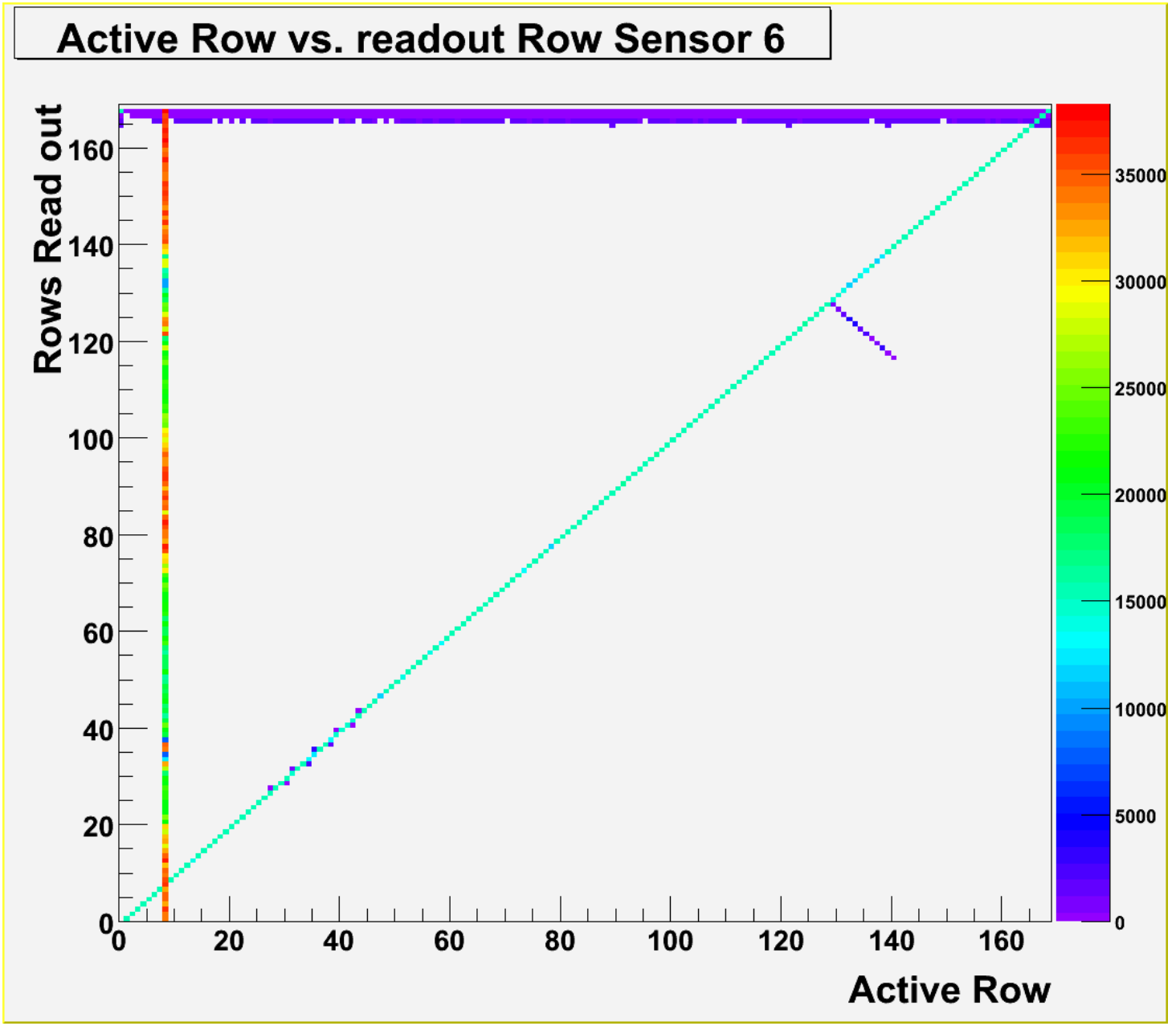


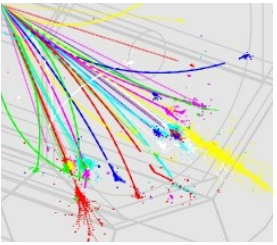
Row Corruption Studies

- Study Row /Column Corruption with sensor 6
  - masking one row at a time
  - checking expected rows vs. readback rows
  - 168 threshold scan runs 200 bunchtrains each
  - Threshold of 50 and 90

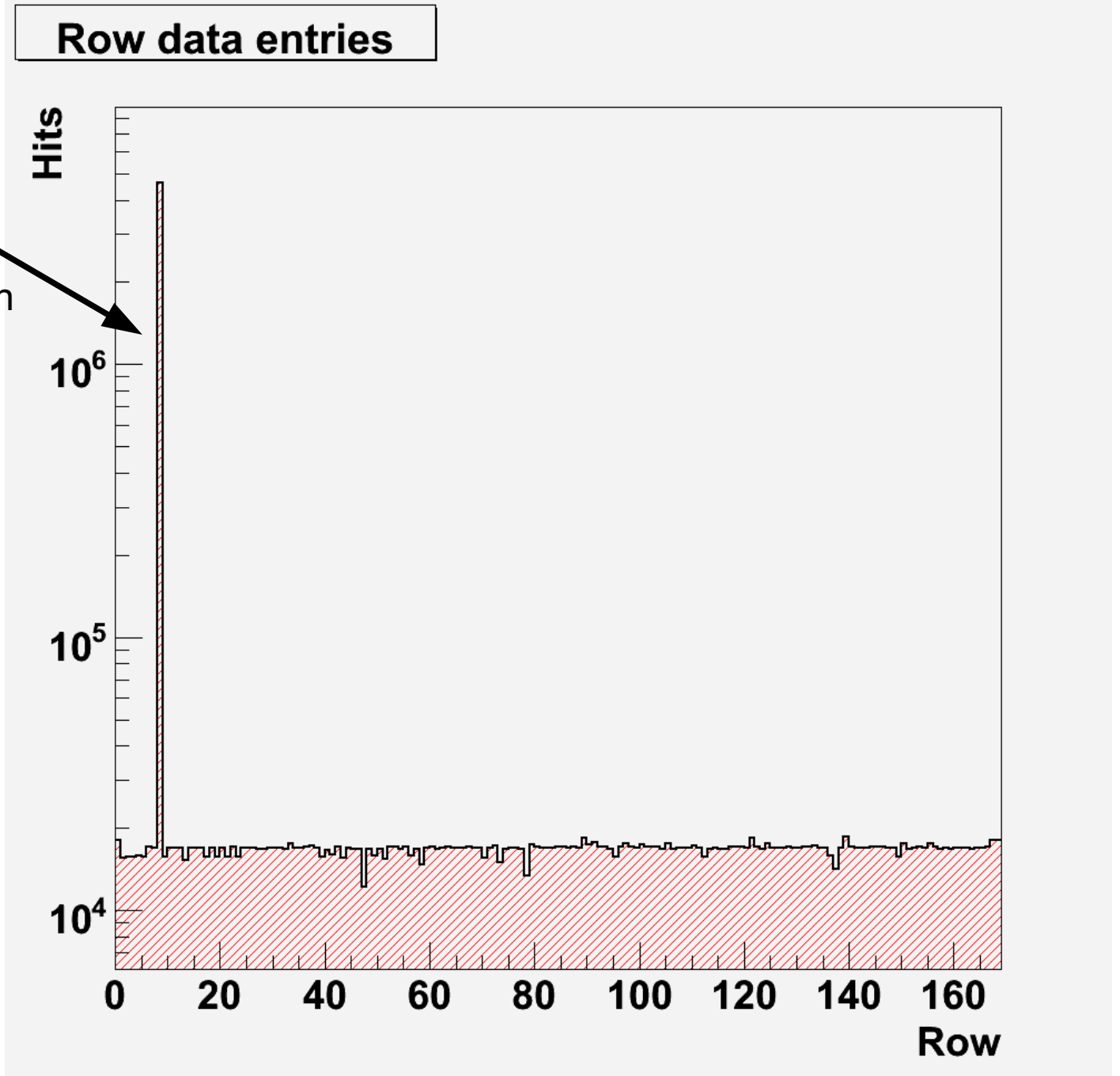


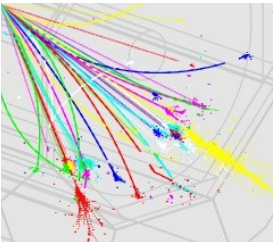
Row Corruption



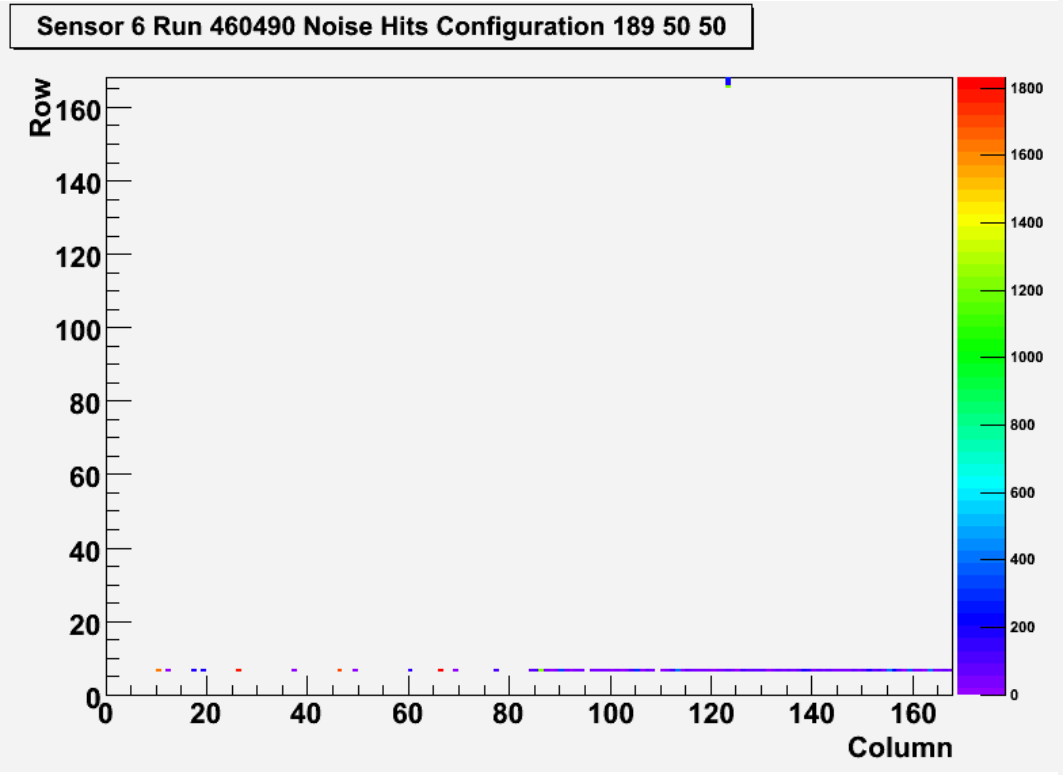


Row Data Volume

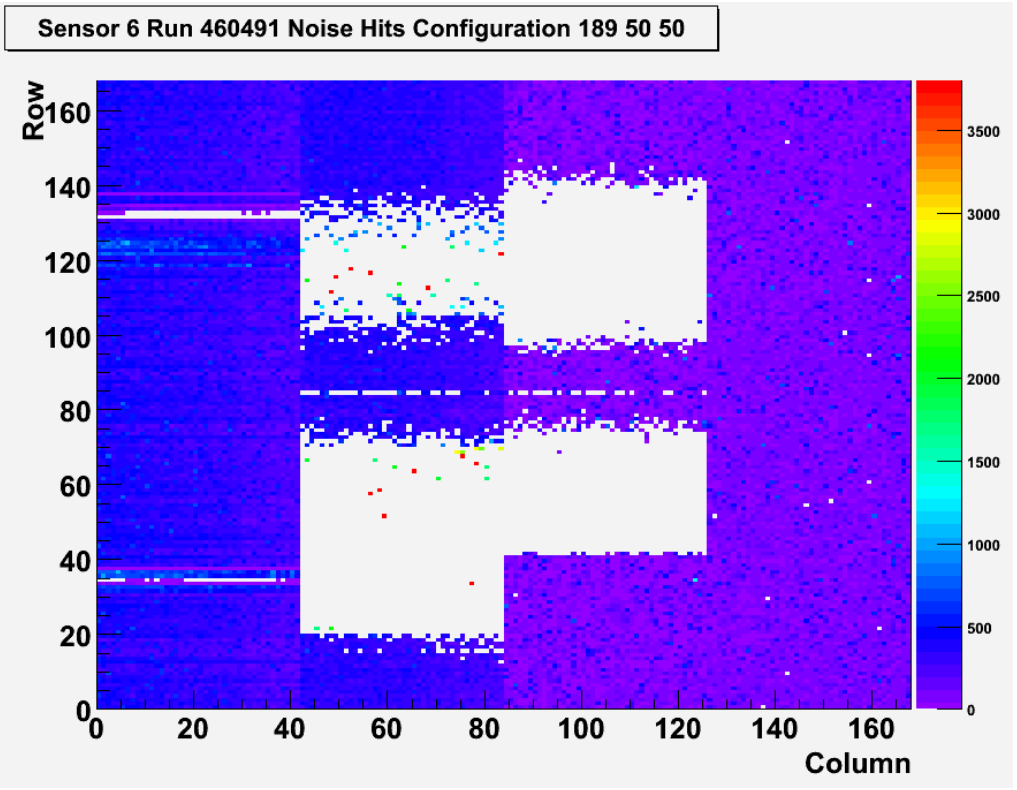




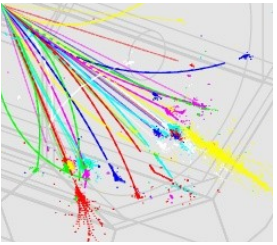
What is wrong here ?



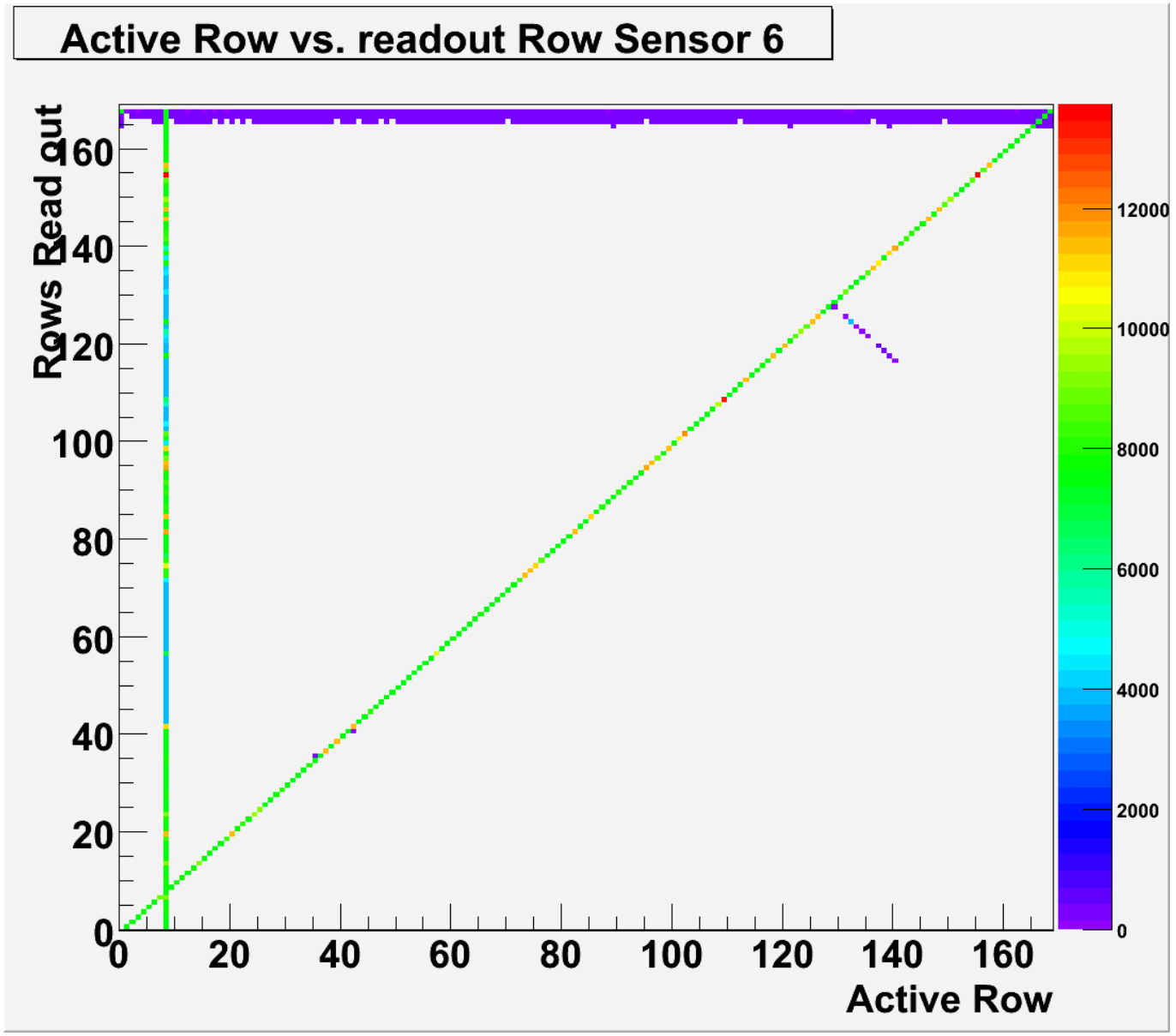
Row 6

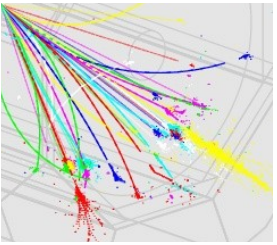


Row 7

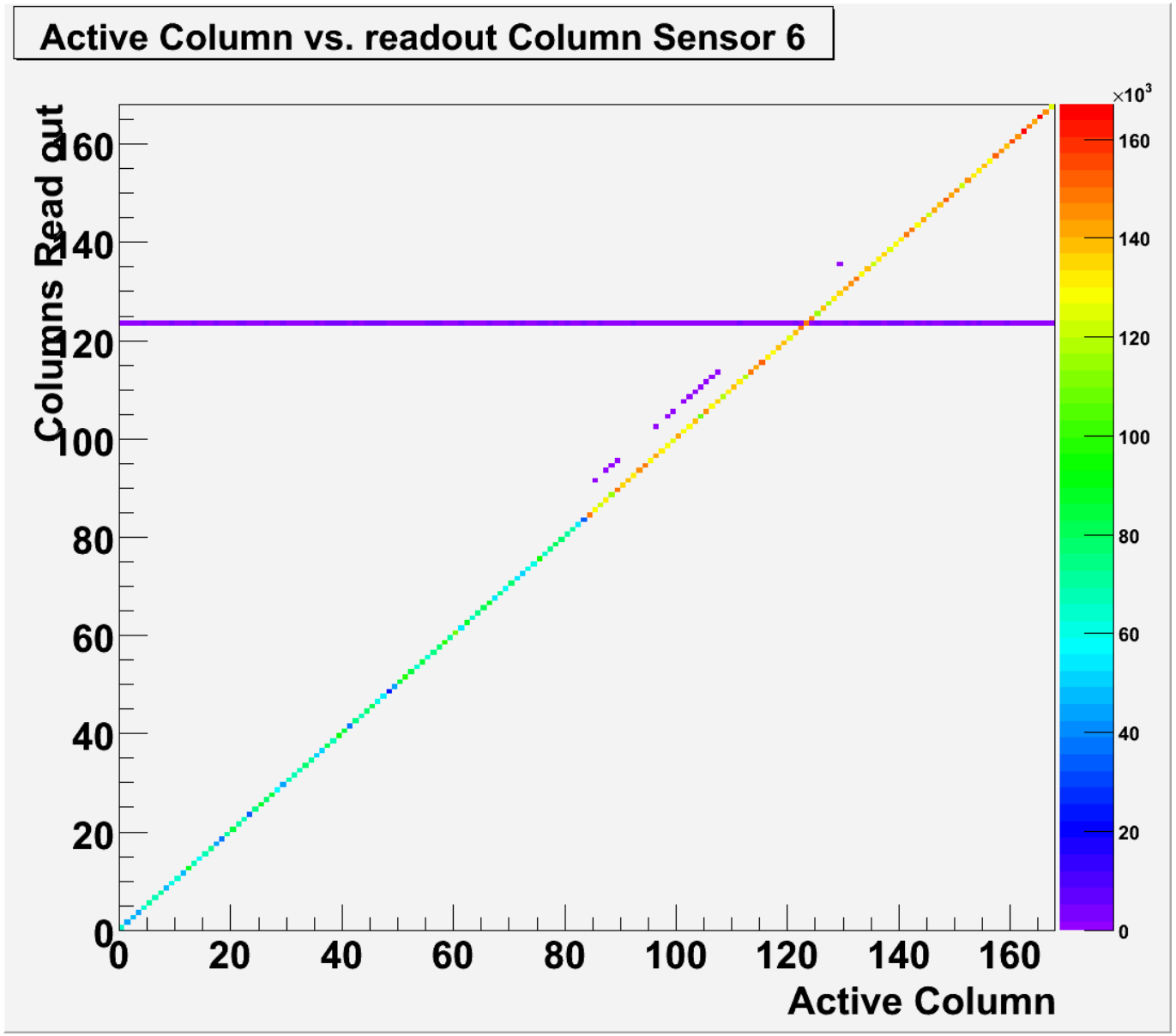


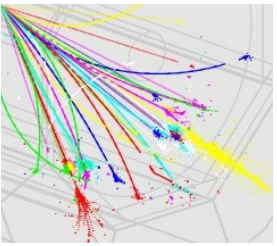
Cross Check ThrsId=90



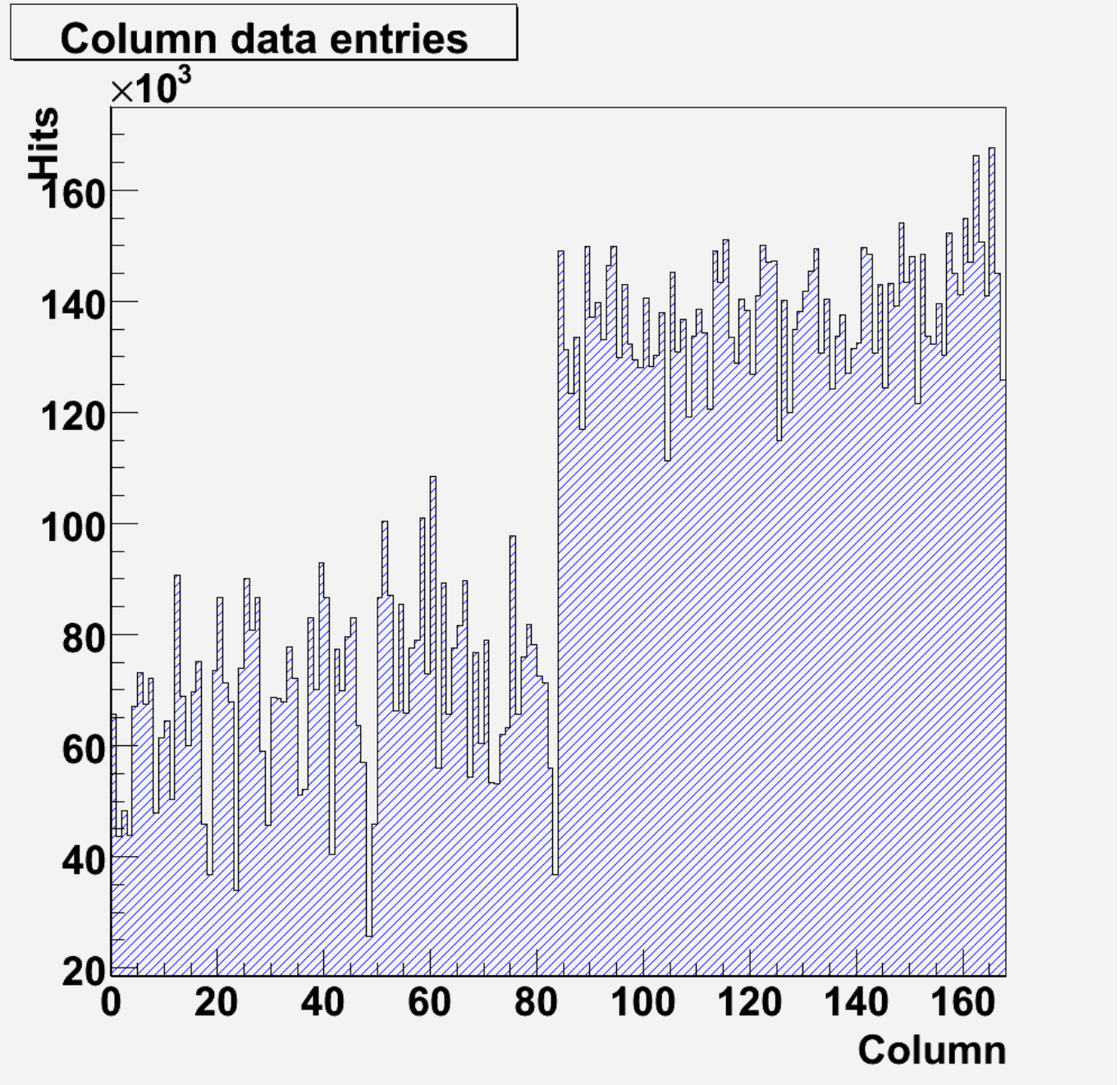


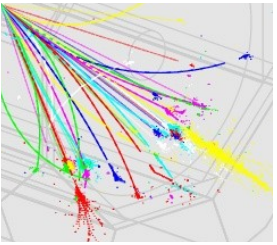
Column Corruption



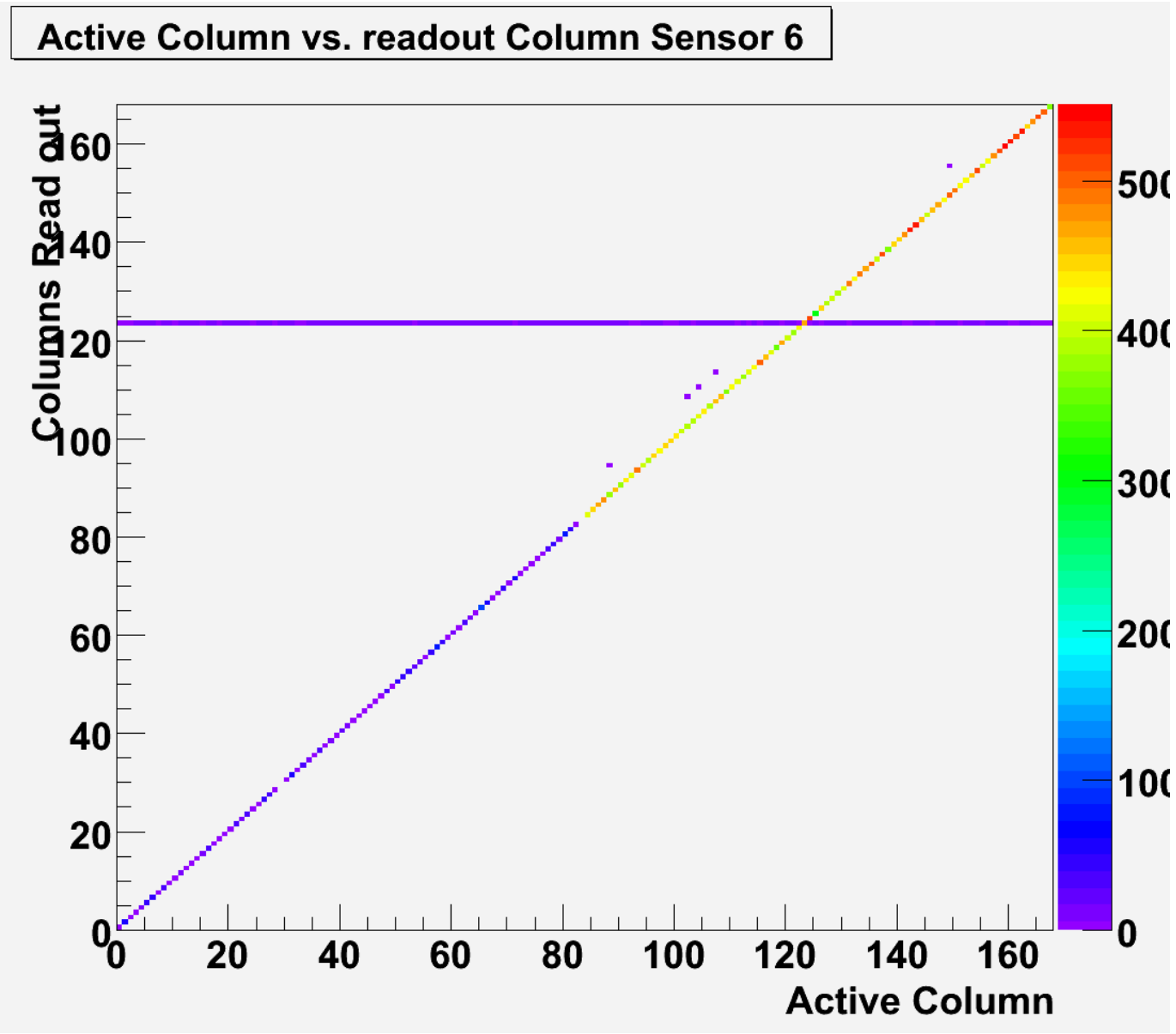


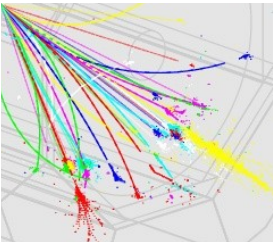
Column Corruption (II)





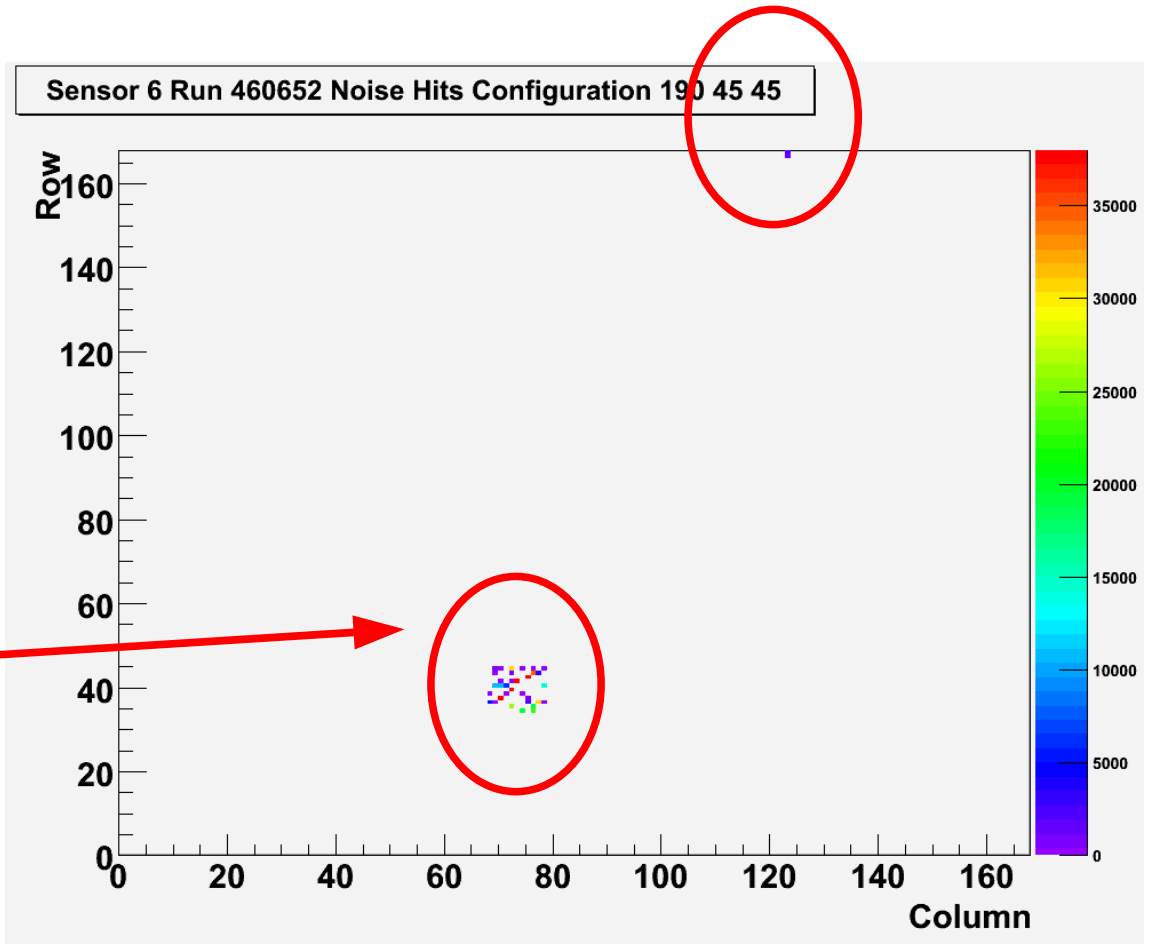
Cross check ThrsId=90

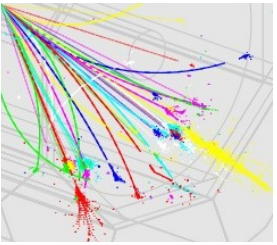




Region Corruption

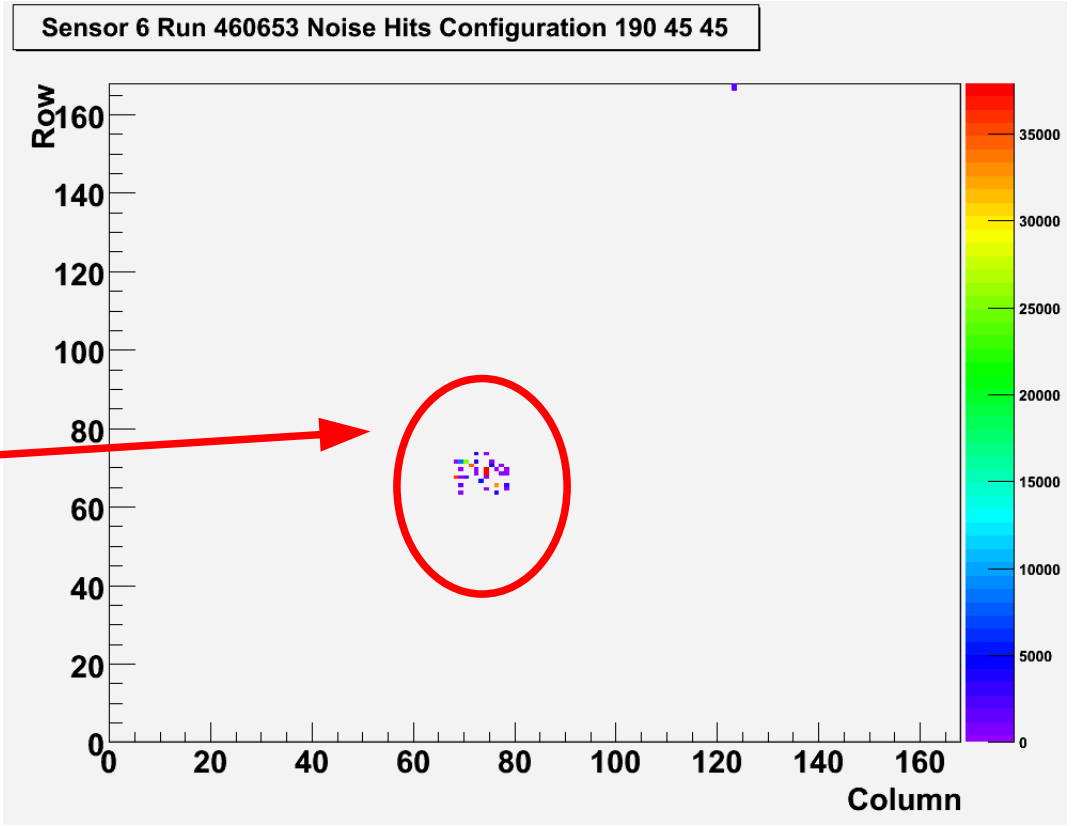
Supposed to be
68,34-78,44
OK !

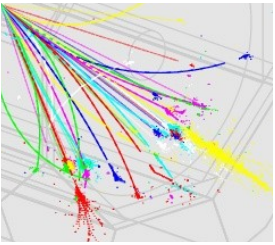




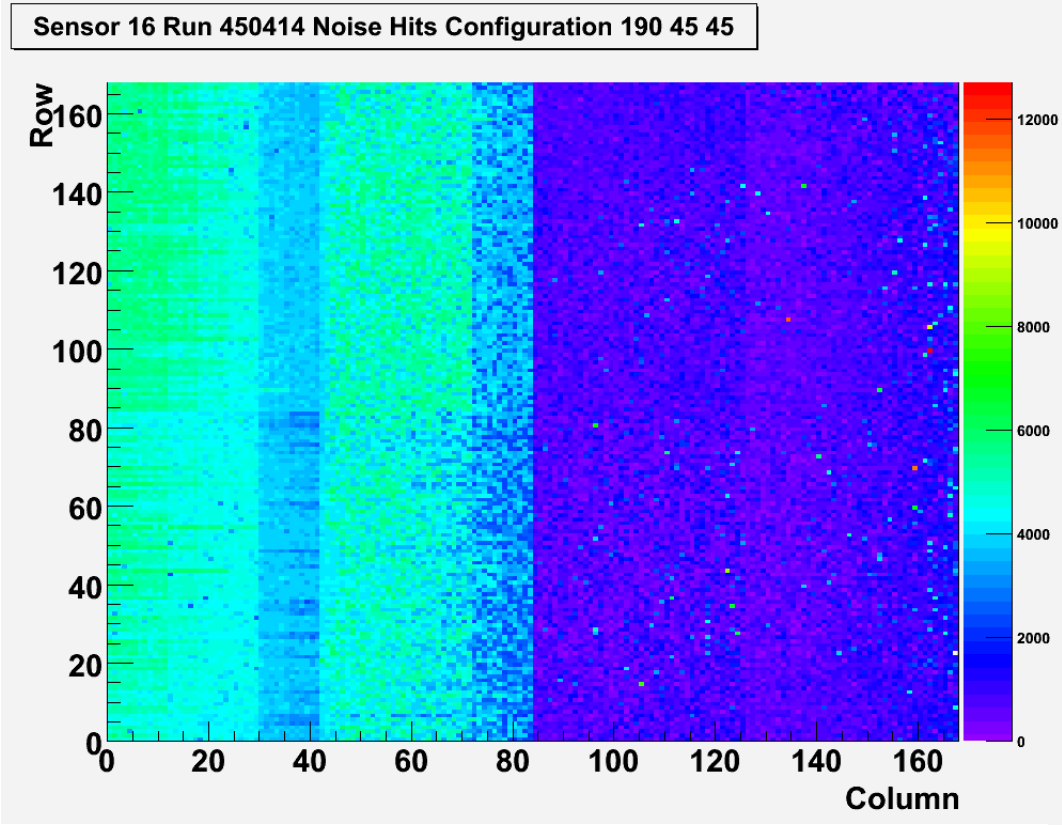
Region Corruption (II)

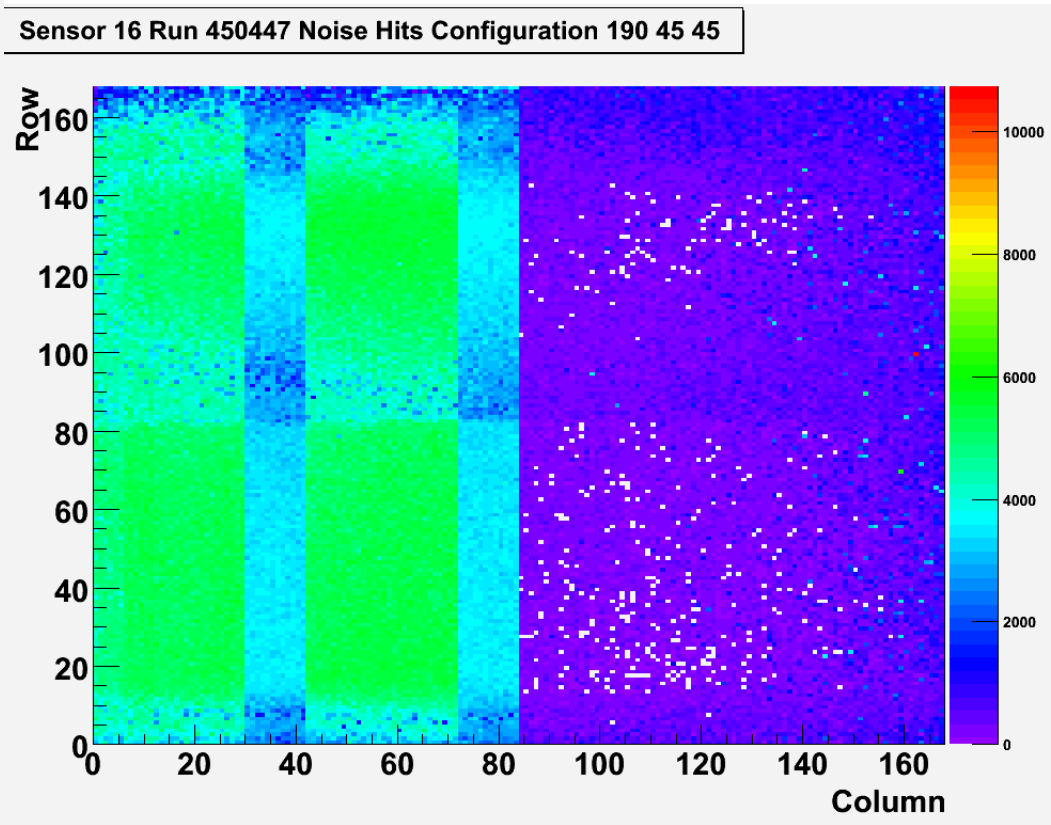
Supposed to be
68,63-78,73
OK !

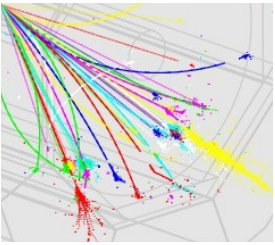




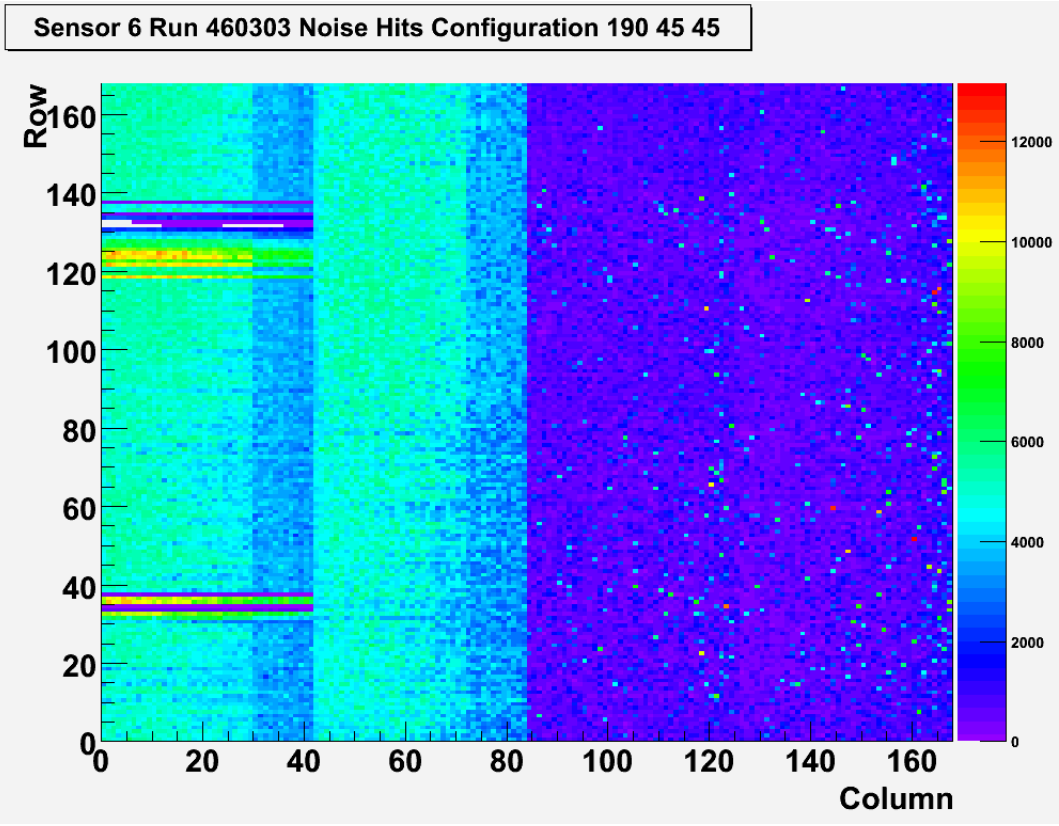
Sensor 16 Cross checks

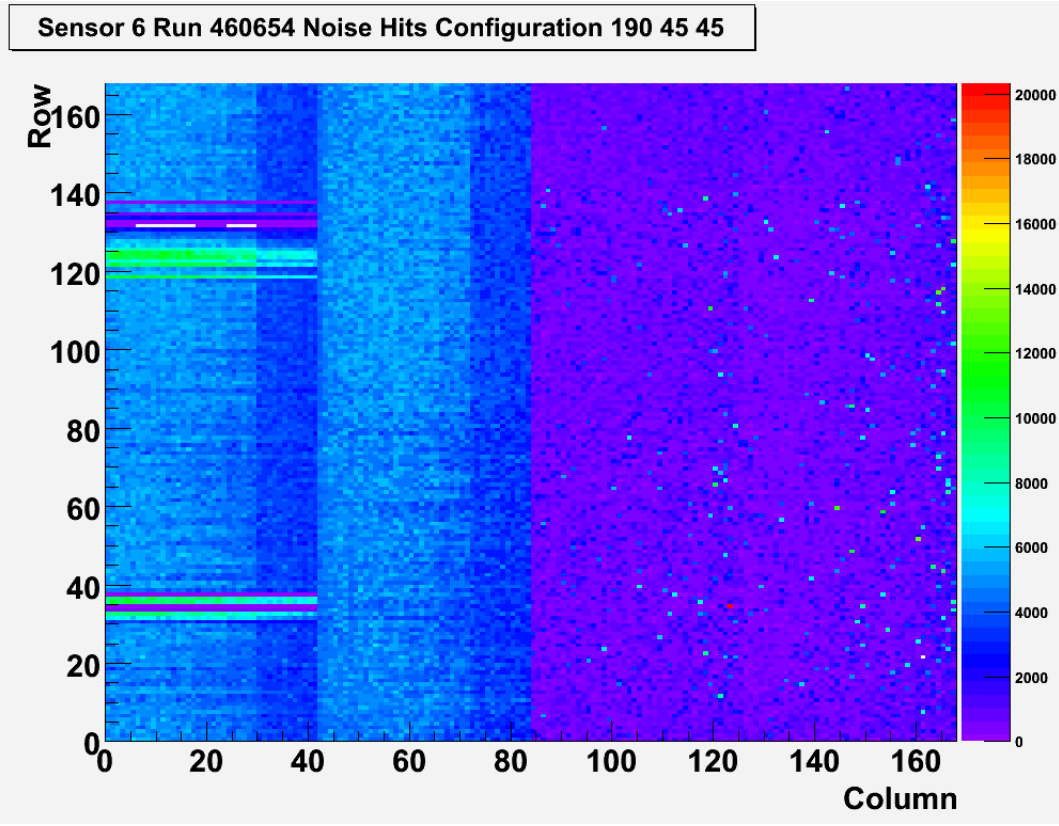


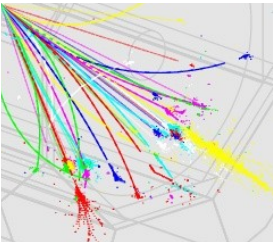




Sensor 6 Cross Checks

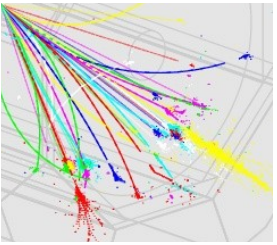






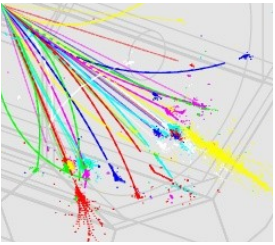
Comments

- Shapers
  - Behave like we expect at low threshold
  - We do see row corruption ...
  - the low efficiency for columns 28-42 and 70-84 are due to the memory filling up
- Sampler
  - Noise is very uniform
  - We don't fill up the buffers
  - see edge effects ...

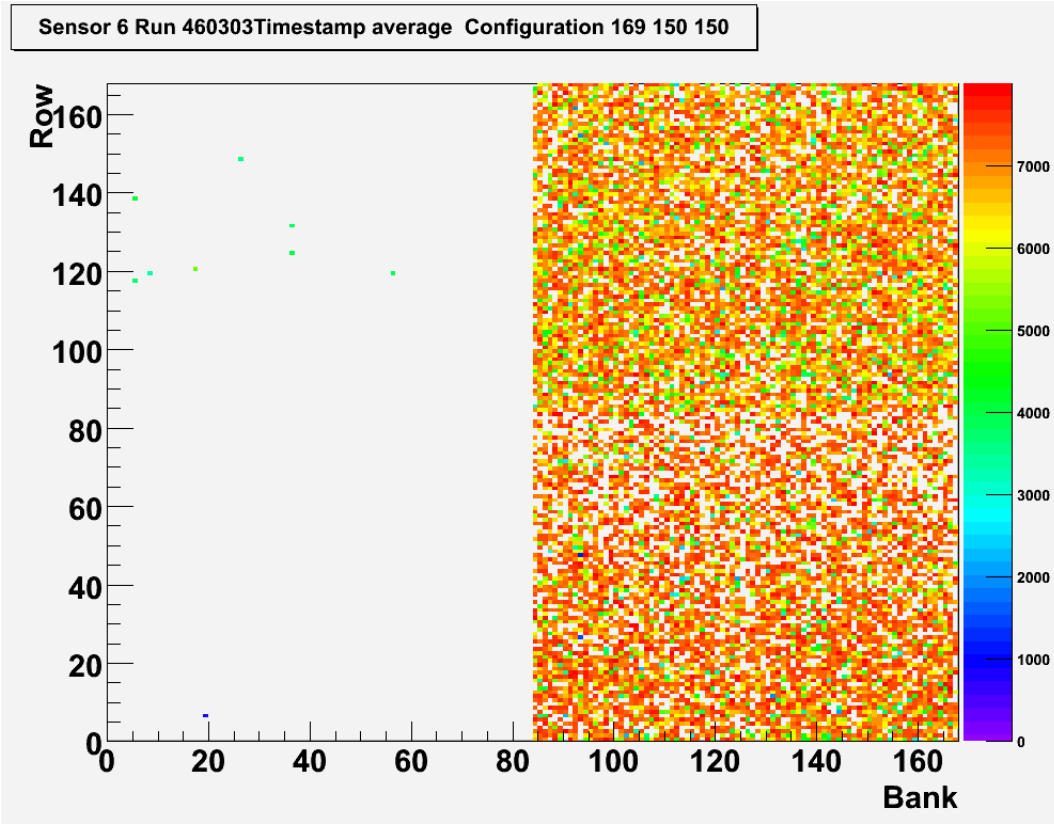


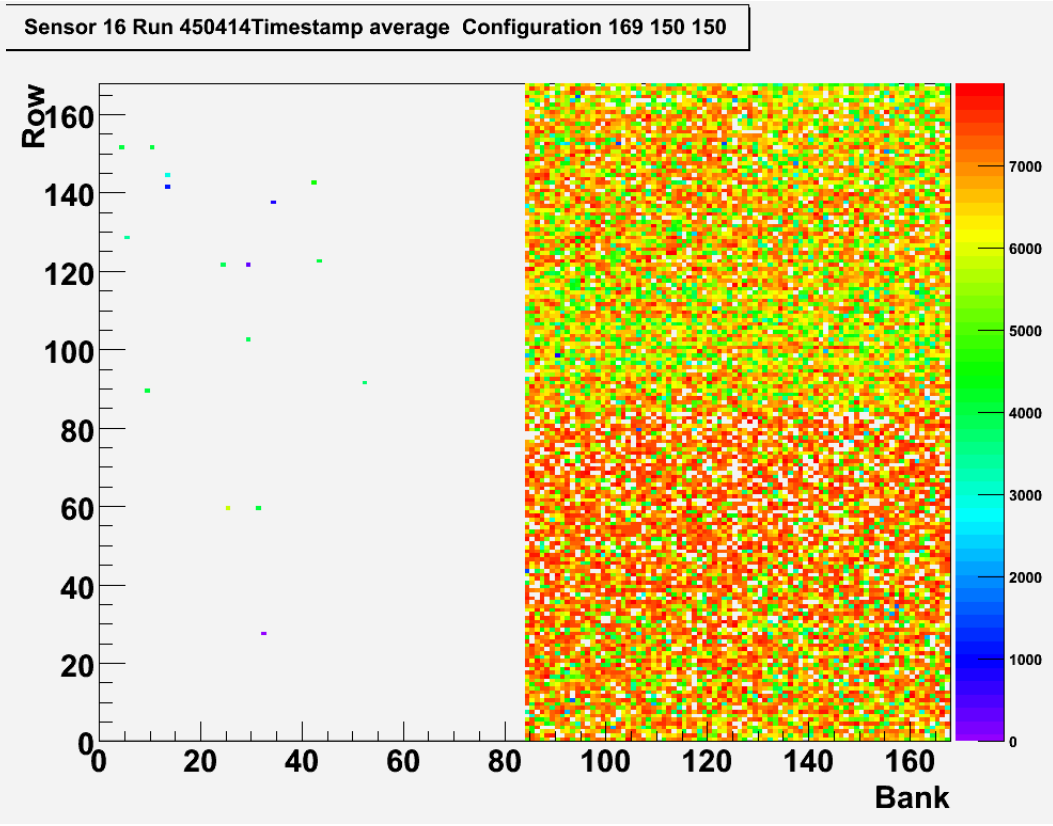
TimeStamps

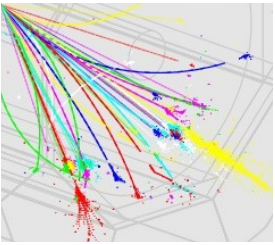
- Have 8192 Timestamps per bunchtrain
- in an ideal sensor
  - Low noise: TimeStamp distribution is flat
  - Medium noise: Exponential decay
  - High Noise: TimeStamp only up to 4, then no timestamps



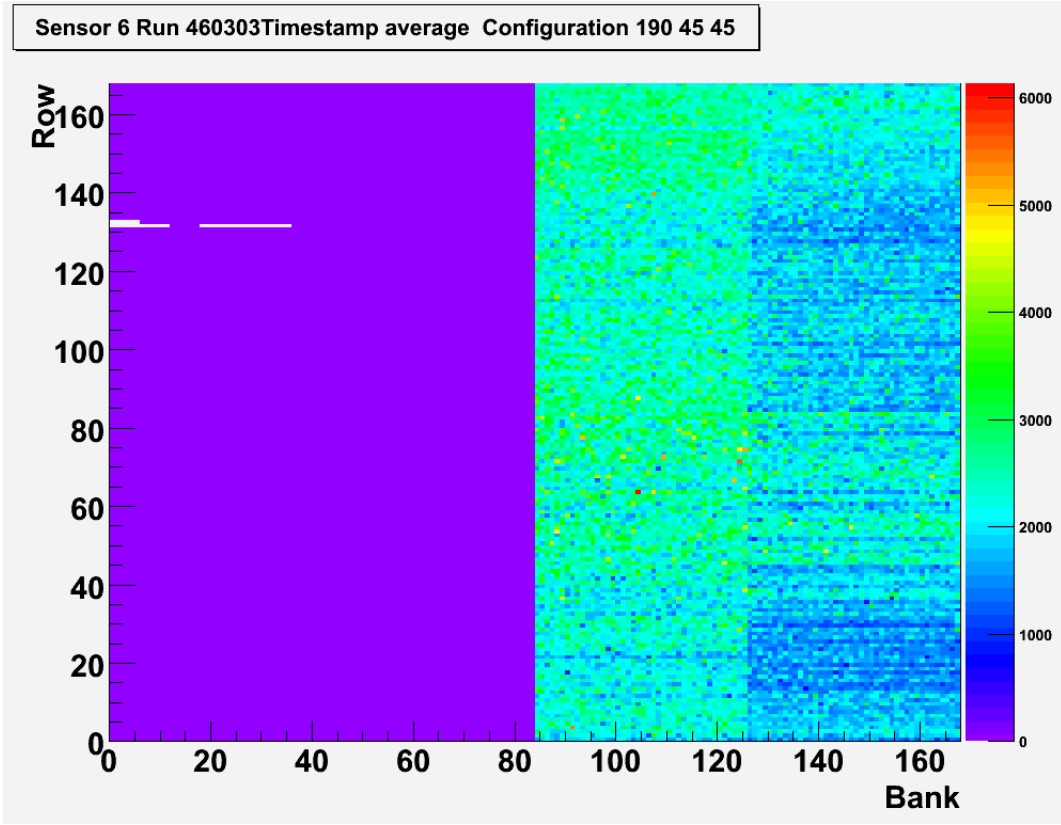
TimeStamp Averages

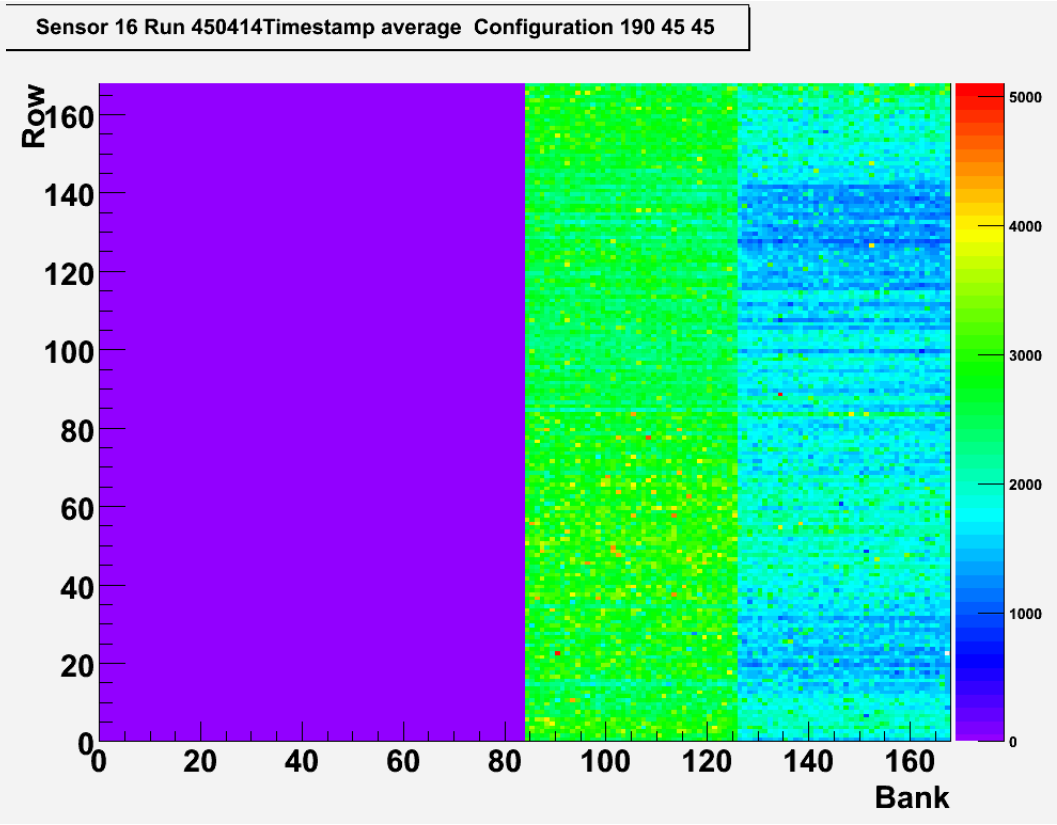


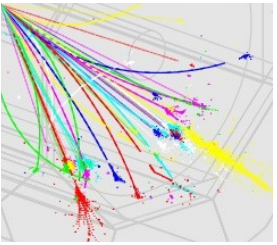




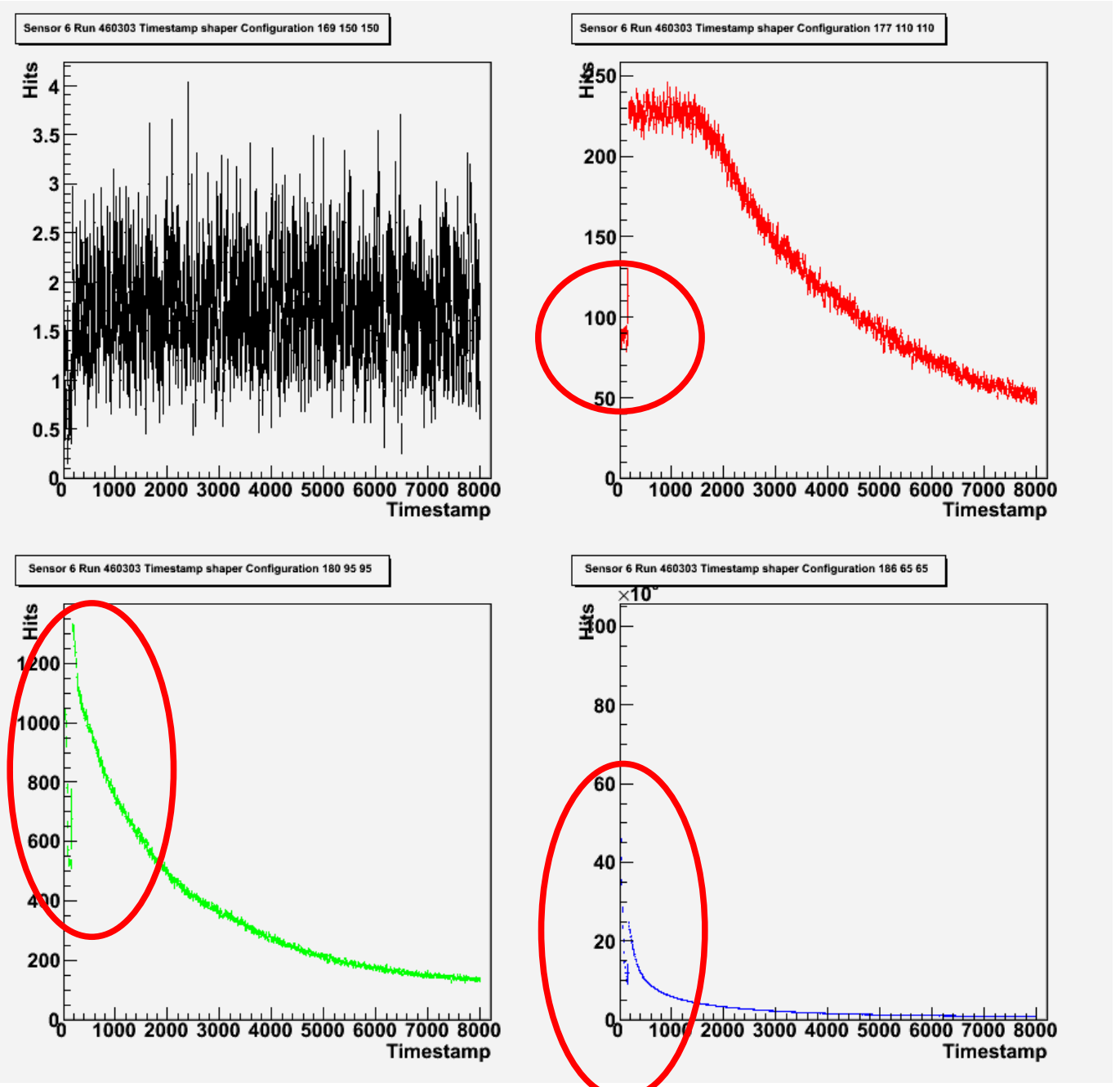
TimeStamp Averages (II)

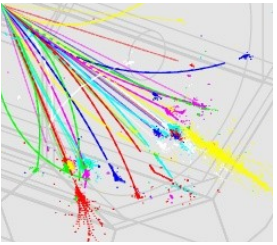




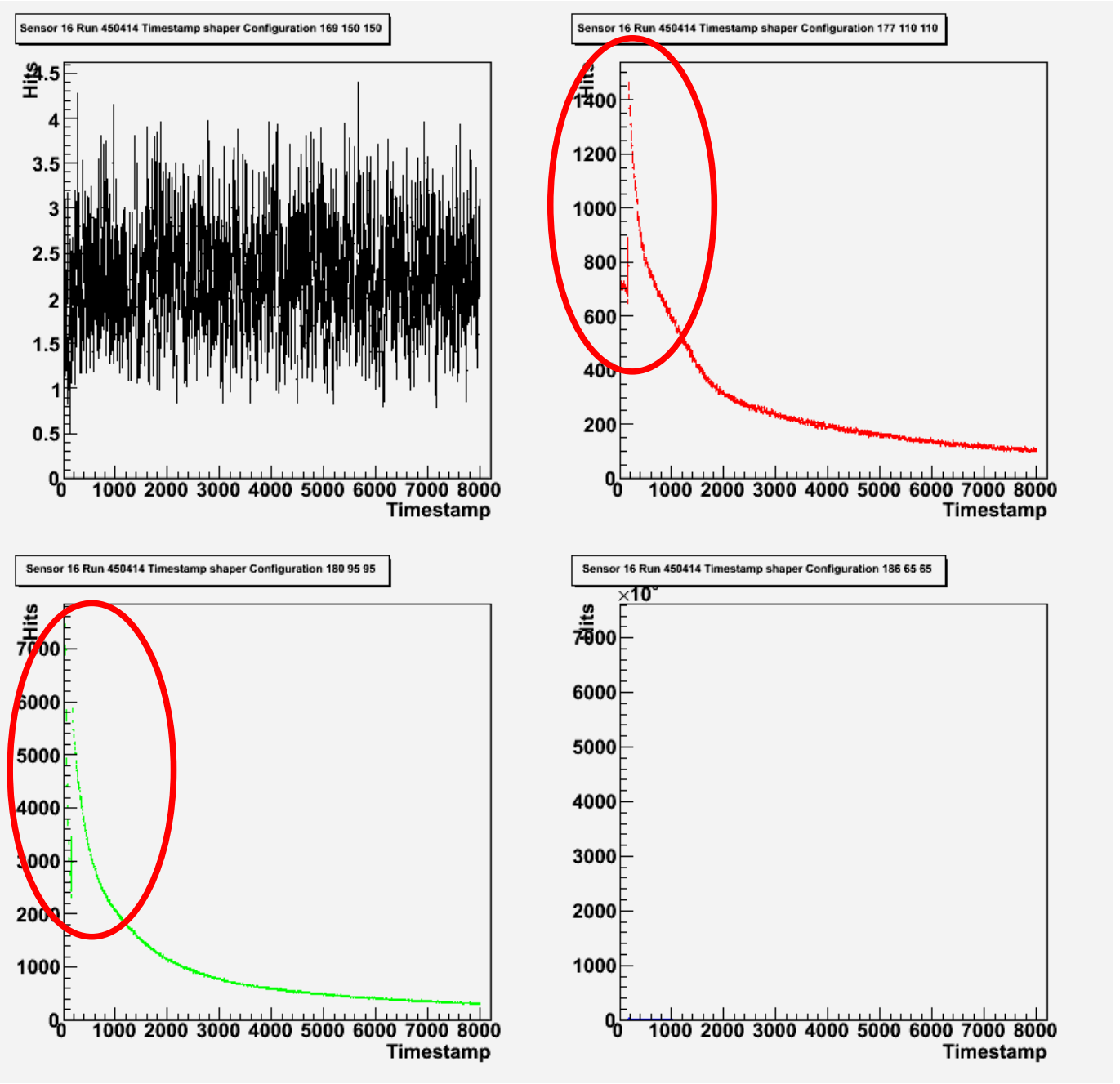


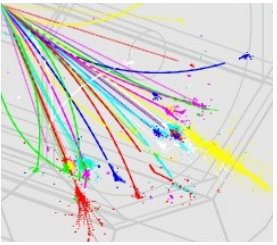
Shapers sensor 6



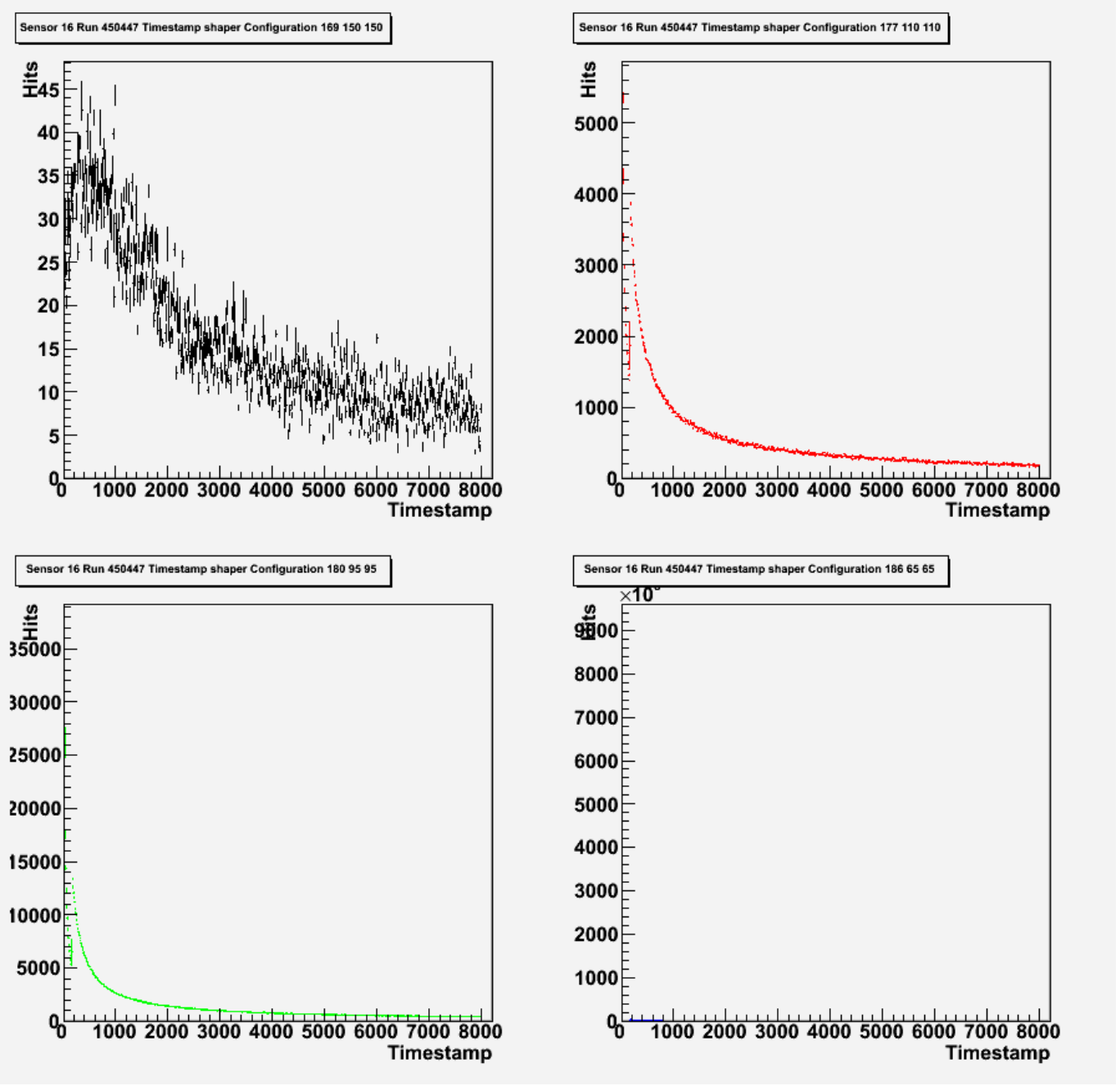


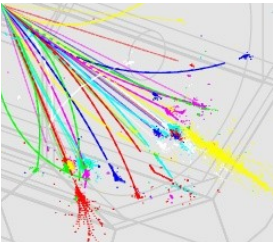
Shapers Sensor 16



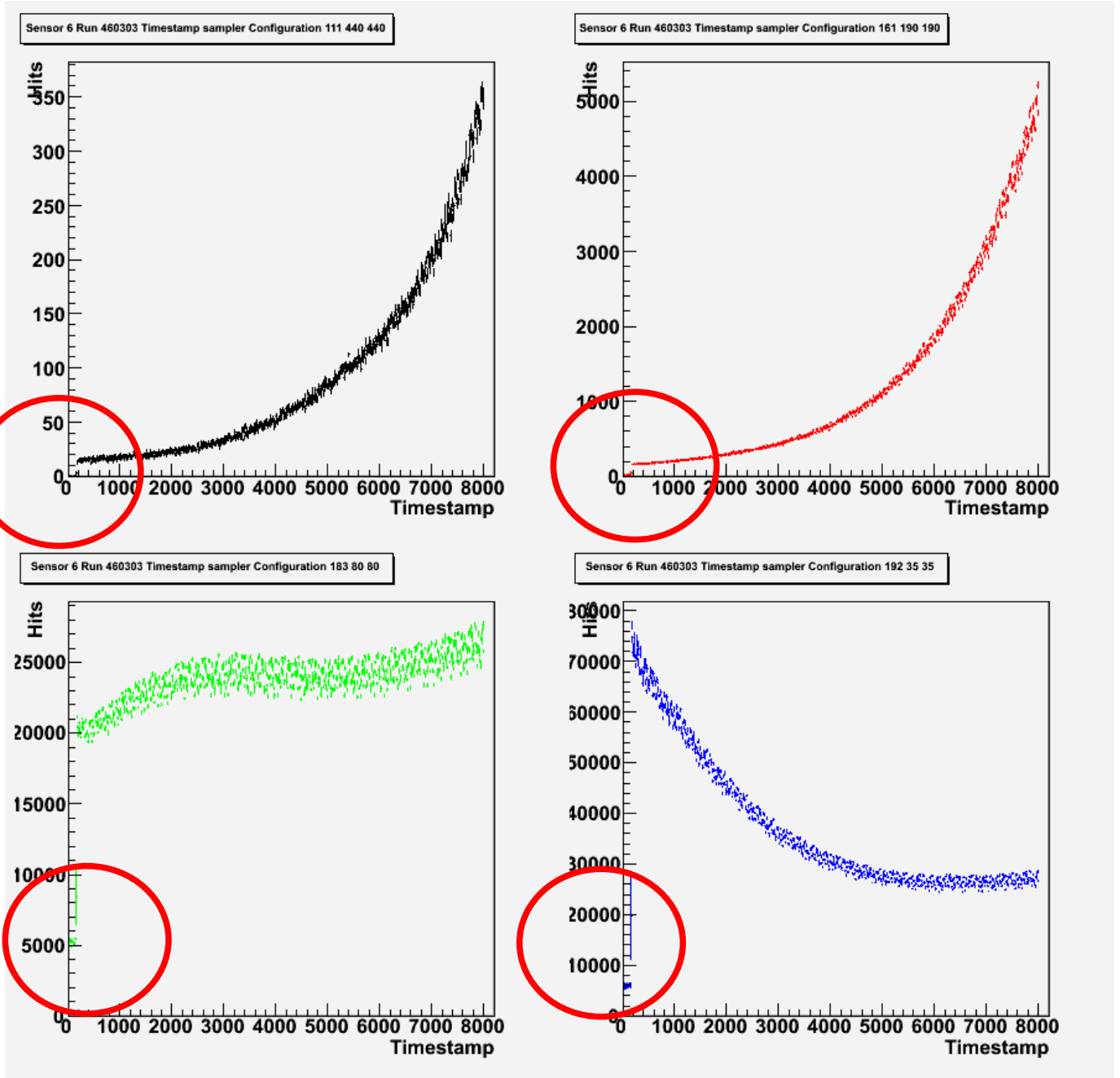


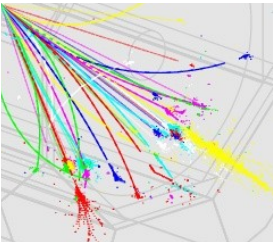
Shapers Sensor 16 (II)



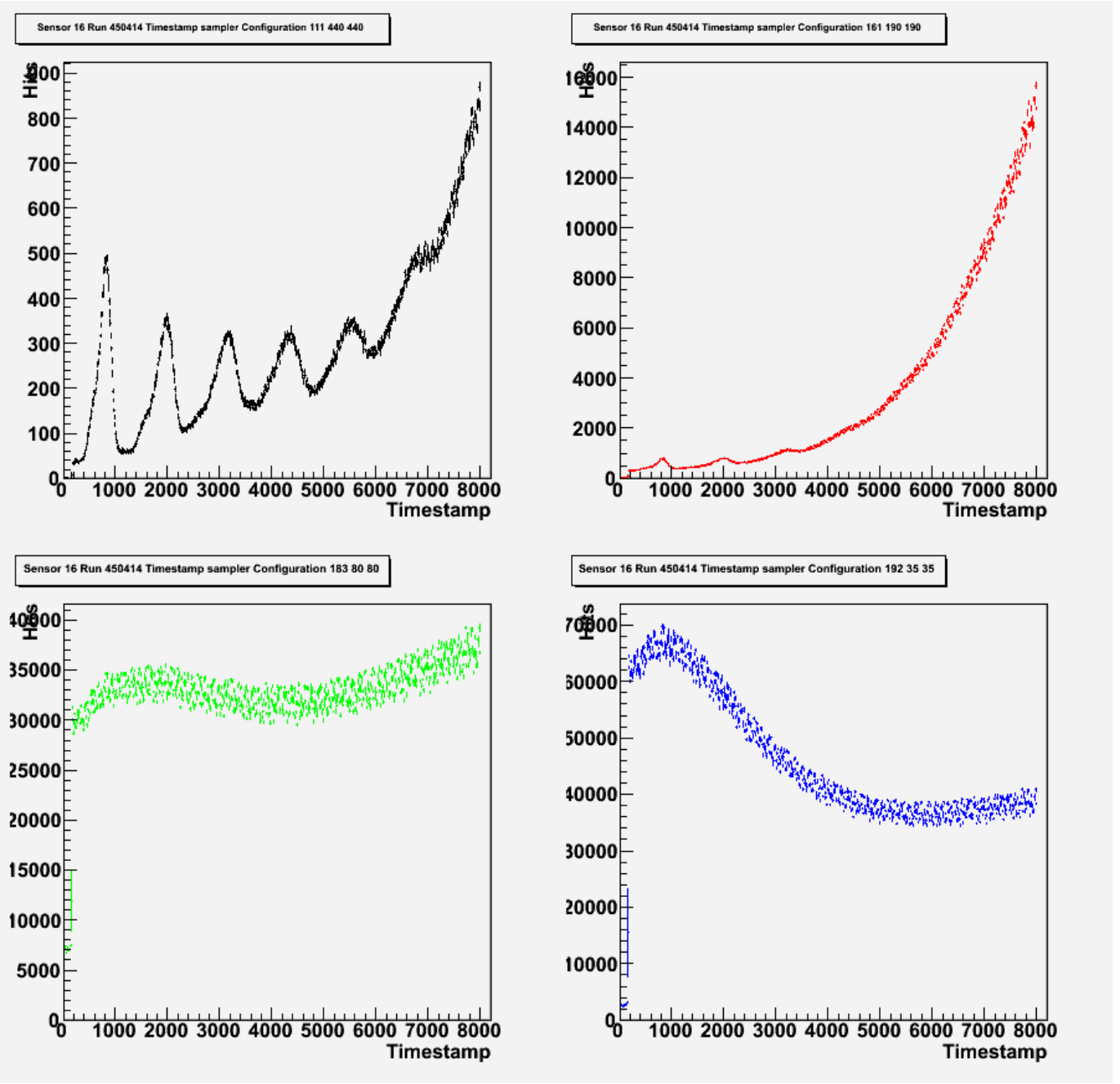


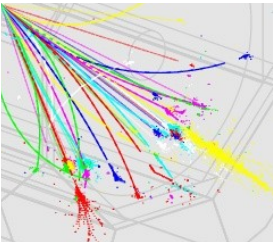
Samplers Sensor 6



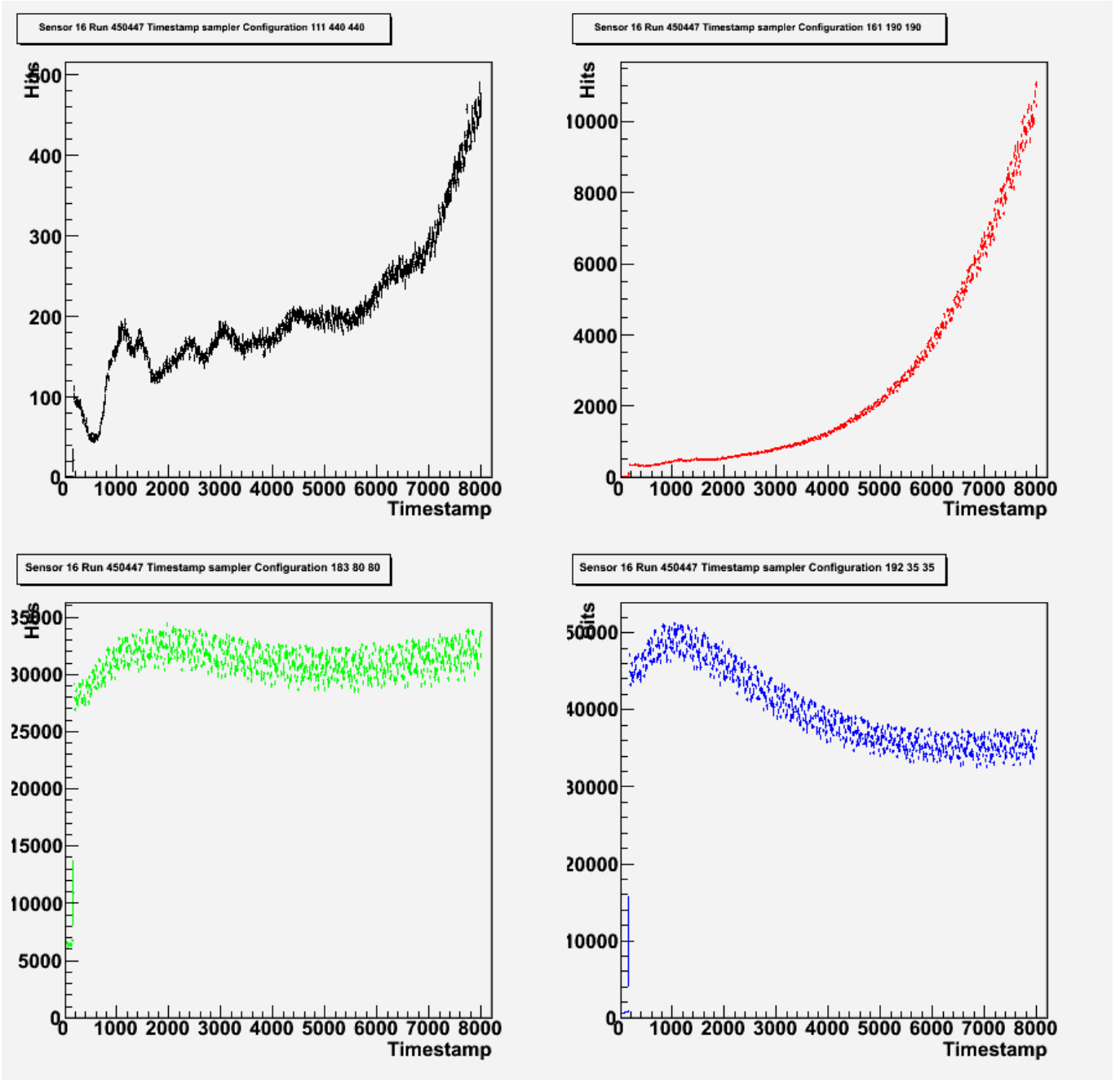


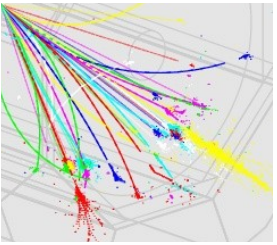
Samplers Sensor 16





Samplers Sensor 16 (II)





Comments

- Don't under stand low timestamps at ~ 200
  - seen also by Paul
- Samplers “leak“
  - Do we understand this ?
  - what are the oscillations on sensor 16 ?
- Results difficult to reproduce sensor 16
  - Unclear why ...
  - Sensor 6 seems to behave much better