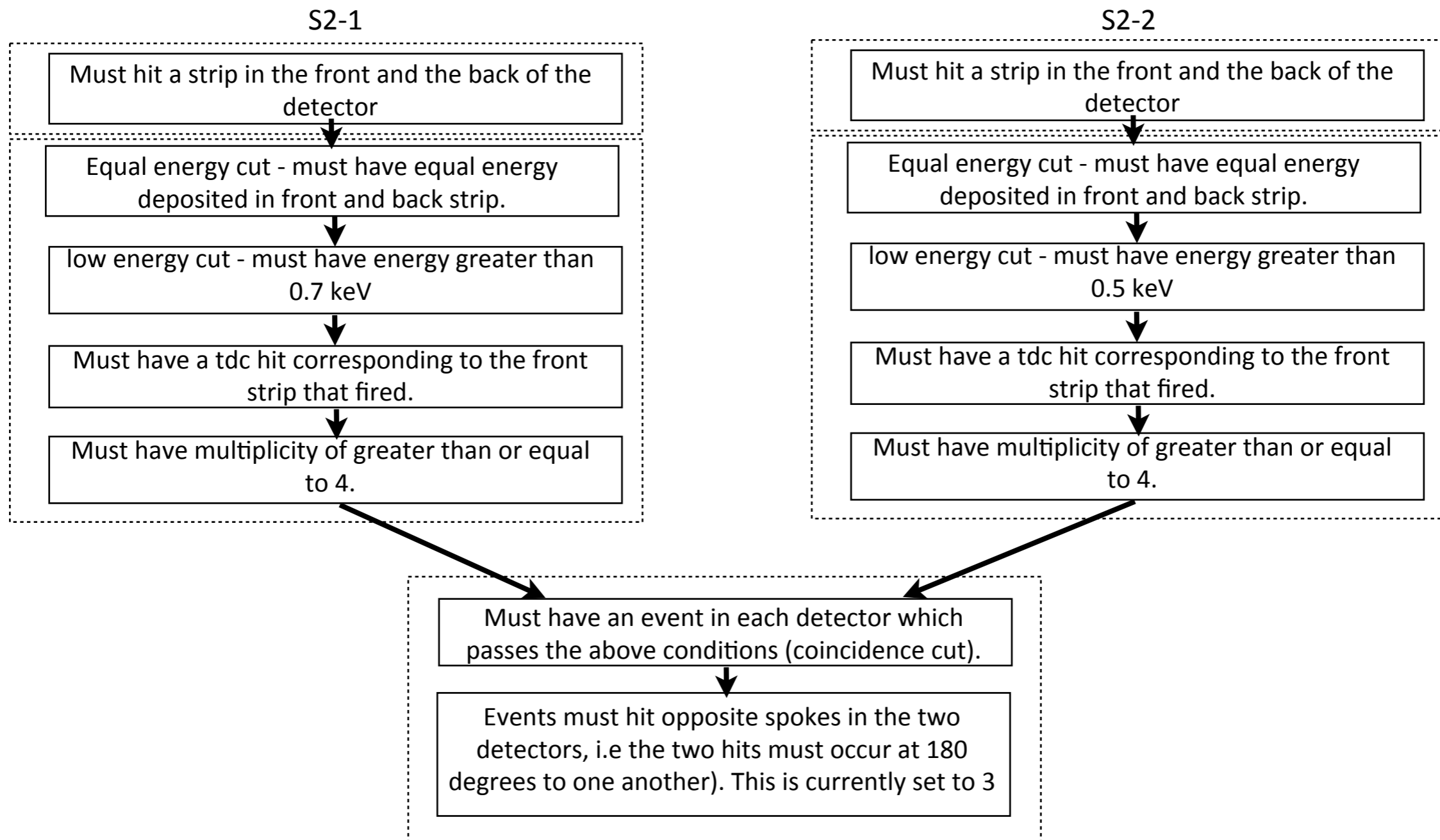
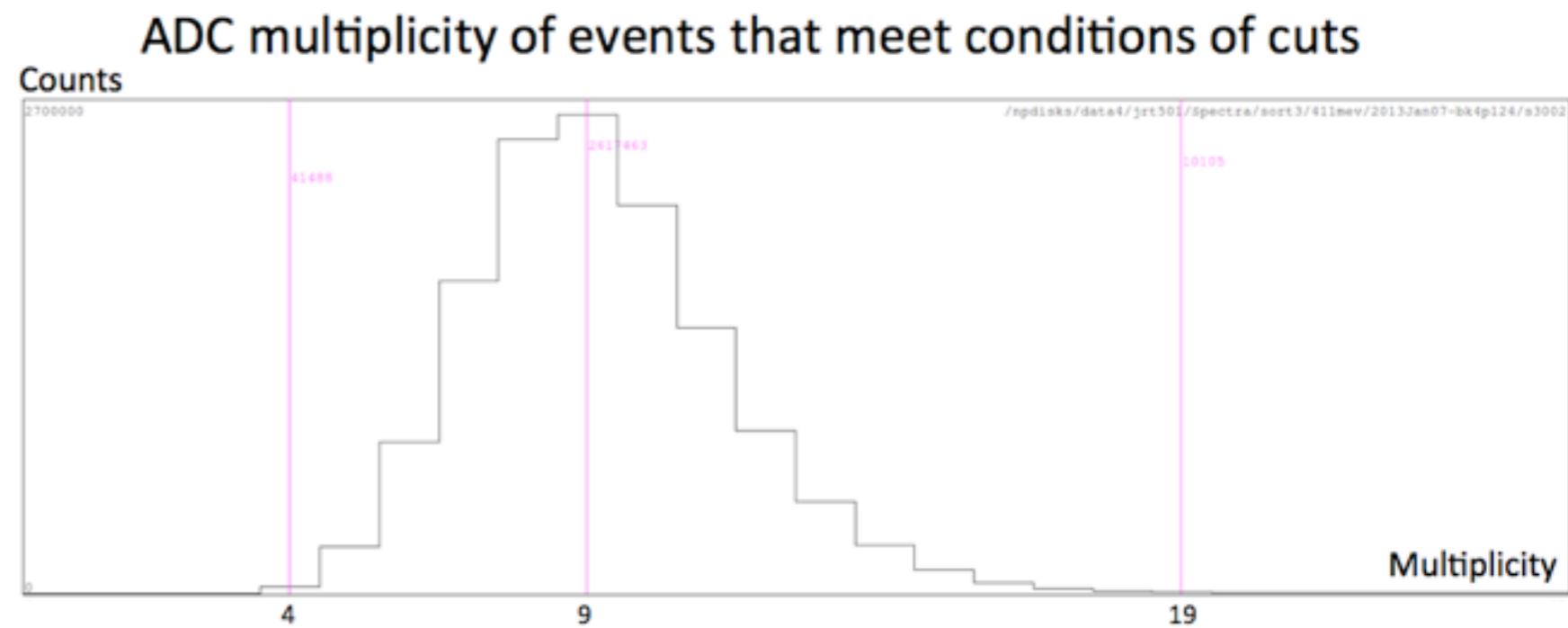
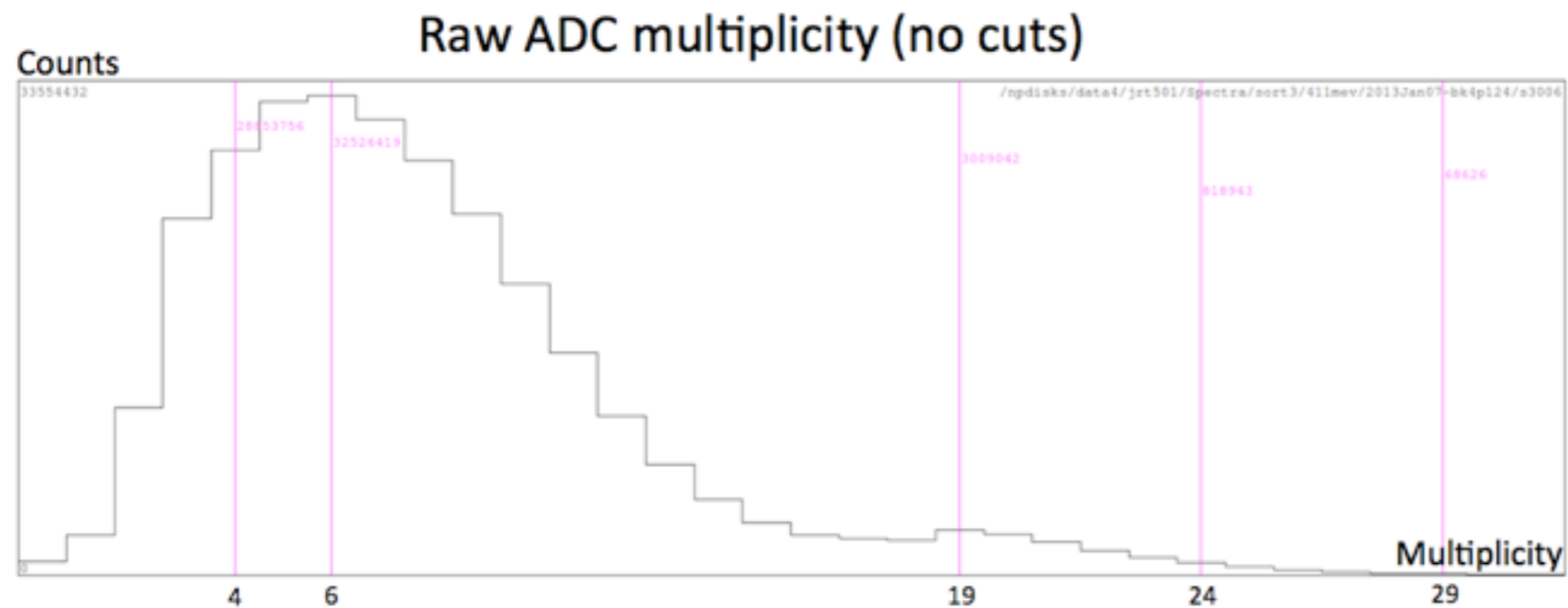


Cuts applied:



ADC multiplicity

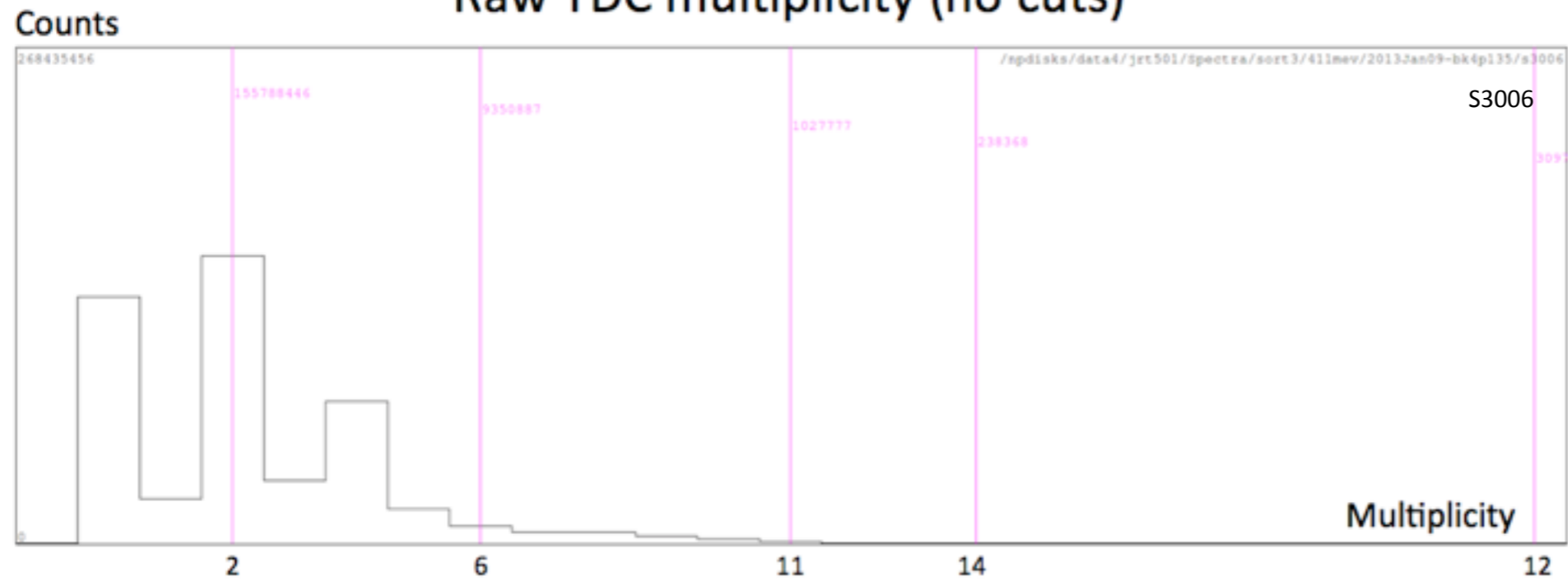
Multiplicity calculated in do loop from 0 to 127 (s2 detector strips only).



TDC multiplicity

Multiplicity calculated in do loop from 0 to 127 (s2 detector strips only). Not sure why I am getting hits on a multiplicity of zero in TDCs.

Raw TDC multiplicity (no cuts)



TDC multiplicity of events that meet conditions of cuts

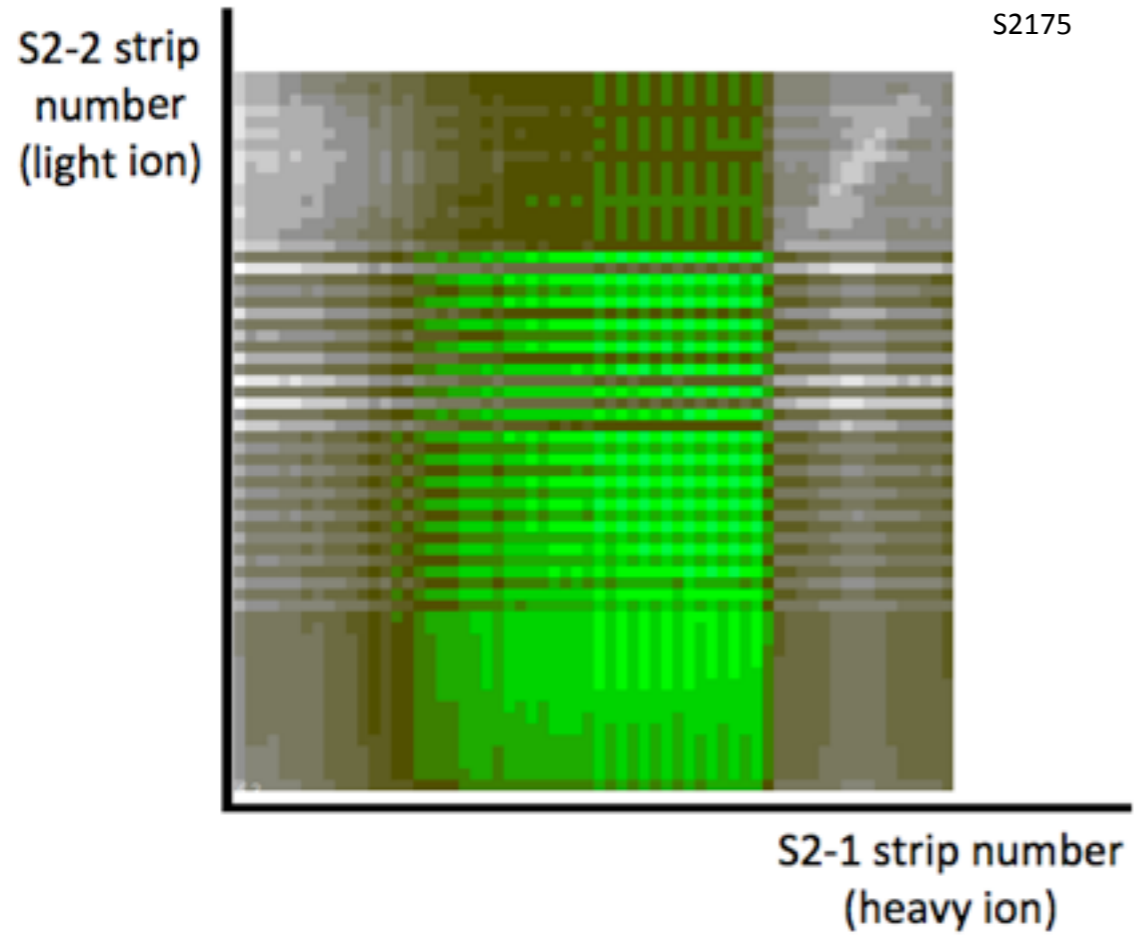


specs sorted with code in book 4 page 135 of lab book

Noisy cable could explain why there the adc multiplicity peaks at 9 rather than 4 after cuts.

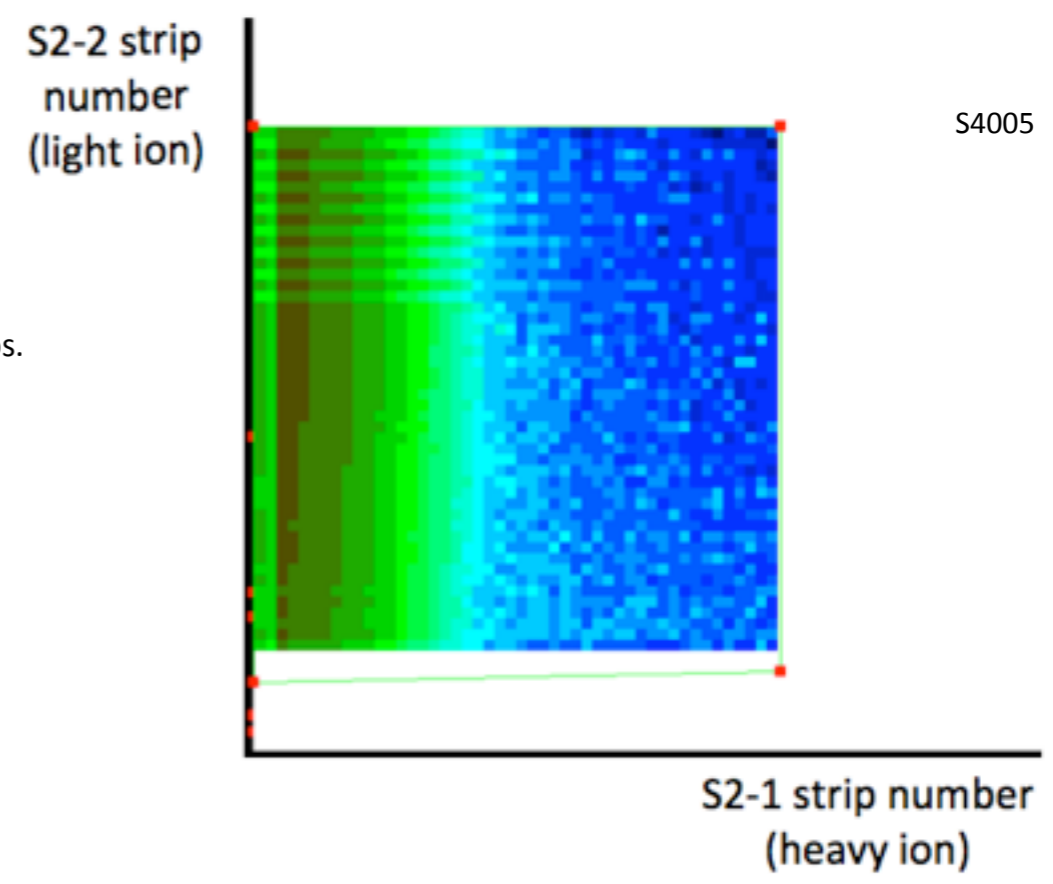
Ordered strip hit pattern - no cuts

S2175



Ordered strip hit pattern with cuts applied

S4005

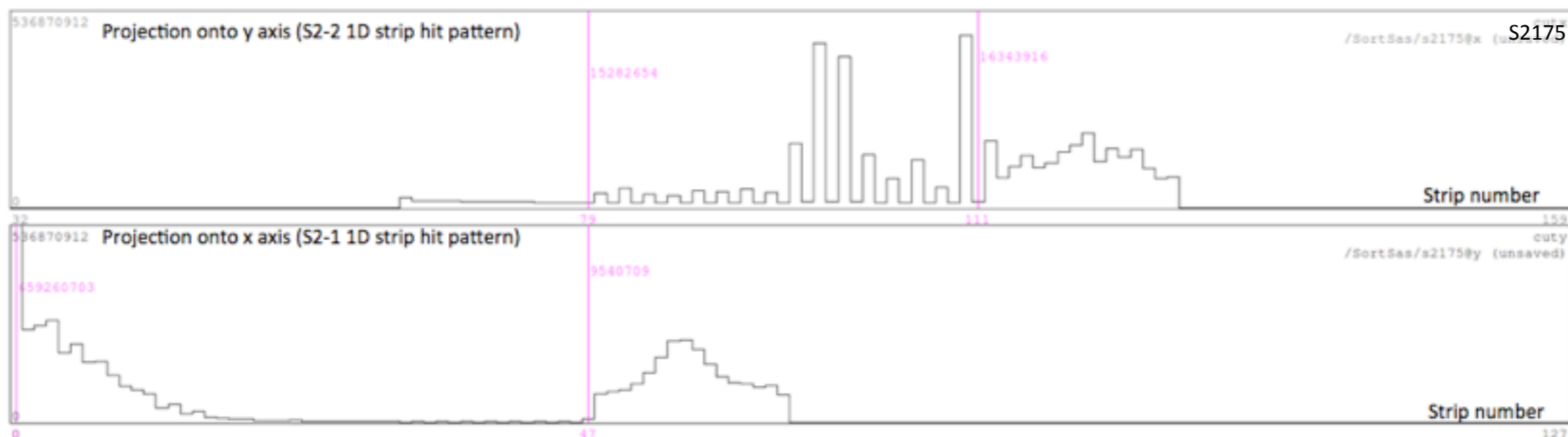


NB - here the back strips are included therefore the last 16 strips of each axis are the back strips.

NB - in this plot back strips are not included

Projections of plots on previous slides - 1D hit patterns

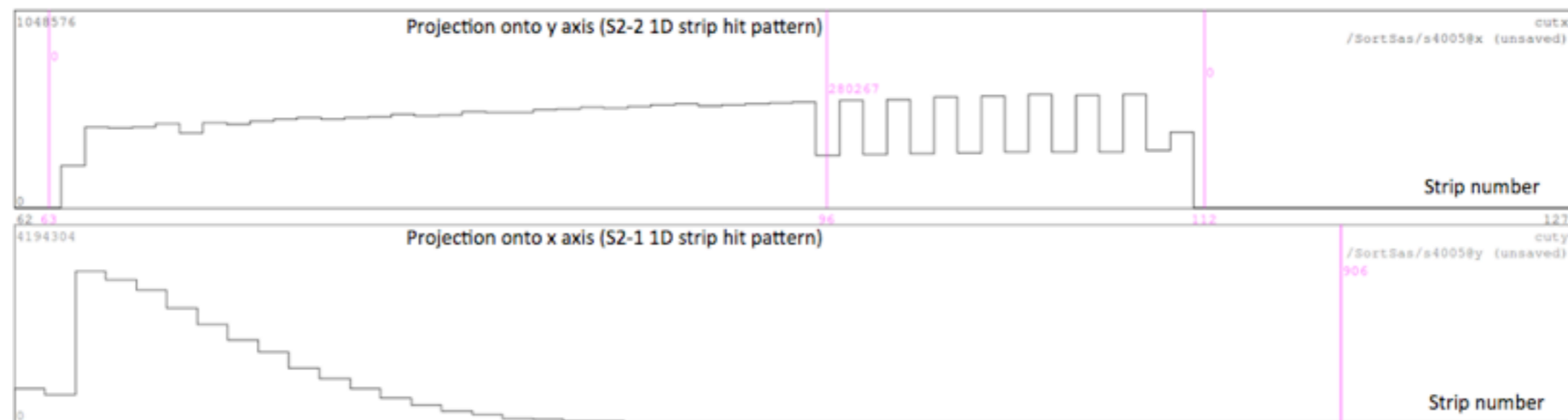
Projection of hit pattern with no cuts onto x and y axes



Detectors are wired using 4 cables, 3 on the front and 1 on the back. The markers on the projection to y axis in the plot with no cuts above show a region where every other strip is 'noisy'. The noisy strips correspond to the channels taken by one cable as each cable takes alternate channels.

Shown below is the same plot but without back strips after the cuts in the code have been applied (see slide 1 for list of cuts). This shows that the cuts are reducing the noise from the cable considerably (if it is in fact the cable).

Projection of hit pattern with cuts onto x and y axes (front strips only)



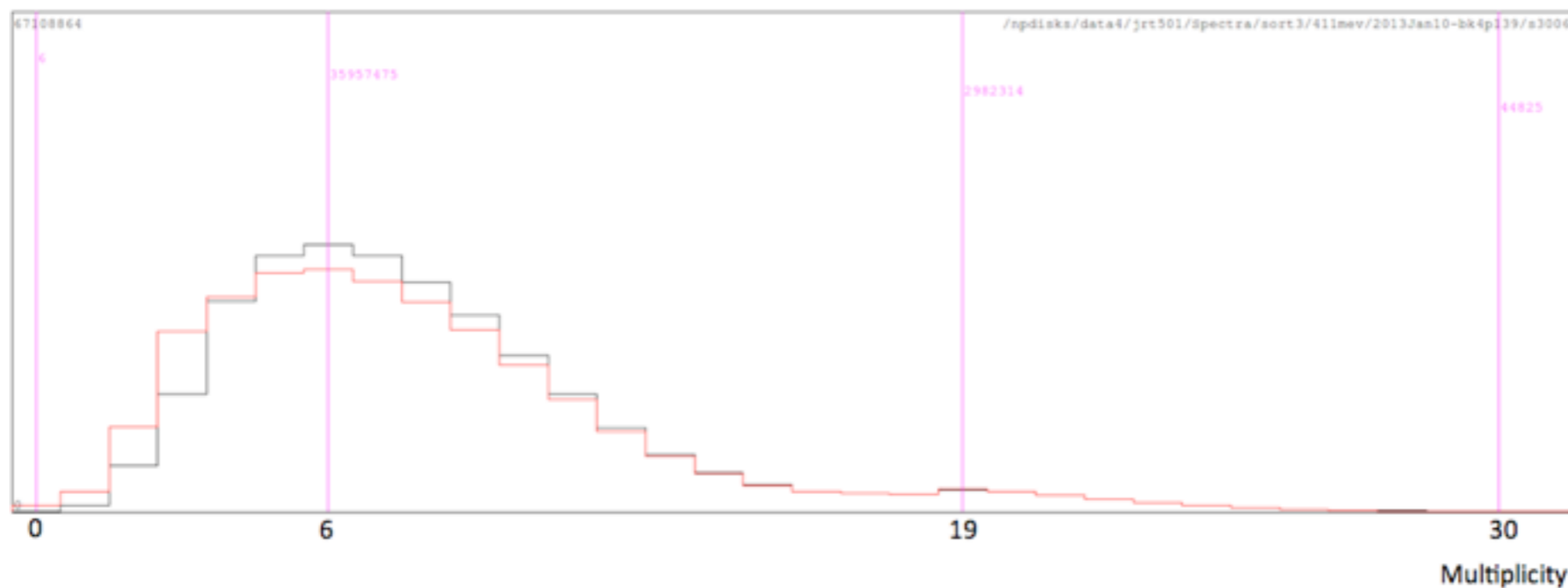
Looking at multiplicities of all channels not just S2 channels

no cuts

Want to have a look at why I am getting multiplicity of 0 in TDC channels and see if there are channels firing that are not the S2 channels.

ADCs

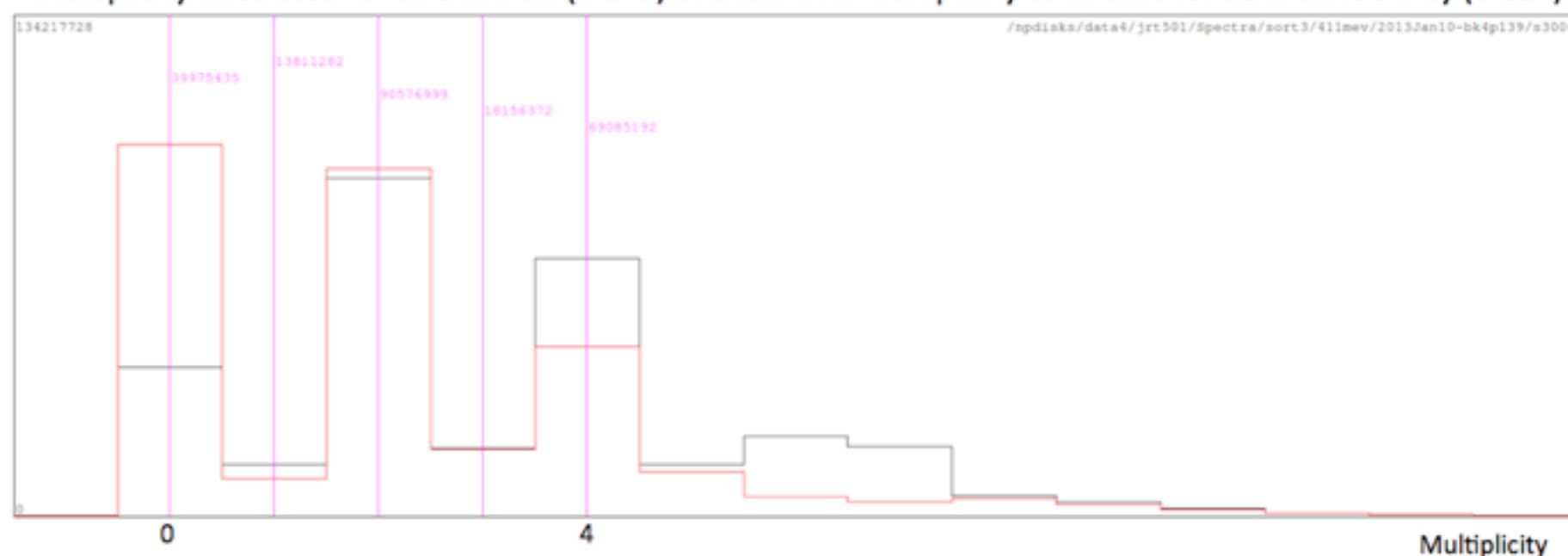
Multiplicity calculated for all channels (0-175) overlaid with multiplicity calculated for S2 channels only (0-127)



When I calculate the multiplicity only running through strips from 0 - 127 I get a lot of zero multiplicities, however when I run through all the channels and calculate multiplicity I get only 6 events with zero multiplicity.

TDCs

Multiplicity calculated for all channels (0-175) overlaid with multiplicity calculated for S2 channels only (0-127)



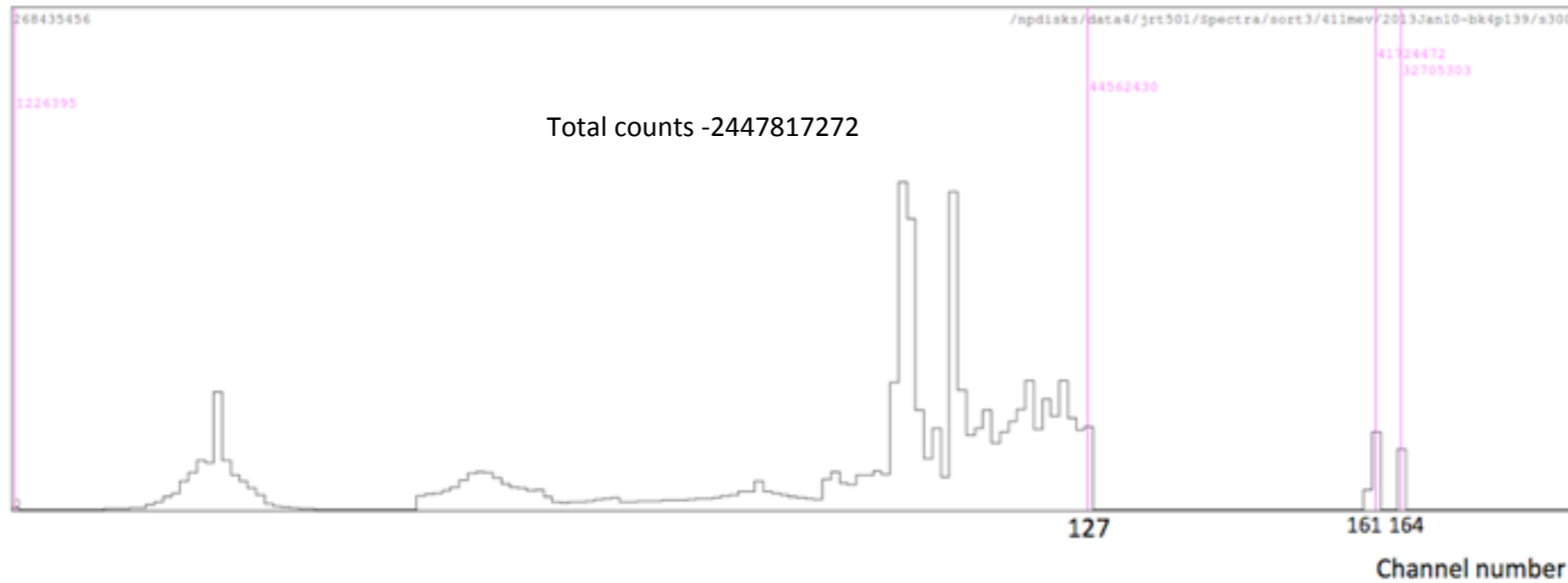
For the TDCs although the number of events with multiplicity of zero decreases when I look through all channels to calculate it, it does not go to zero, there are still a lot of events with multiplicity of zero.

When gated on multiplicity of 0 don't see anything in hit pattern for adc or tdc...?

Red - calculated for chan 0-127 (bk4p124-s3006)
Black - calculated for chan 0-175 (bk4p139 s3006)

Hit patterns of channels 0-175 unordered - no cuts

ADC channel hit pattern (unordered) for channels 0-175

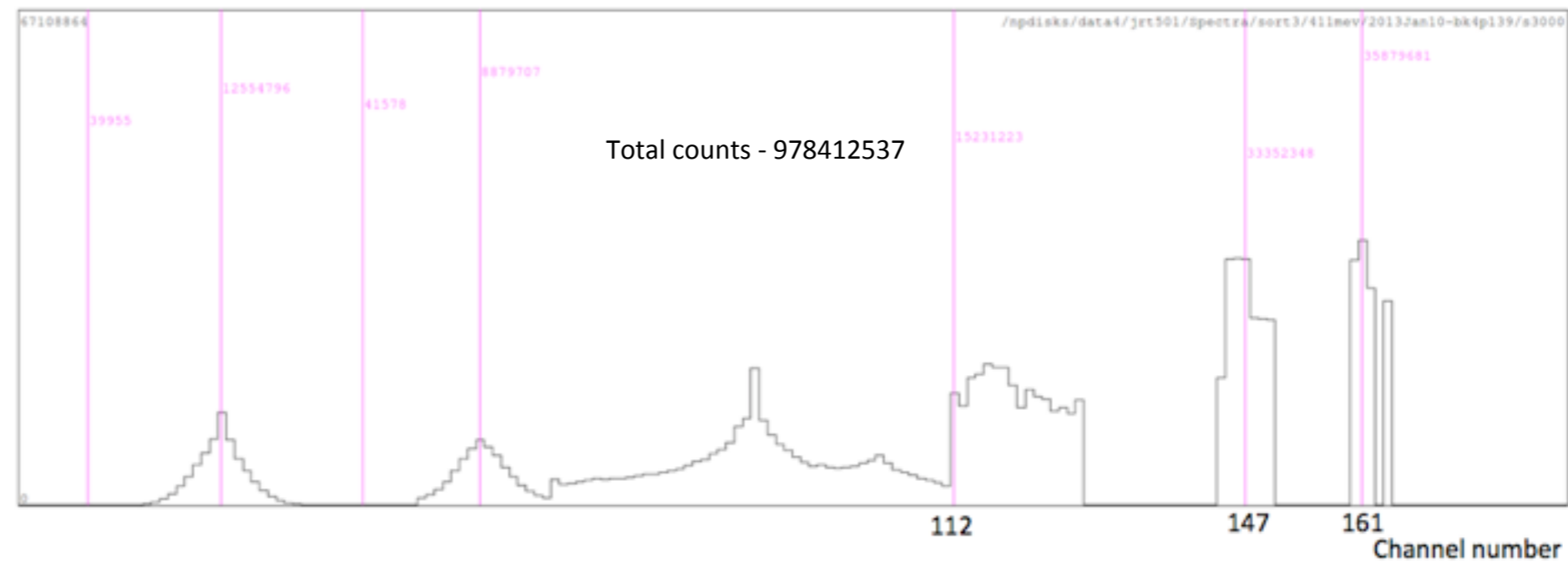


NB - if we put the same plot as a log scale we see there are counts in every single channel from 0-175. Should check and see what I get if I run from 0-200. Lowest count in a single channel is around 32000.

Channel list from log book:

- 0-47 S2-1 front
- 48-63 S2-1 back
- 64-111 S2-2 front
- 112-127 S2-2 back
- 128-143 W front
- 144-159 W back
- 160-175 PDs

TDC channel hit pattern (unordered) for channels 0-175

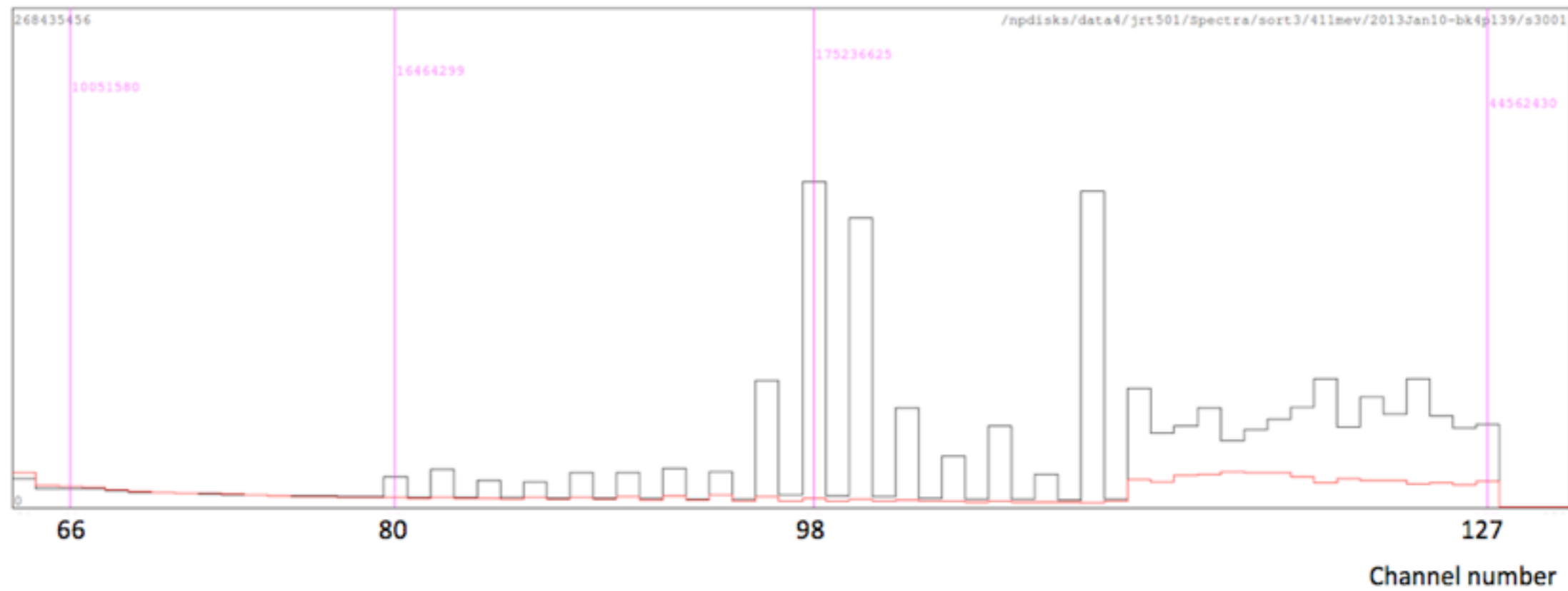


NB - if we put the same plot as a log scale we see there are **NOT** counts in every channel. So is it possible that there were faulty TDC channels?

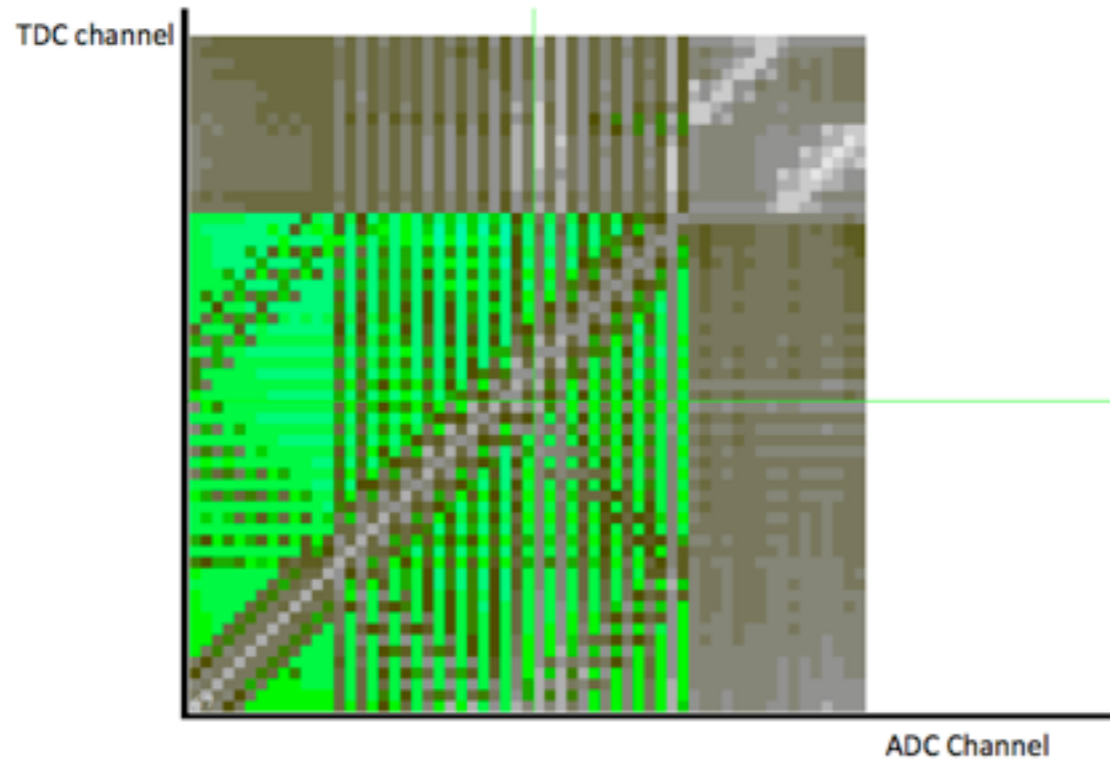
Both figures from same sort and spec bk4p139 s3000

ADC and TDC hit patterns S2-2 - no cuts

Tdc hit pattern overlaid onto adc hit pattern for S2-2 - no cuts



ADC channel hit vs TDC channel hit for S2-2



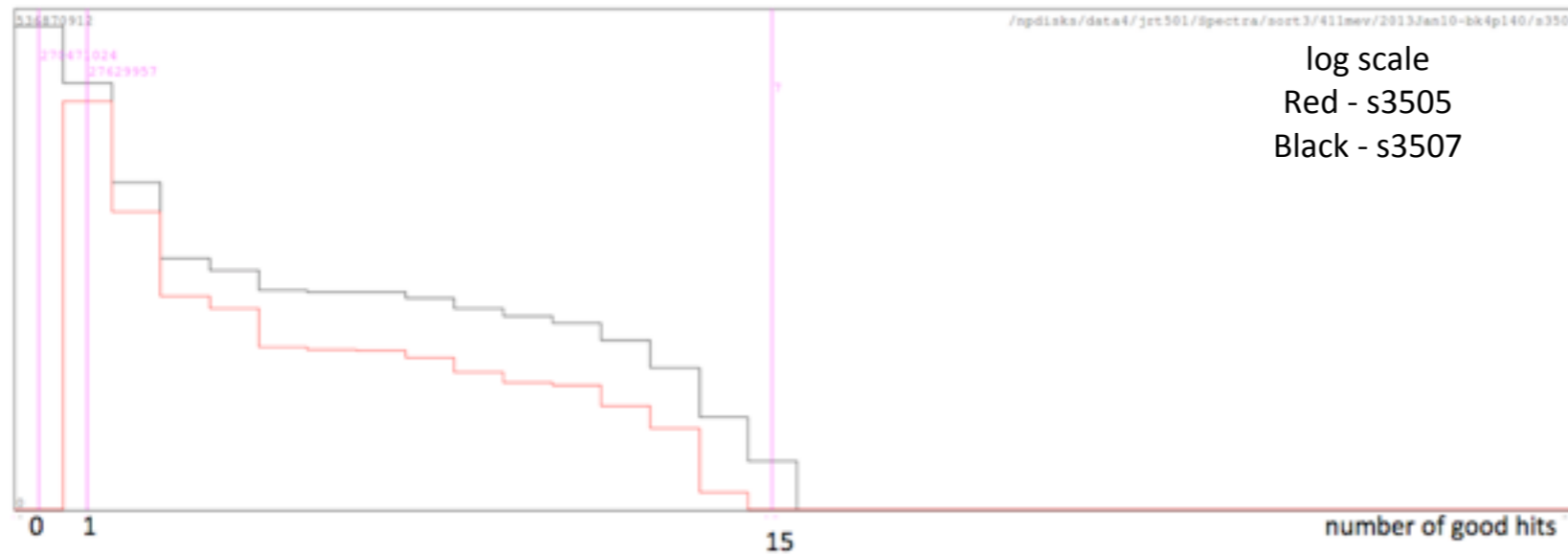
The hit patterns above follow the same pattern but the TDC pattern does not have the noisy pattern (possible source cable).

Both figures from same sort bk4p139 s3001 and s3002

Good S2 hits

I plotted the good S2 hits for each detector before the coincidence cut and then also plotted it after the S2 detector coincidence and back strip hit conditions shown on slide 1. I overlaid them here to show how many events are lost in the coincidence. These plots were created to give an idea of how many 'good hits' there are per event. I expected it to peak at 1 after coincidence cut and this is the case.

S2-1 good hit plotted before coincidence and spoke cuts (black) and after (red)



A good S2 hit is one that:

1. must hit strip on front and back of the detector.
2. Satisfy the equal energy cut.
3. Satisfy the low energy cut.
4. Must hit TDC for the front strip hit.
5. Must have multiplicity of 4 or greater.

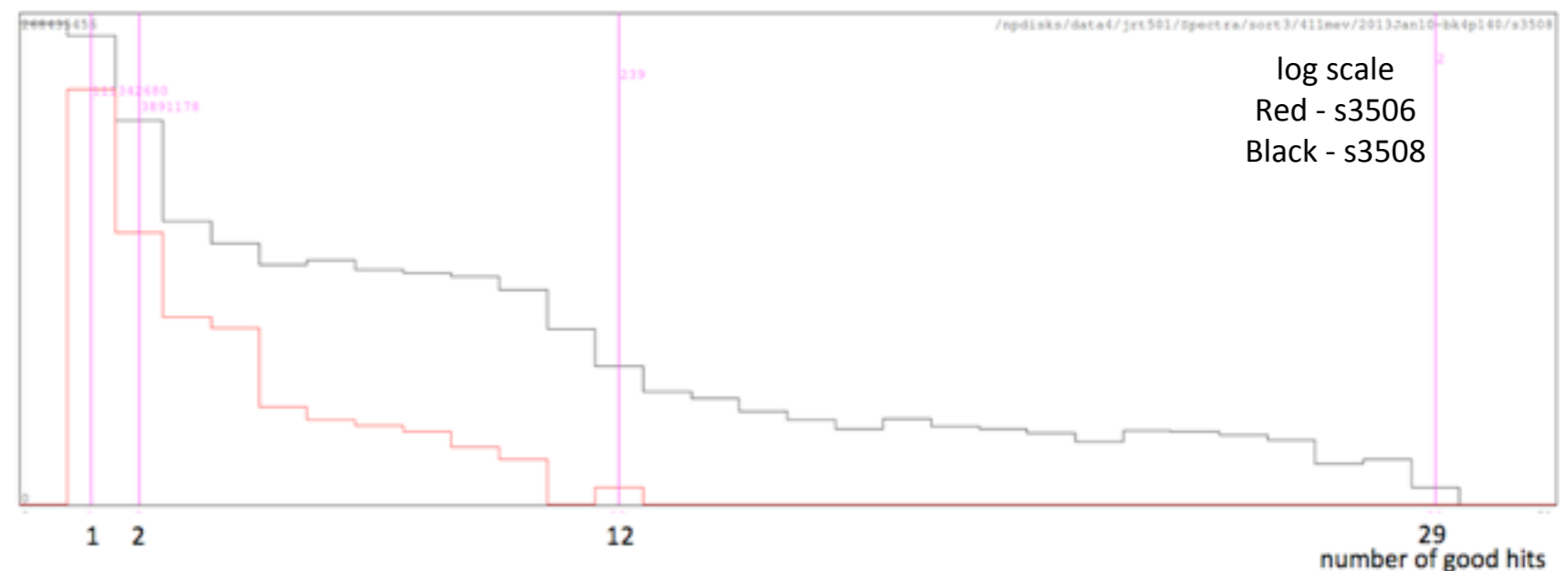
Basically everything up to the coincidence between the two detectors shown on slide 1.

Ratio of events with 1 good hit to events with more than one after the coincidence cut is:

S2-1: 12.5

S2-2: 266.0

S2-2 good hit plotted before coincidence and spoke cuts (black) and after (red)



Both figures from same sort bk4p140