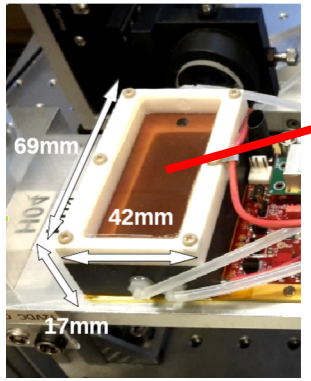
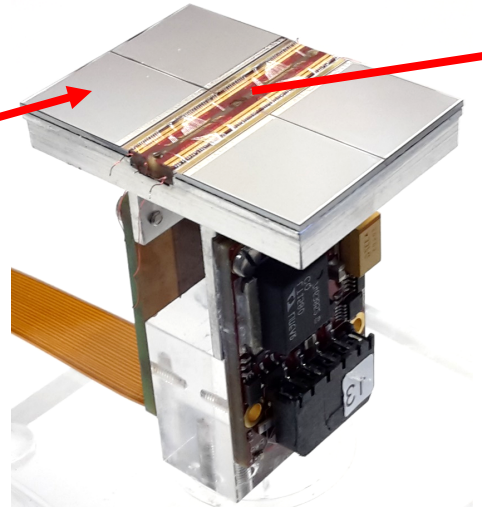
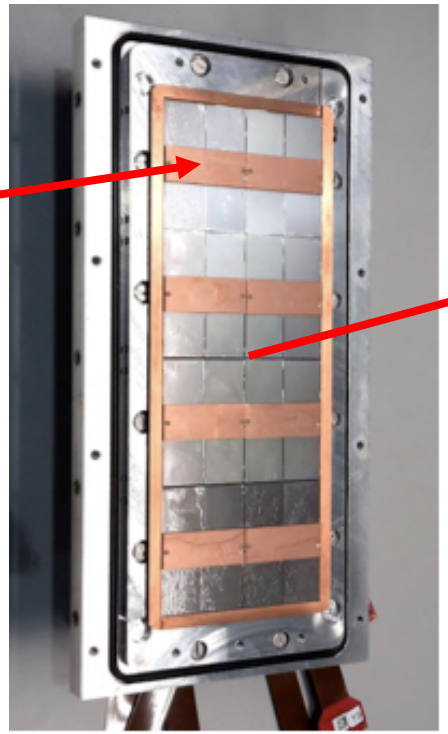
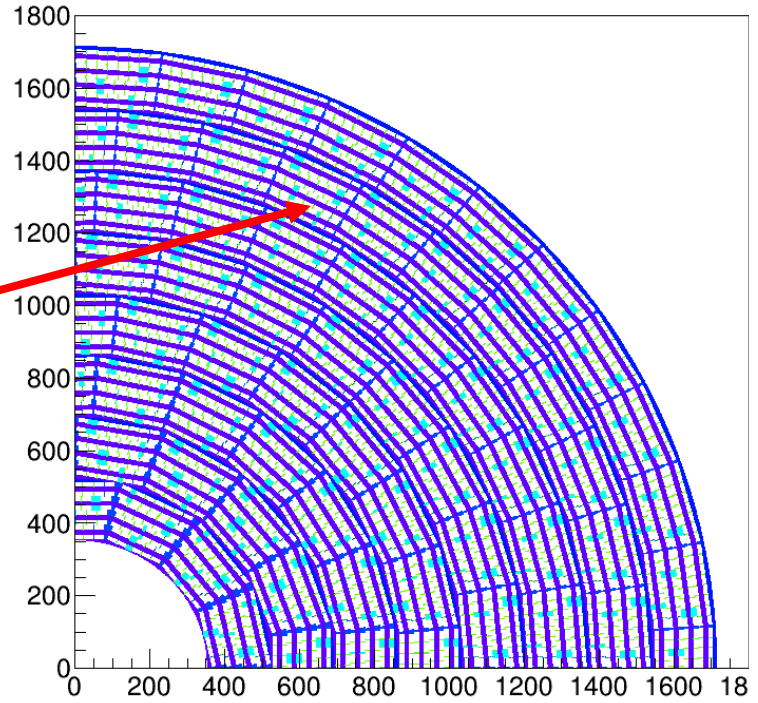
Pixel TPC









Single chip 2017

Quad 2018

Module 2019

TPC plane

Third Laser data taking with 8-quad module

Data taking run 1272 with logging of
- 1 The laser positions and times
- 2 The trigger timestamps datastream TIMESTAMP
- 3 The data streams for the two concentrators LINK0 and LINK1

Settings run V_{grid} = -330 V (OK) ; V_{drift} = -280 V
- x position = 5 mm steps of 0.1 mm in total 3 steps
- 3x 100 points

We Sander/Peter/Bas changed the LV power converters and added a mini-cooling plate made by Oscar. A bug in the ToA decoding was fixed. Sander also corrected a bug in the online software that coded the spidertime.
During the run we could not get a stable readout in concentrator0 and we had to switch off power for one quad. After that data taking was smooth.
NB Noise runs were taken and a few more channels masked.

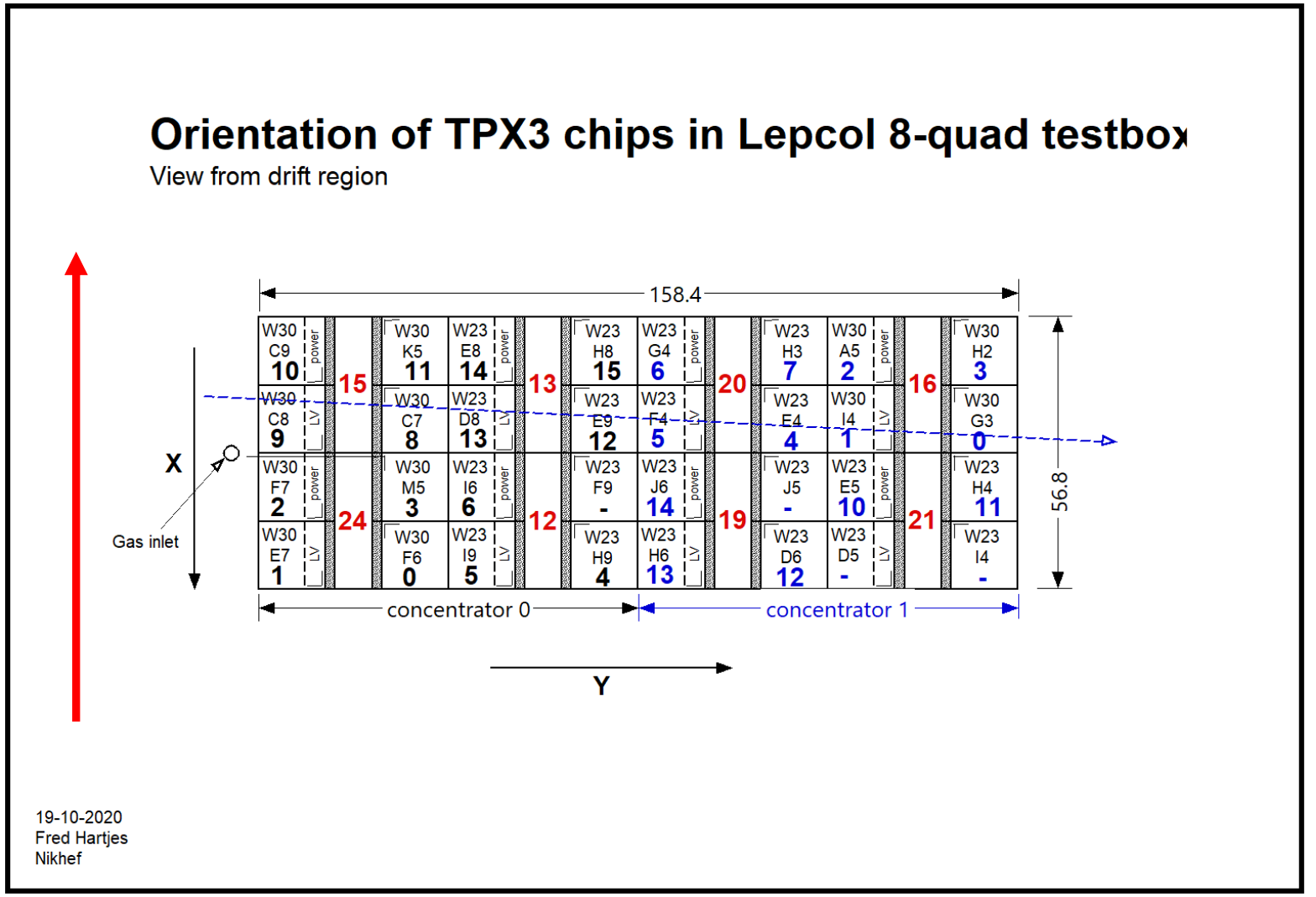
Second Laser data taking with 8-quad module

In the TIMESTAMP stream, we added a heartbeat, but we could not find it back in the stream. This is needed for longer runs.

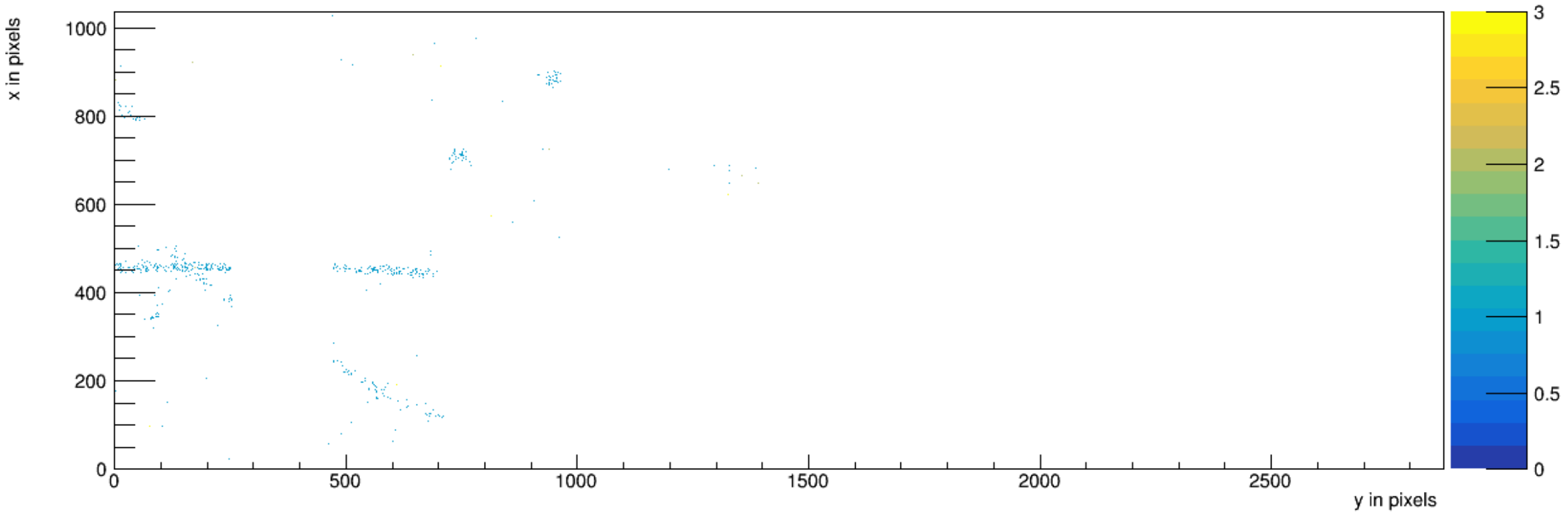
To use the trigger times an offline fix was applied.
Also an offset for matching with the concentrator streams is needed.
For both streams the same offset is used. So no magical offset is needed (see two weeks ago) anymore.

We use the geometrical layout of Fred with the correct chip numbers and the x axis running up (as Jan proposed)
Unfortunately Quad 12 was switched off.

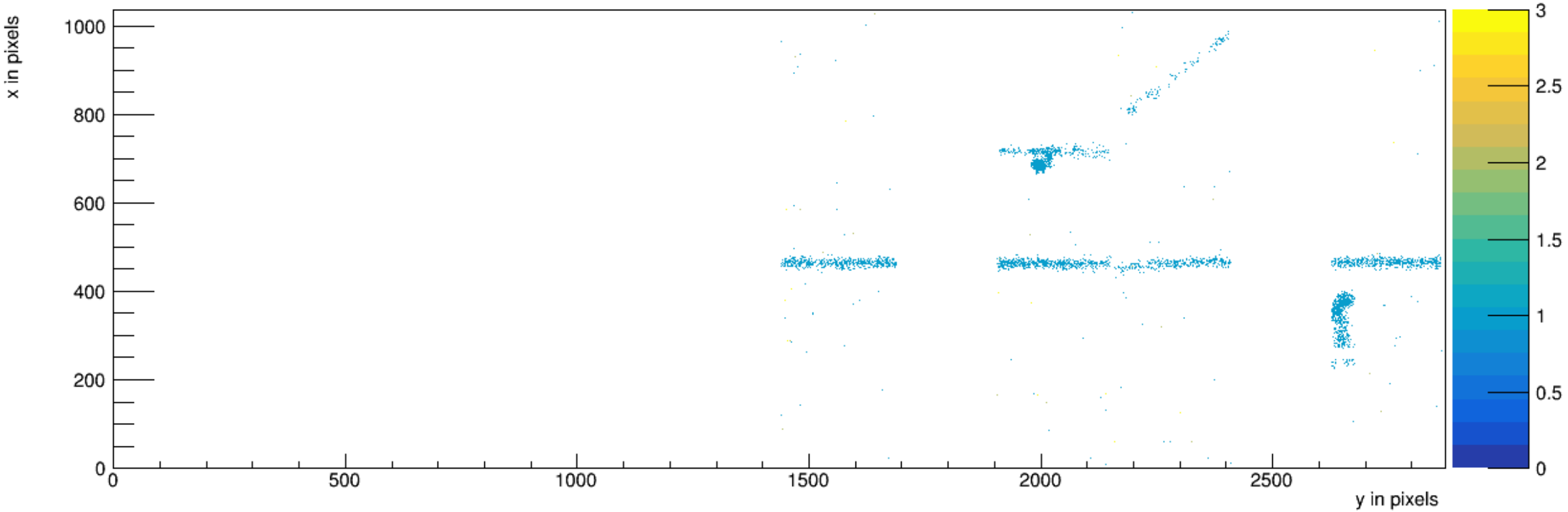
Updated event display layout



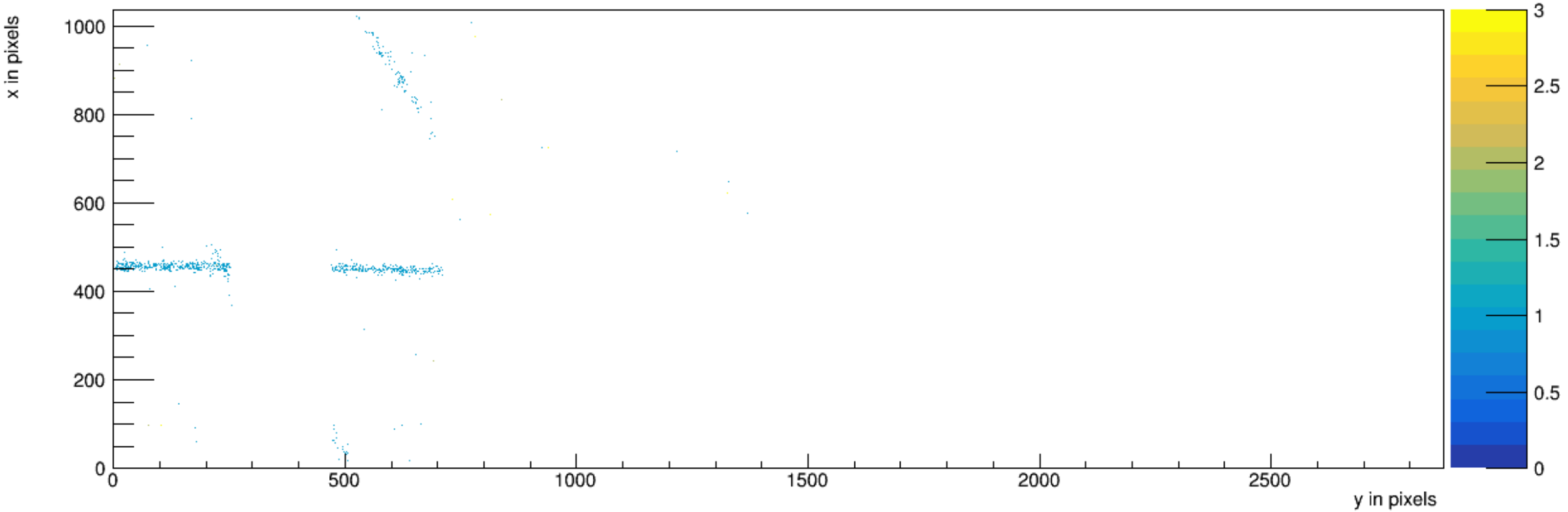
Event 4 concentrator 0



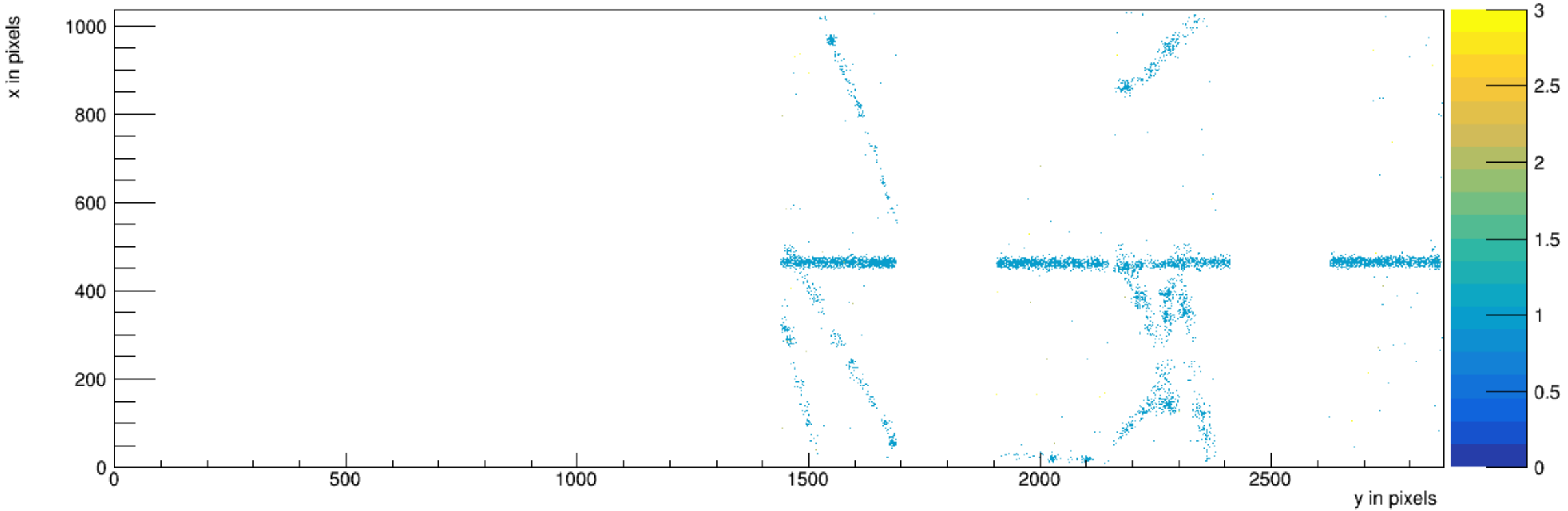
Event 4 concentrator 1



Event 5 concentrator 0



Event 5 concentrator 1



Some observations

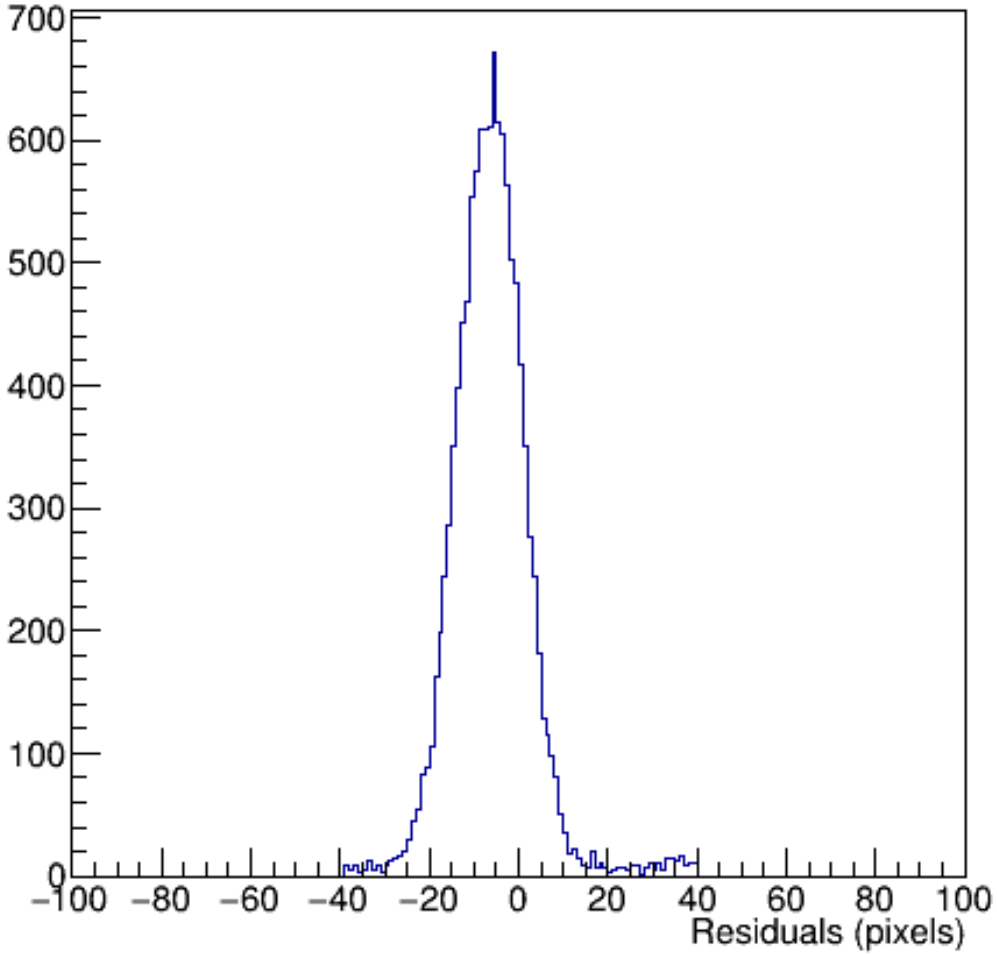
With a loose matching between trigger time and data stream we can indeed reconstruct events. The cosmic background comes from the loose timing cut.

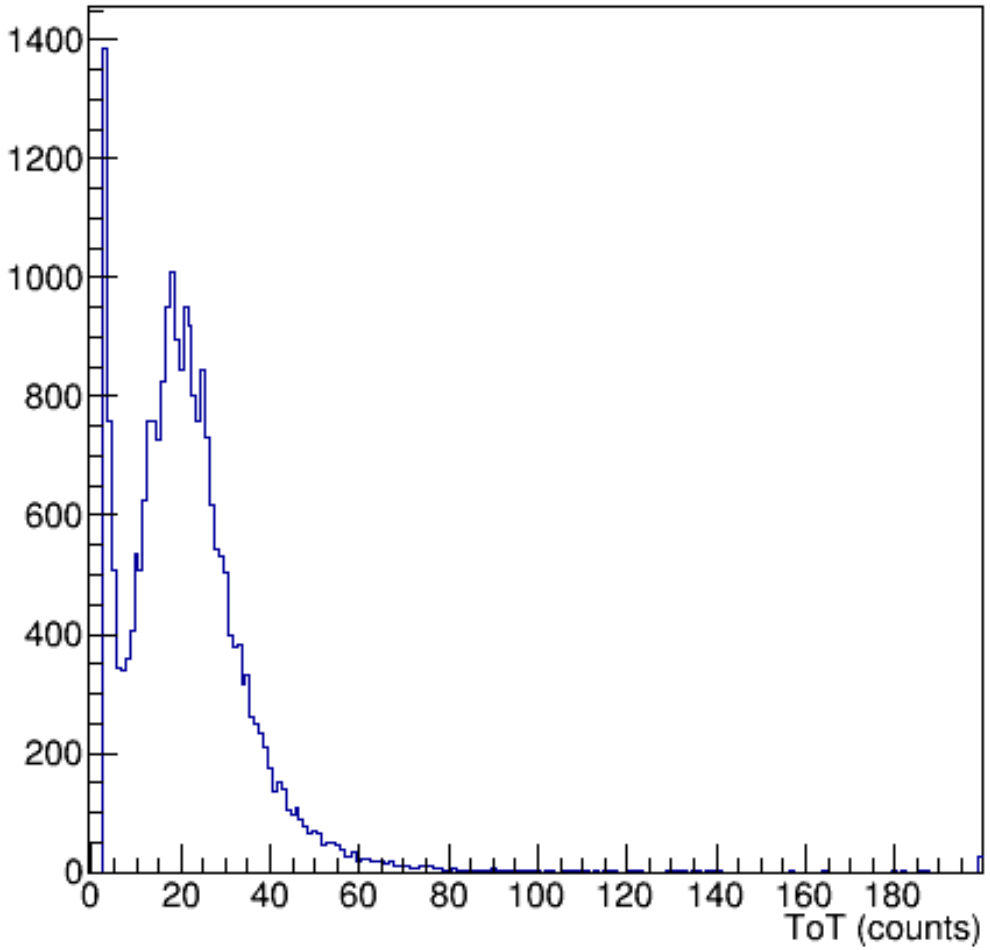
The event numbers correspond to the trigger for concentrator 0 and 1.
I synchronized on the first hits in the concentrators. This is before the laser actually fires. It starts really at “trigger” 4 and so on.

The big difference with the previous data set is that now we observe a track in each trigger event display. So efficiencies are pretty high.
We only have one big hoera event at the beginning and afterwards it is quiet.
So this shows that de new LV power supply is doing a much better job.

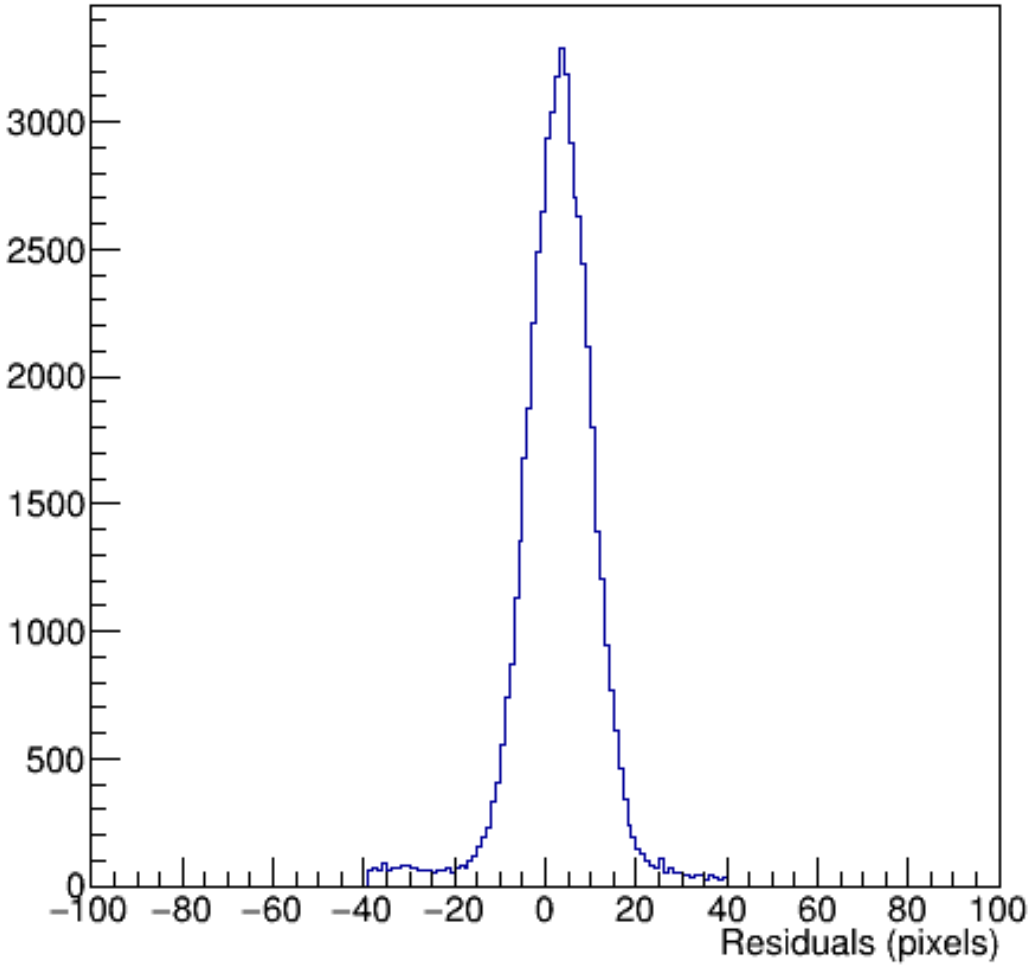
Now I am more convinced that event 4 etc in link0 and link1 correspond to one event and one laser track.

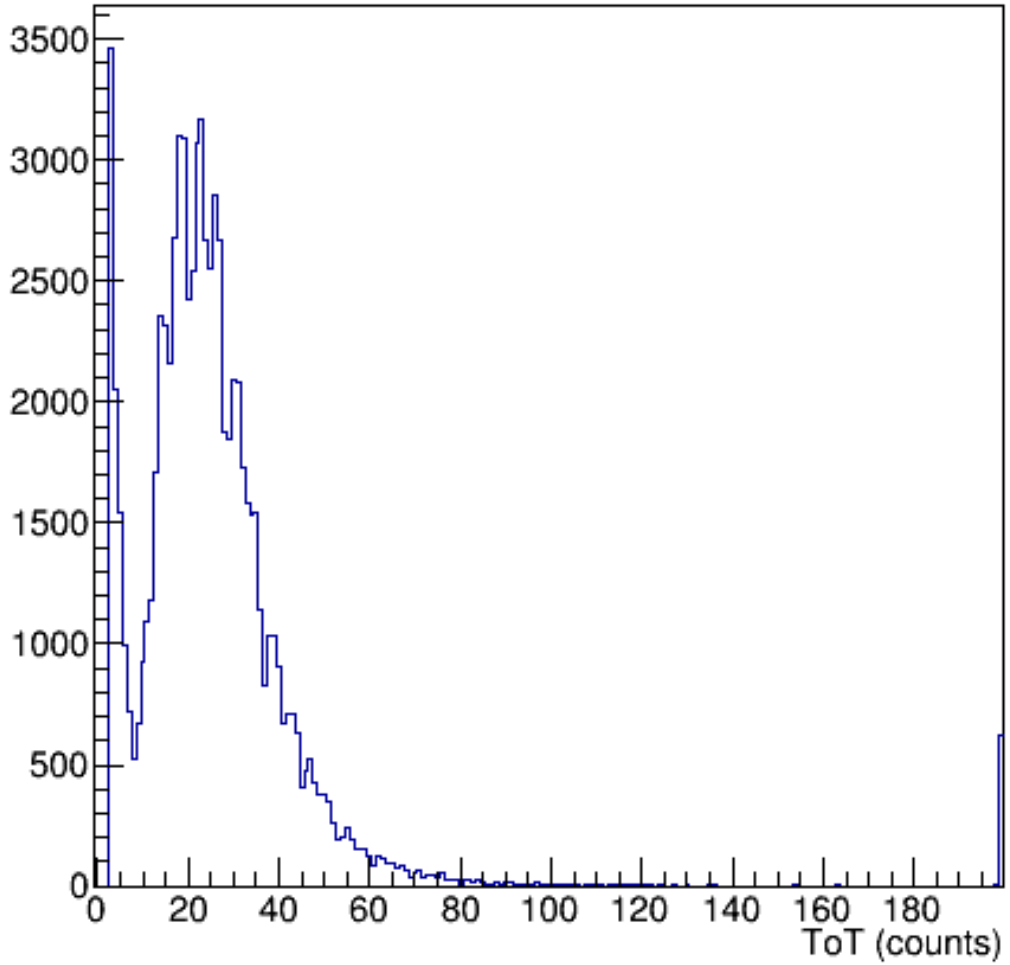
Some observations concentrator 0





Some observations concentrator 1



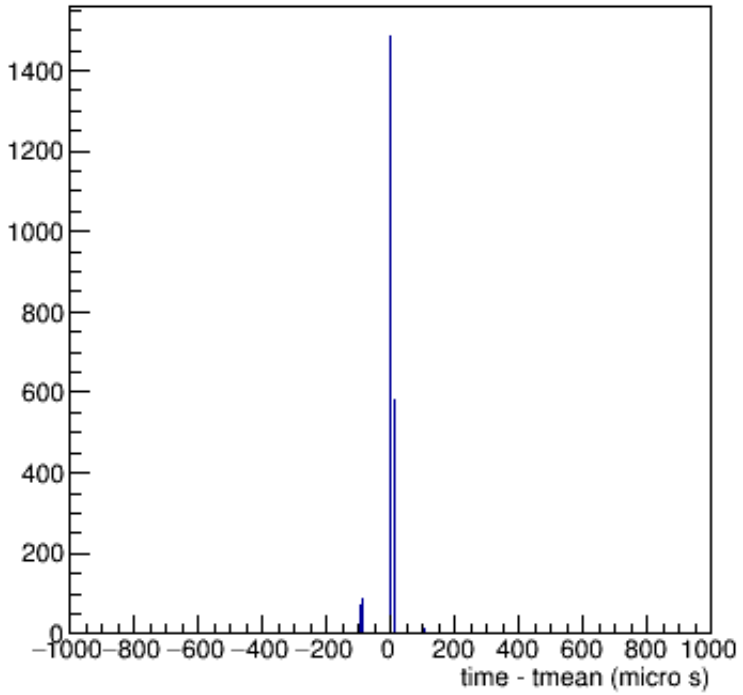


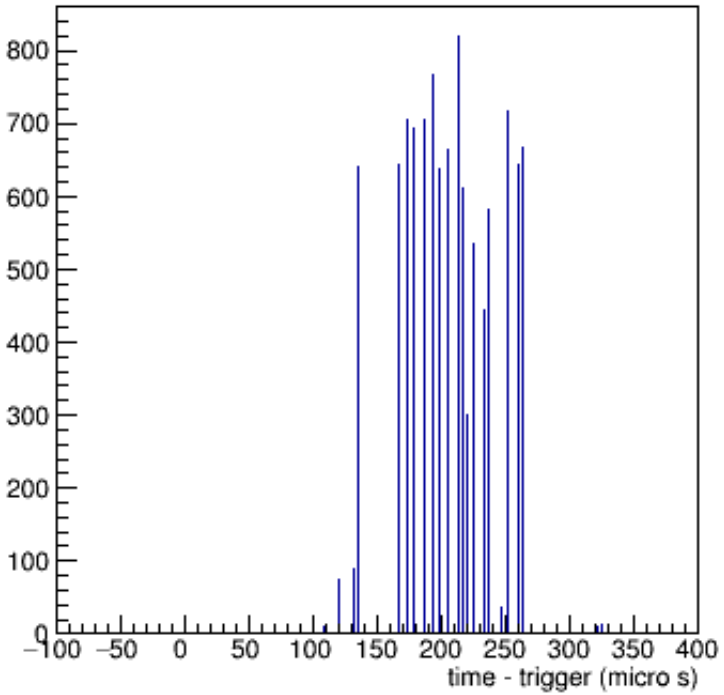
Some observations concentrator 0

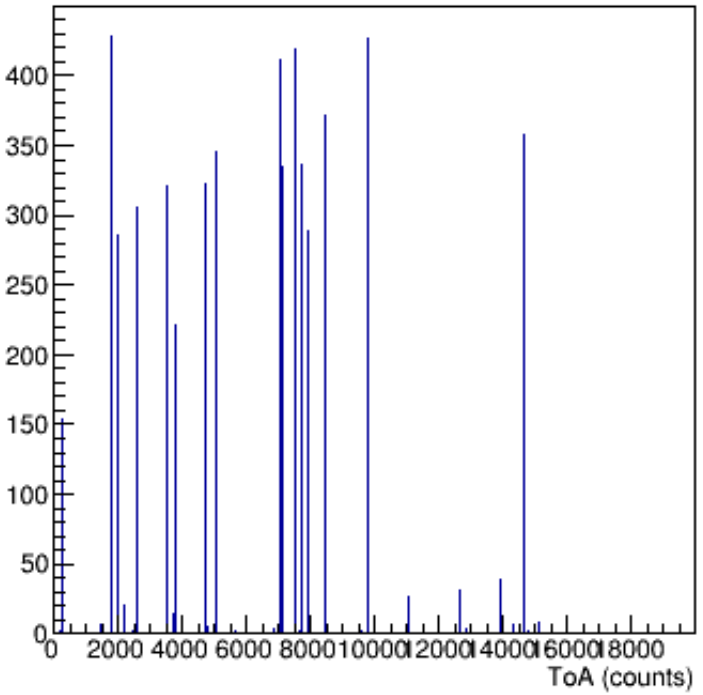
Sharp peak wrt mean
- ToA and relative timing in conc are OK

NO sharp peak wrt trigger
- So problem…

ToA decoding HAS entries below 4096 after fix







Some observations concentrator 1

Sharp peak wrt mean
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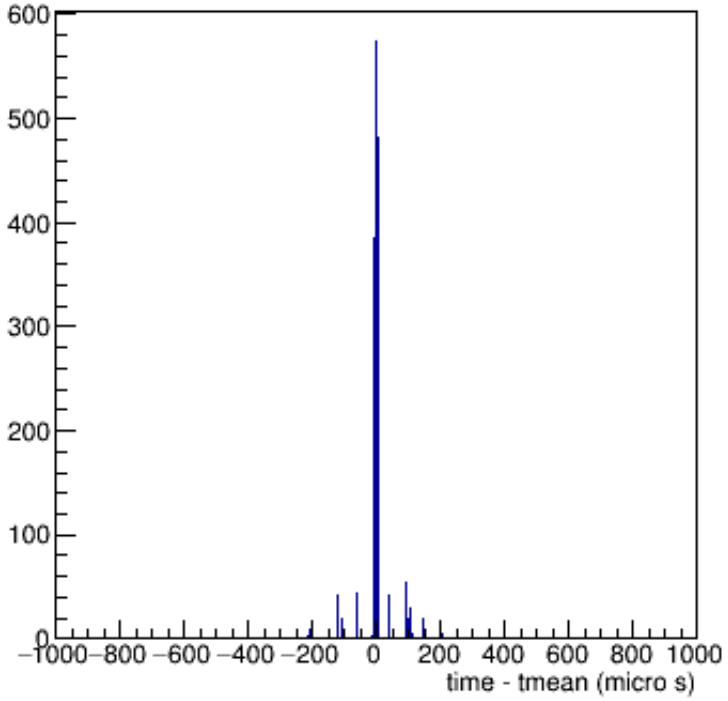
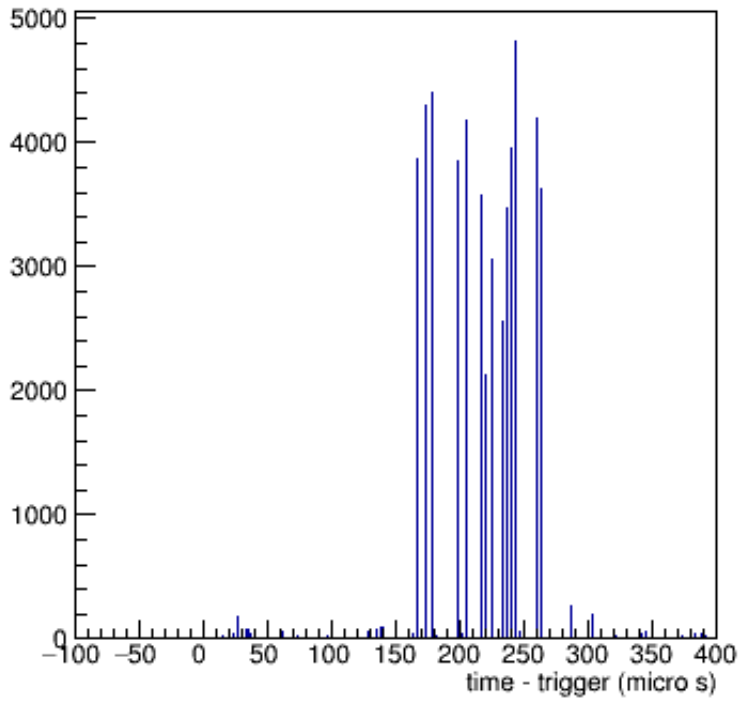
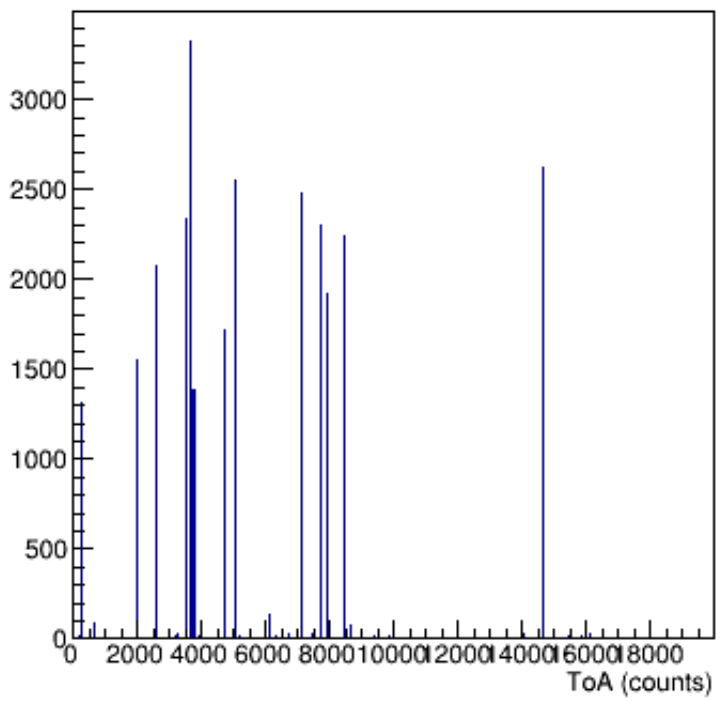
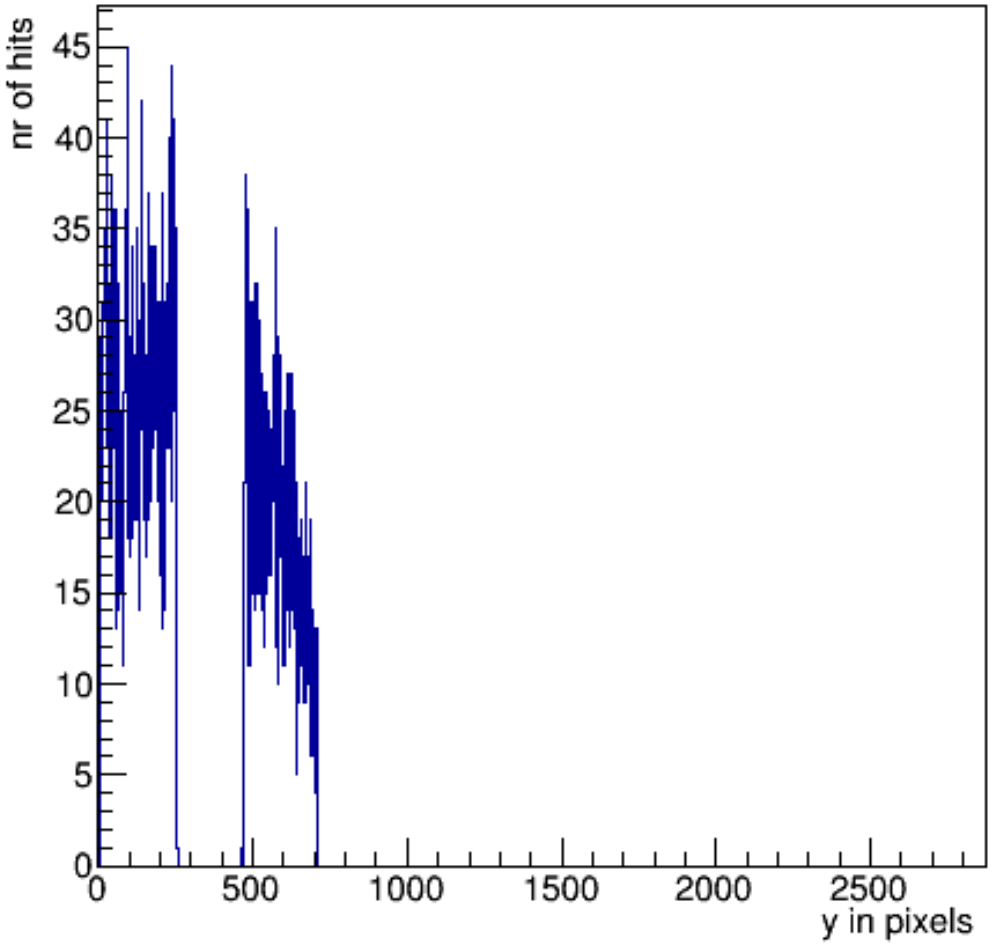
ToA decoding HAS entries below 4096 after fix

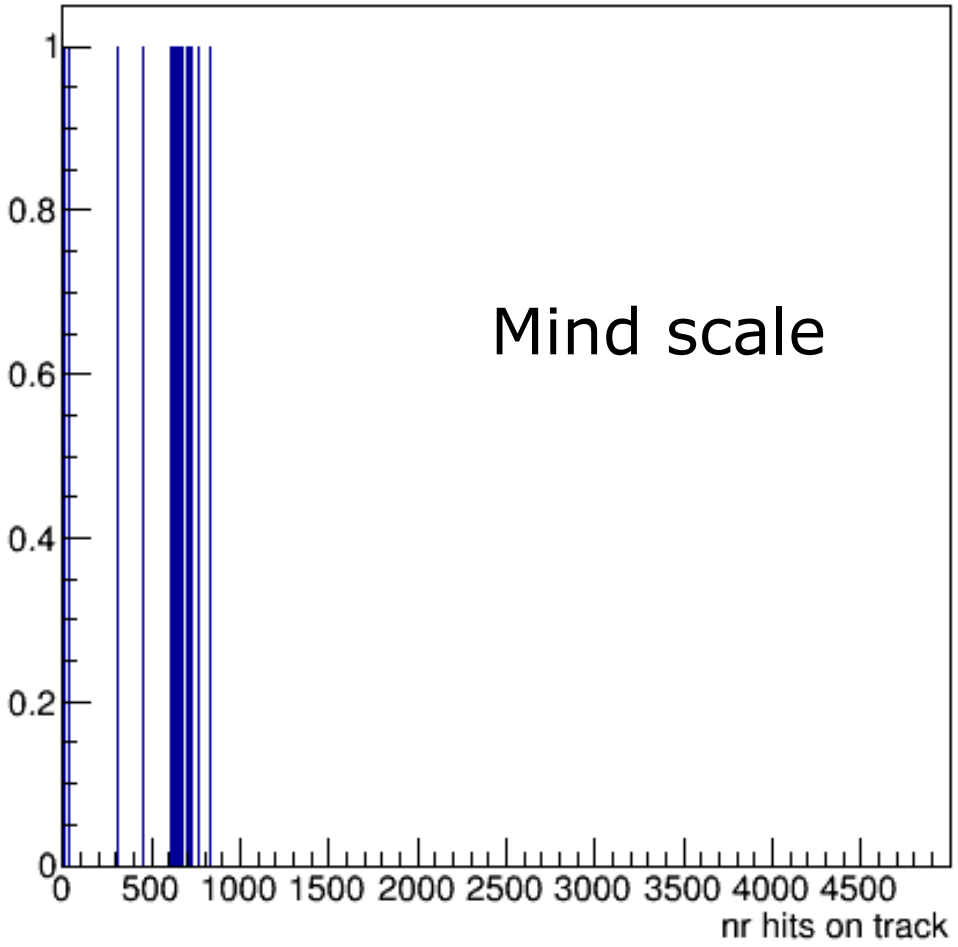






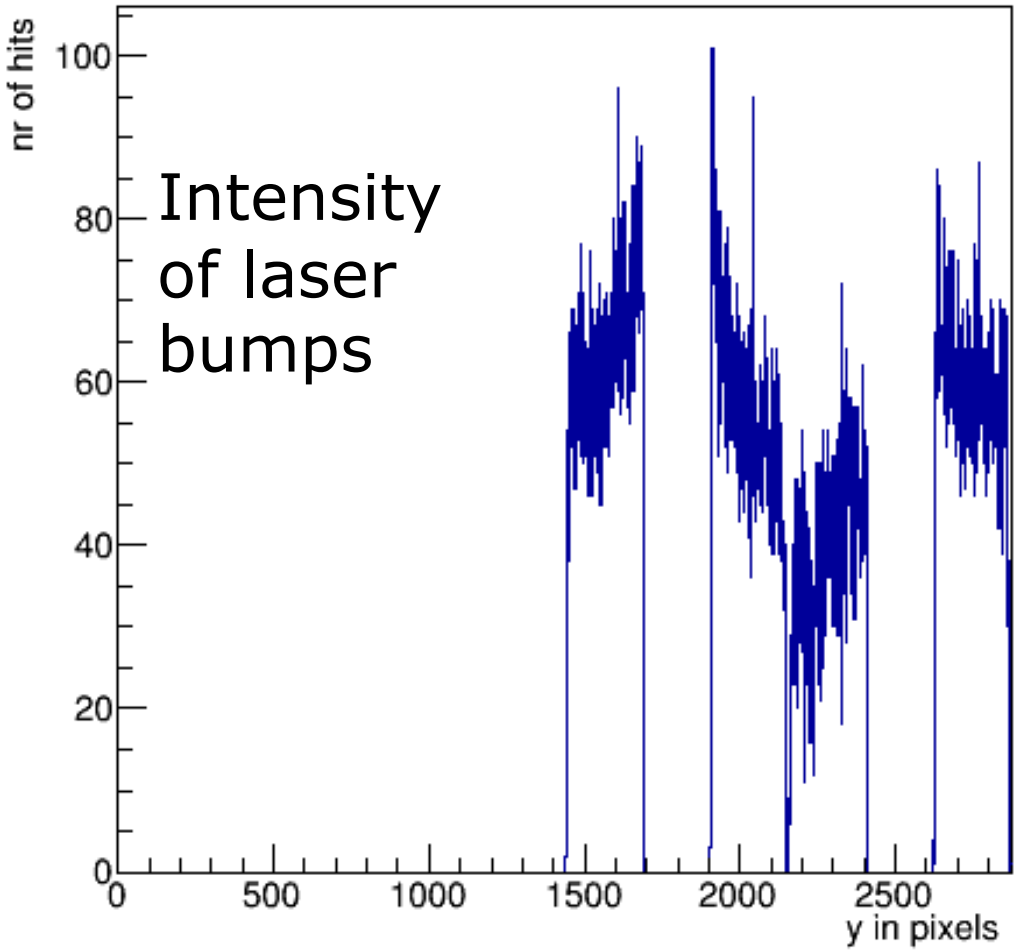
Some observations concentrator 0



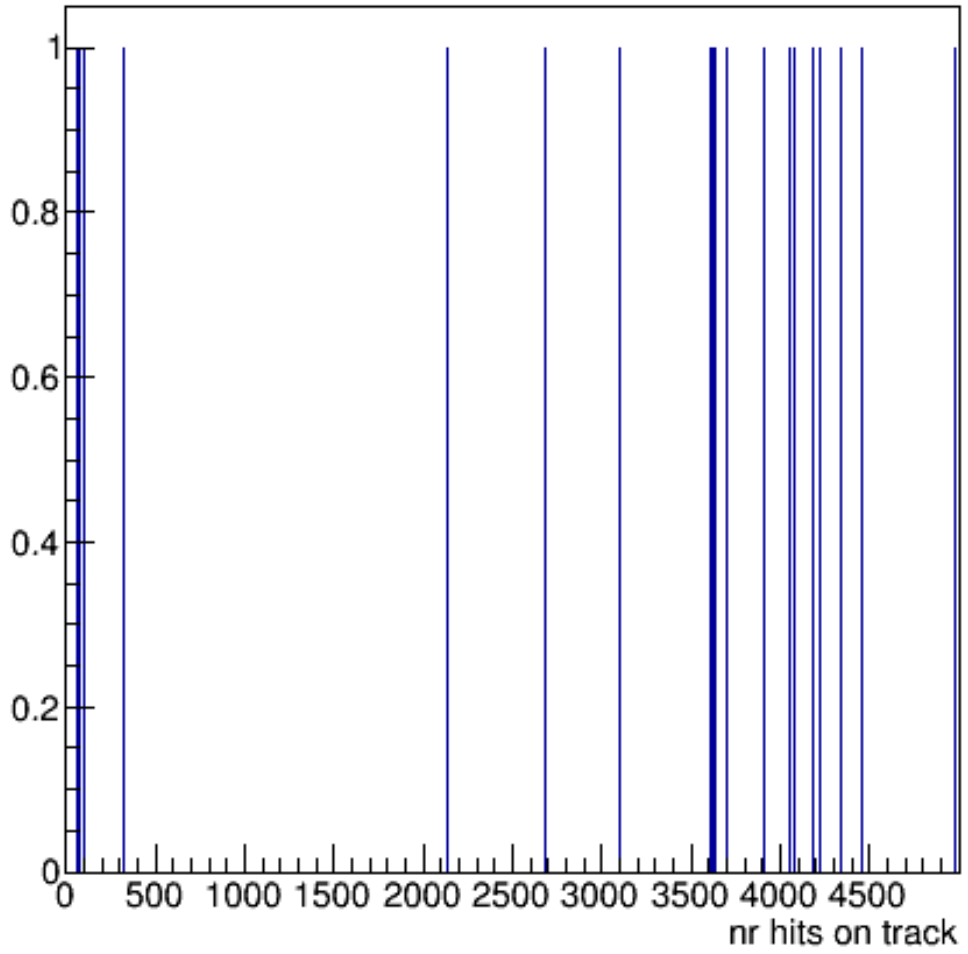


Mind scale

Some observations concentrator 1



Intensity of laser bumps



Conclusions

Thanks to the efforts of may of us and in particular the ET experts Sander van Doesburg, Henk Boterenbrood, Bas van der Heijden and the support of the Ruud Kluit and Martin van Beuzekom, we can now run the daq, equalize all the chips and take laser data.
Last week with extra help of Bas, Sander and Oscar (cooling).

Significant progress has been made. The new low voltage power supply made the data taking more stable. No hoera events anymore. The efficiency of data taking is pretty high.
Laser intensity looks fine, but we can also run at a lower value.

But …
The heart beat in the trigger stream needs to be added/fixed.
There is a remaining timing puzzle; The internal concentrator timing looks sharp and precise. Why is the time wrt the trigger washed out?