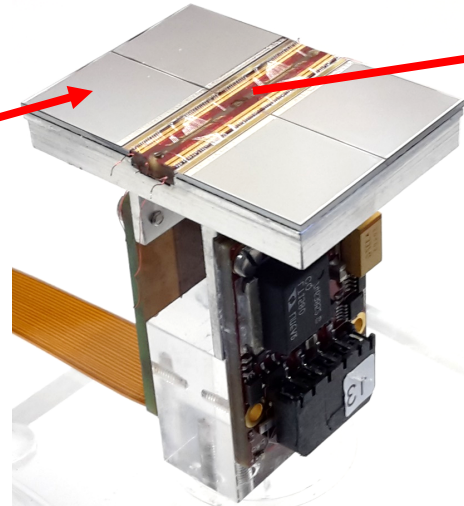
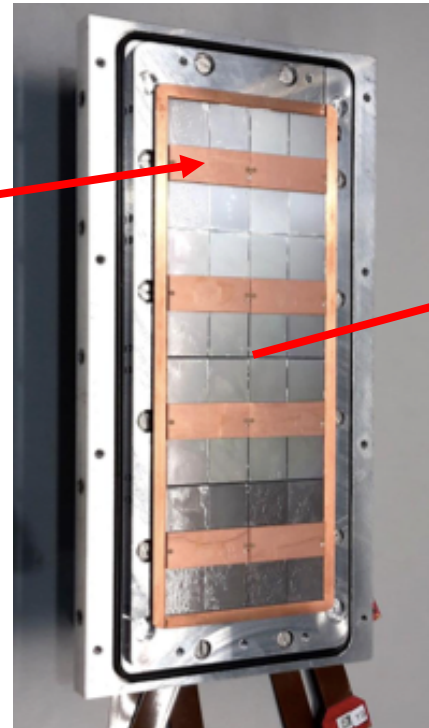


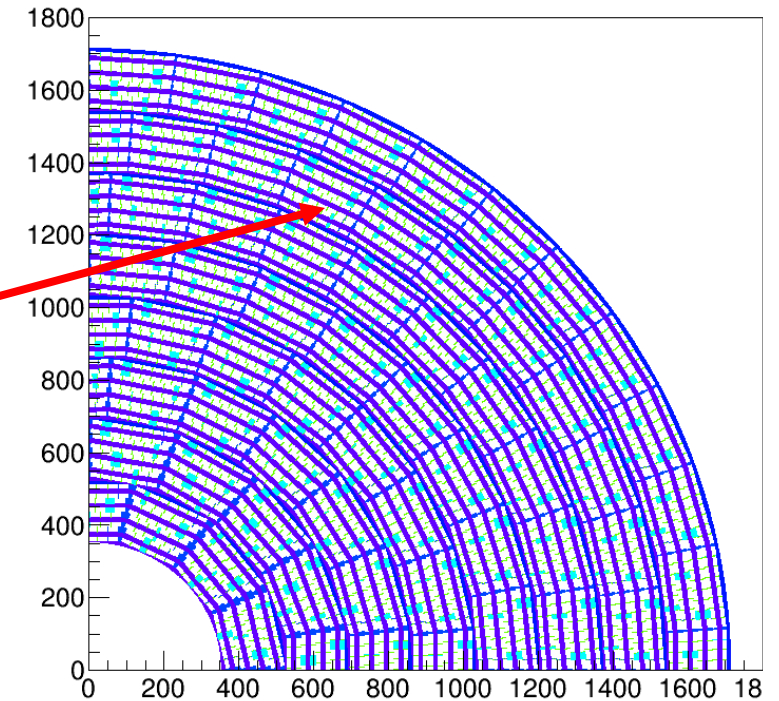
Single chip
2017



Quad
2018



Module
2019



TPC plane

Upgrade of arawana and analysis

Upgraded arawana to SLC6. Needed a "clean" disk.

Have two disks /Ex-HD1 with files from /localstore/

/Ex-HD0 with files from /localstore2/

All files DATA and code are copied on /localstore/ localstore2/ again.

Root (old version SLC6) is installed and works.

For compilation of the laser_setup_software c++11 is used and one needs to source `init_laser_setup_software.sh` on /home/gastpx3

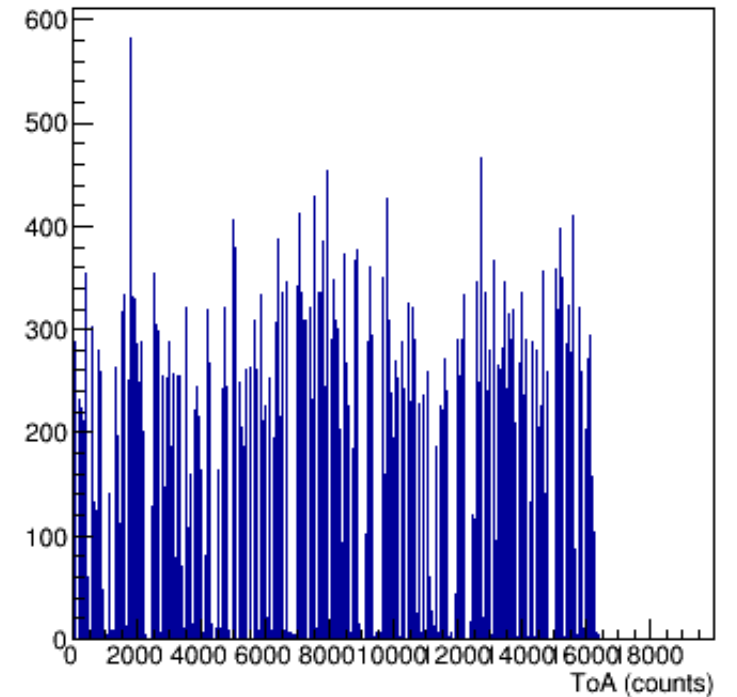
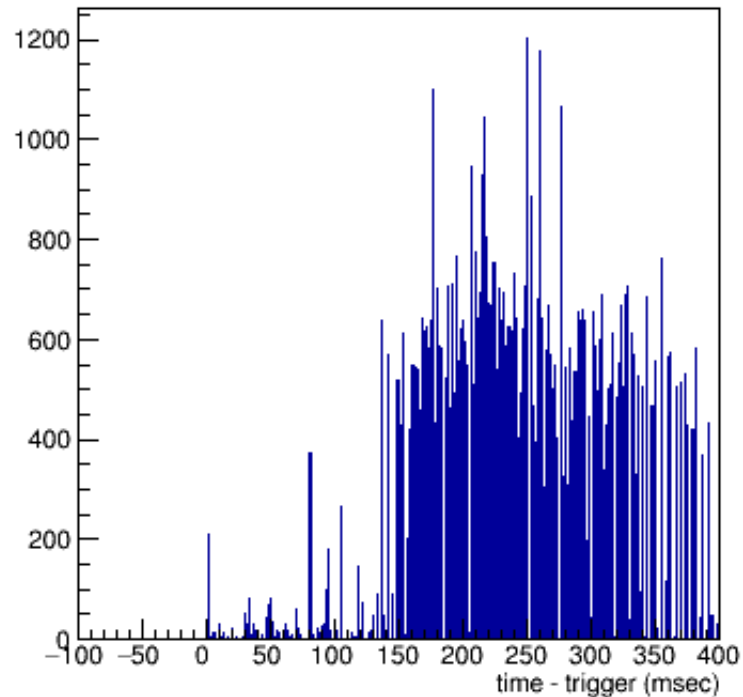
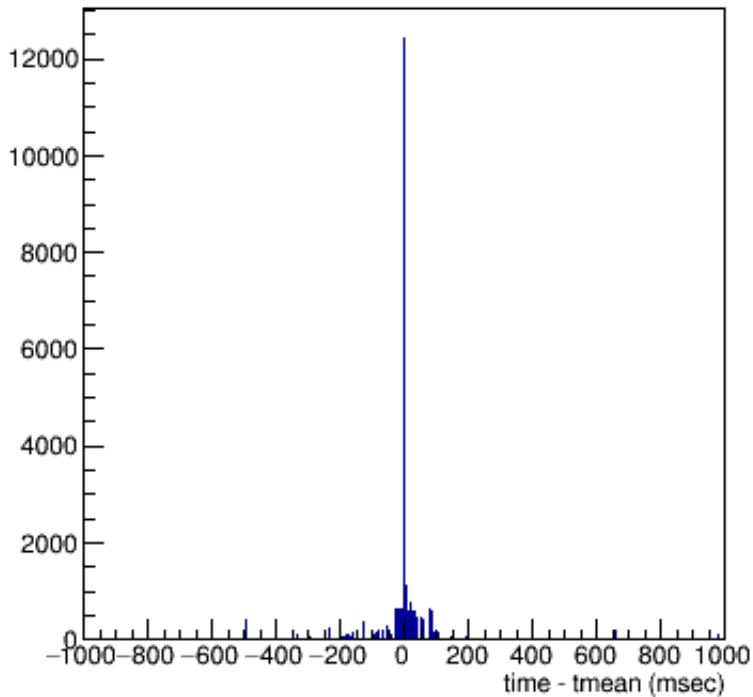
Data analysis continued of run 1272 – see details 16 november -

Settings run $V_{\text{grid}} = -330 \text{ V}$ (OK) ; $V_{\text{drift}} = -280 \text{ V}$

- x position = 5 mm steps of 0.1 mm in total 3 steps
- 3x 100 points

Recap: Timing puzzle

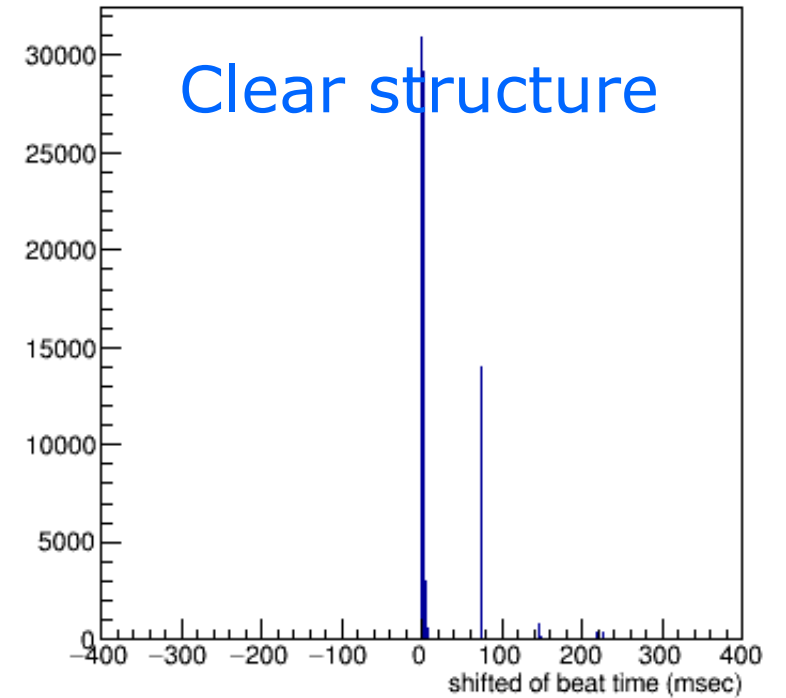
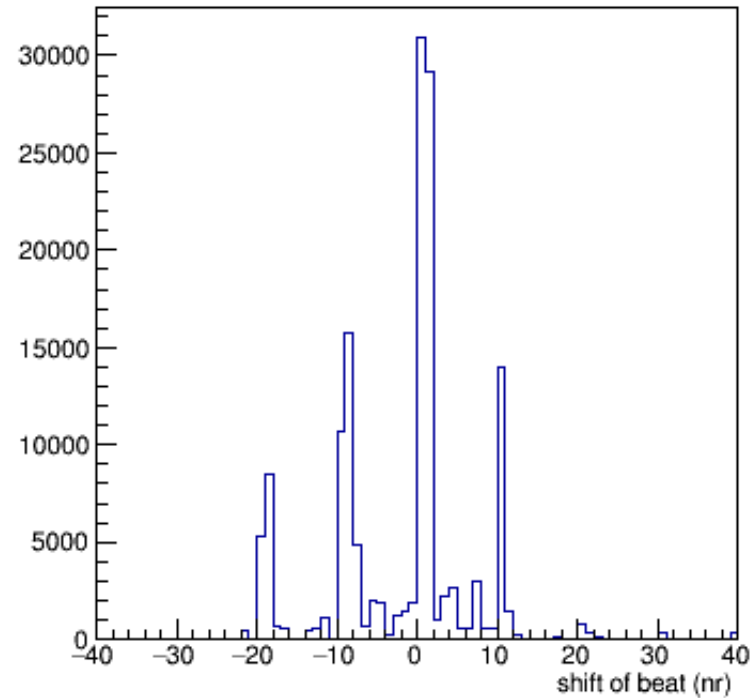
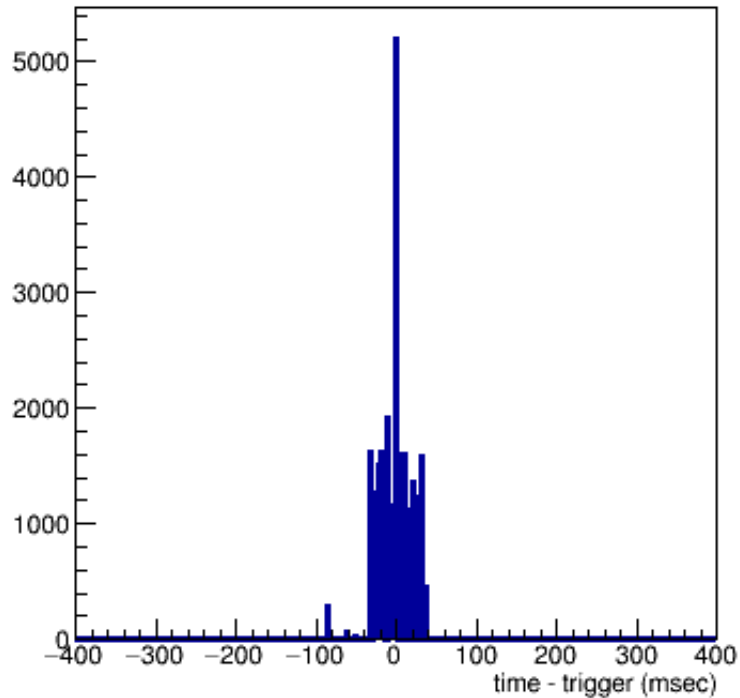
mean times peak sharply AND timing wrt trigger is washed out



Mind time: unit milli seconds

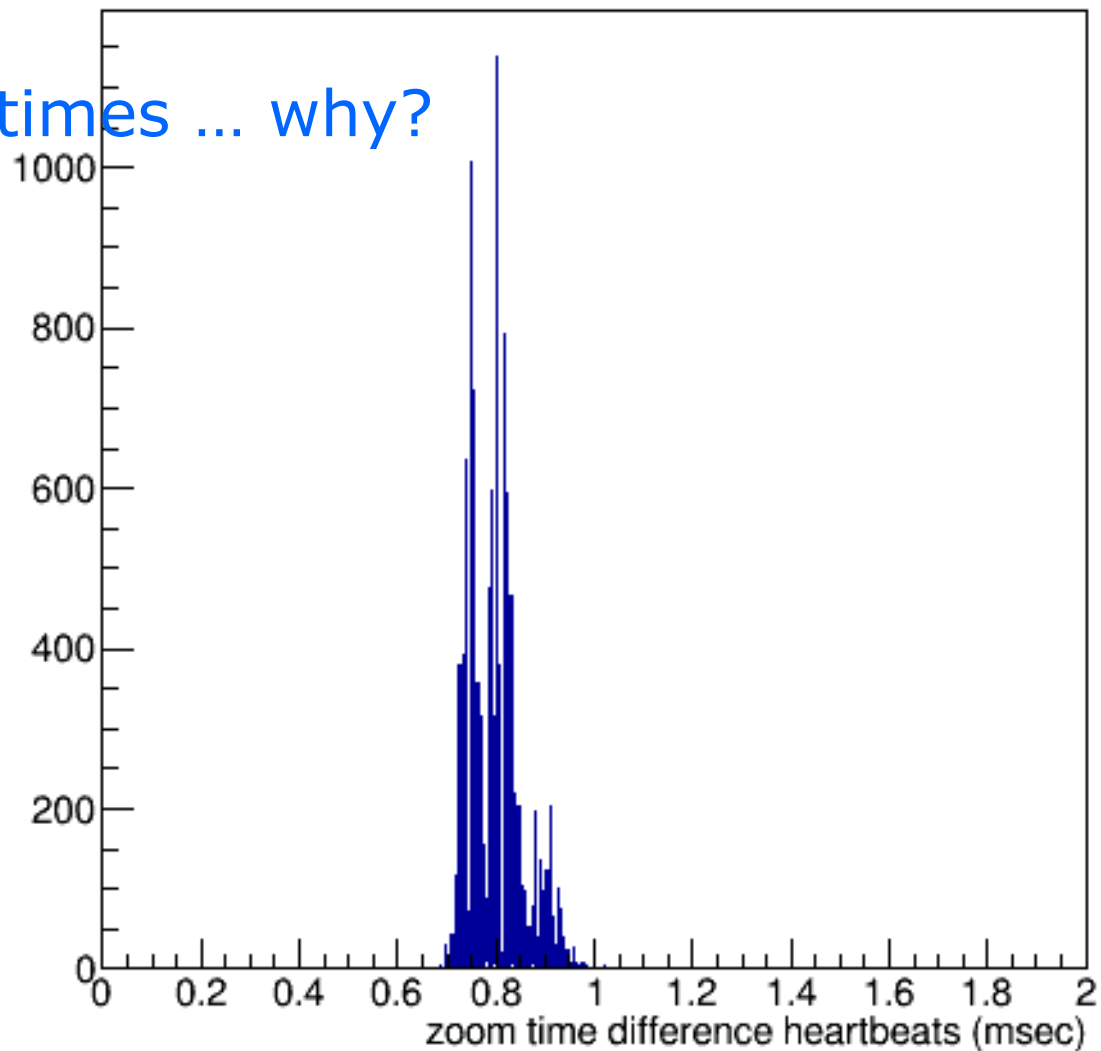
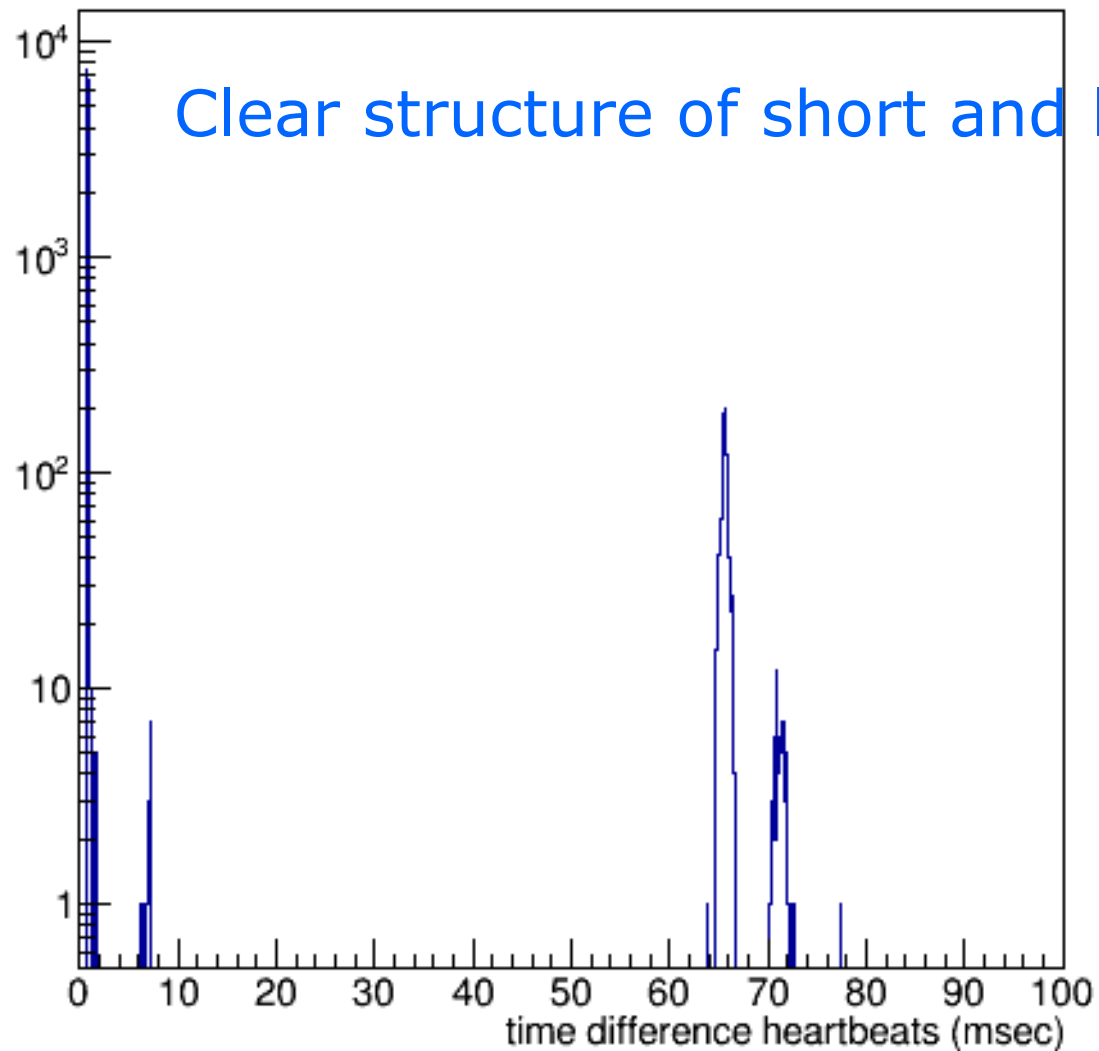
Timing puzzle: New looking for the best heartbeat

Selecting the beat that gives the smallest $|\text{time} - \text{trigger}|$



Timing wrt trigger gets better: but still washed out ± 40 msec
Discrete structure peaks 73, 146 ms etc.

Timing – heartbeat puzzle



Timing – heartbeat puzzle

trigger 0	dt msec 0	nr heartbeats above 10 msec 6	nr of heartbeats 60
trigger 1	dt msec 397.893	nr heartbeats above 10 msec 6	nr of heartbeats 51
trigger 2	dt msec 400.886	nr heartbeats above 10 msec 6	nr of heartbeats 59
trigger 3	dt msec 399.097	nr heartbeats above 10 msec 7	nr of heartbeats 61
trigger 4	dt msec 400.567	nr heartbeats above 10 msec 4	nr of heartbeats 40
trigger 5	dt msec 399.626	nr heartbeats above 10 msec 6	nr of heartbeats 59

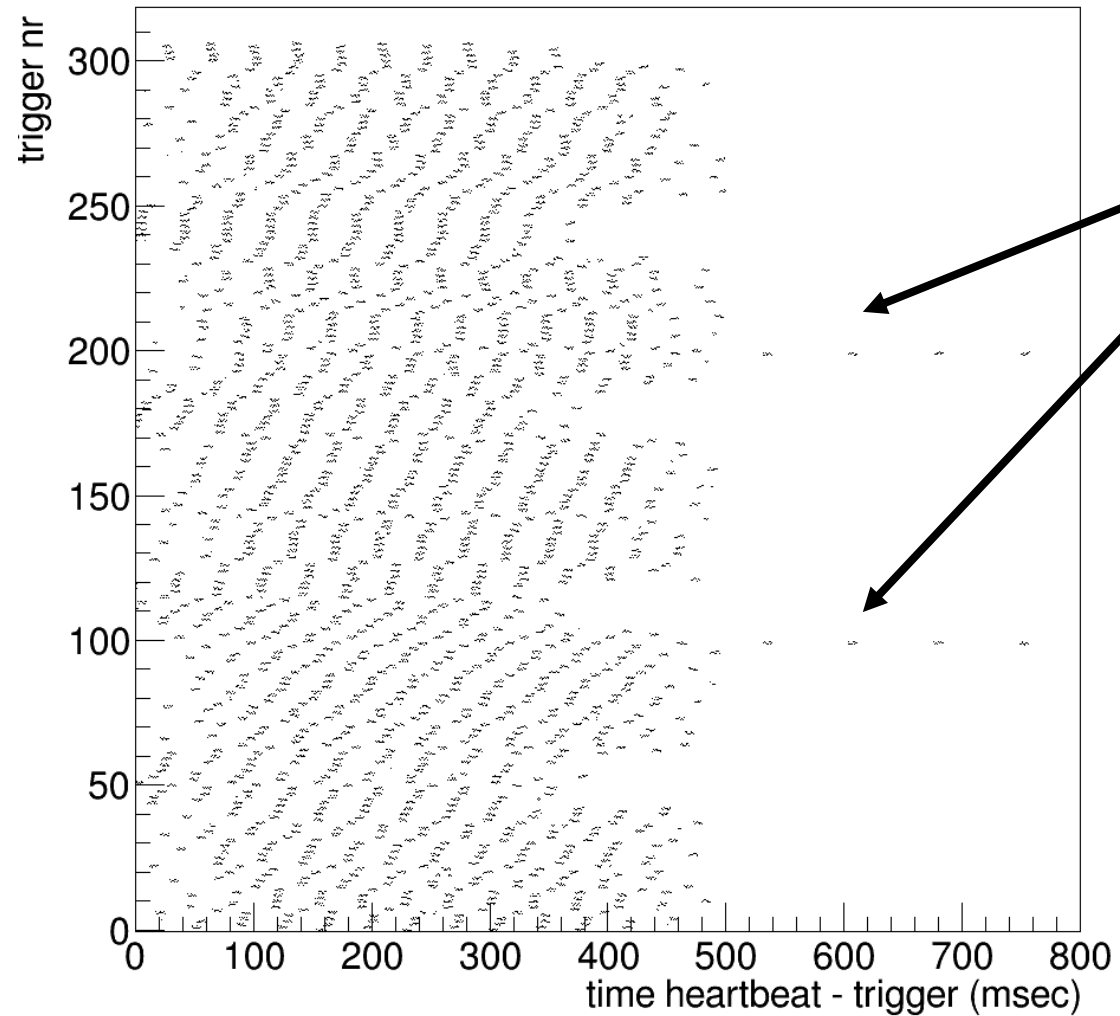
We see a clear structure of e.g. 36-54 short and 4-7 long times per laser trigger (400 msec).

Where short = 0.7-1 msec and long = 66-78 msec (slide 5)

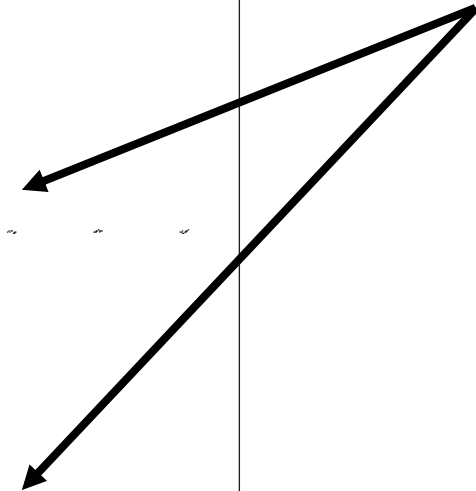
If we look for the best heart beat we can identify the structure on slide 4 as coming from a long beat time that was 'missed'.

Code `Tpx3daq.cpp timestamp(_per_sec) is injected` `usleep(50000); //20 Hz`

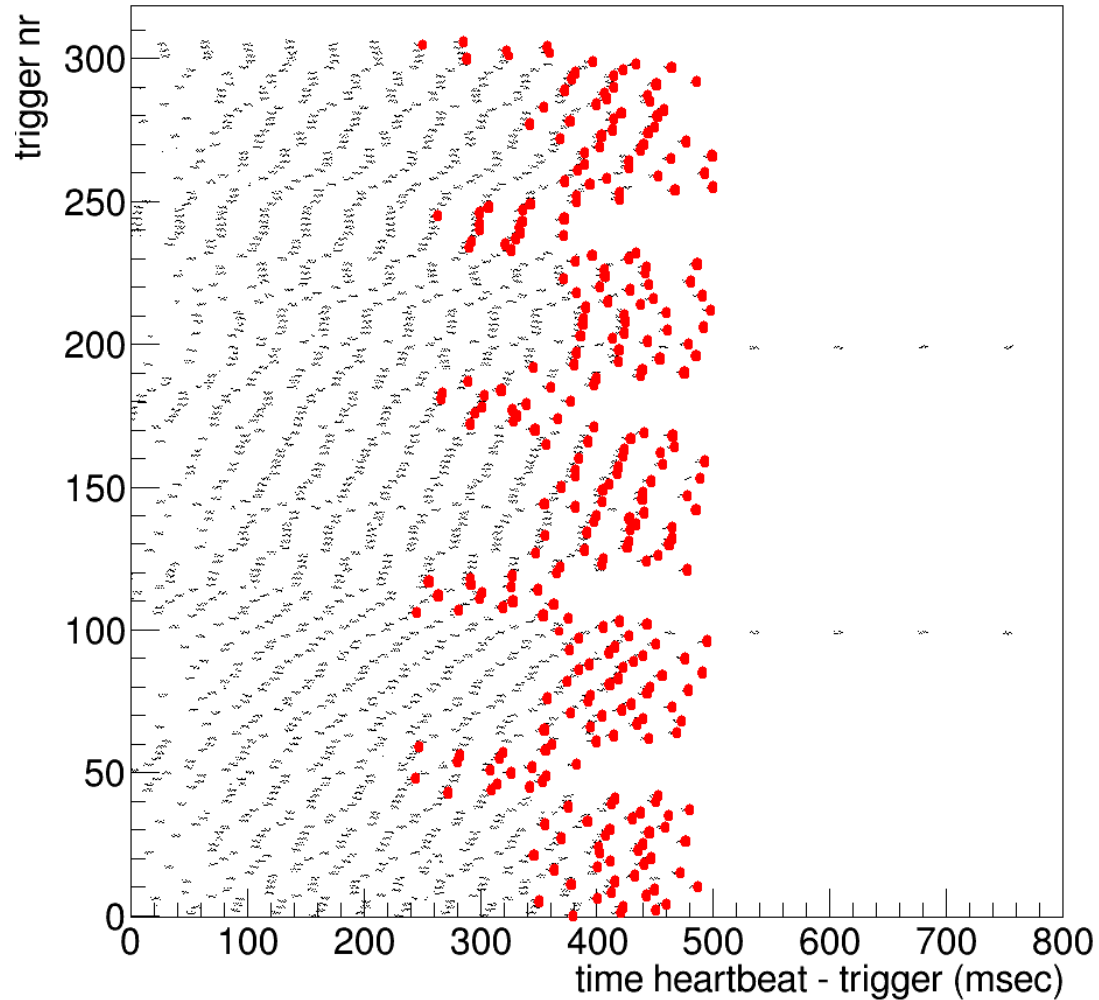
Timing - heartbeat puzzle



Here the laser moves



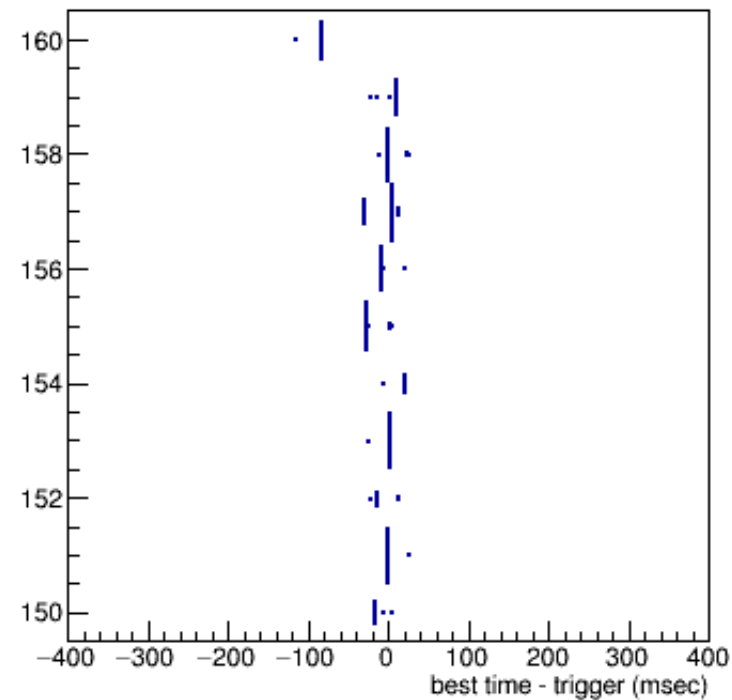
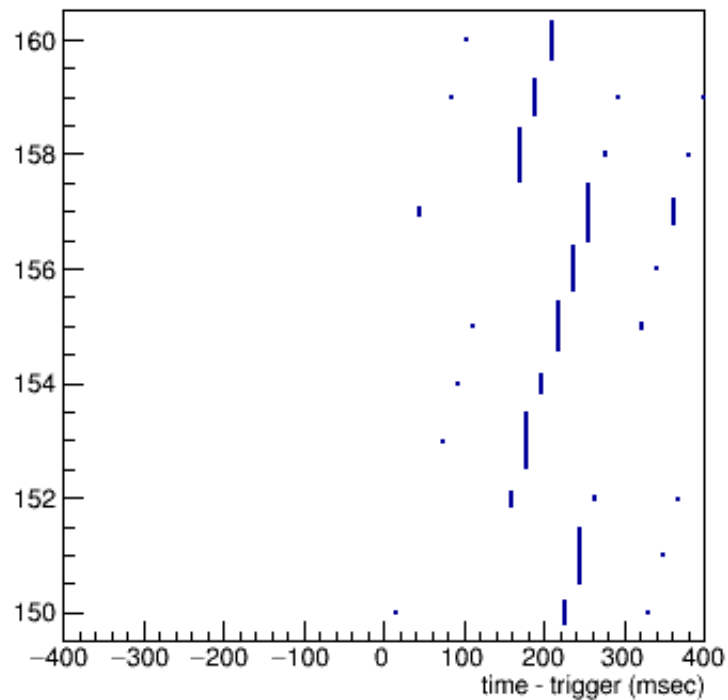
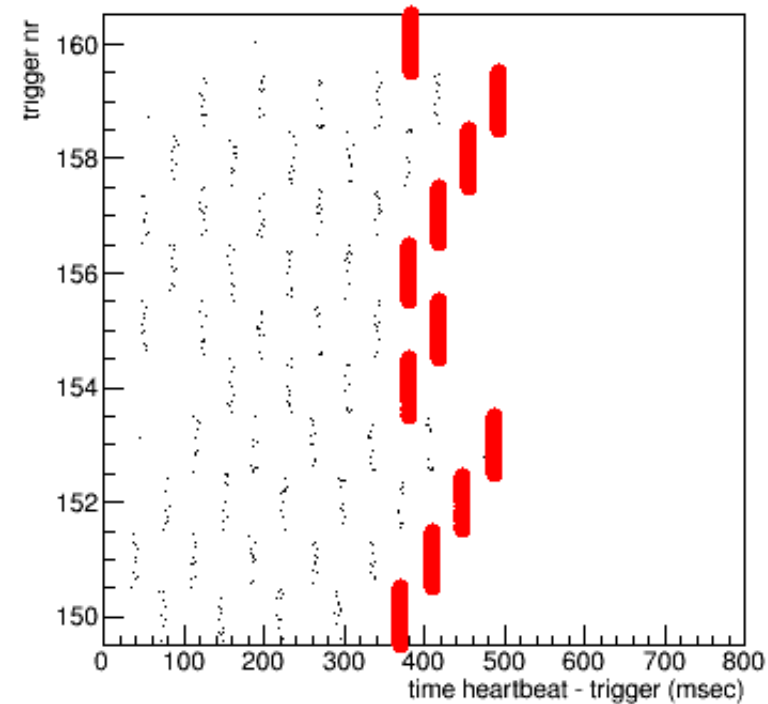
Timing – heartbeat puzzle



In red the heartbeats with hits on track

Timing – heartbeat puzzle

In red the heartbeats with hits on track



Here a clear correlation

This is washed out after looking for the best heartbeat

Timing – spidrTime

In principle the spidrTime runs from 0–255.
It counts units of 409.6 micro sec ($25*4*4096$ ns).
In the data I rarely see spiderTimes different from 0.
In particular all the on track hits have spiderTime 0.
This does not seem logical to me ...

Note that the spidrTime correction to the time stamp
spann 0.4 - 100 msec.
So typically of the same range as the observed remaining
wash out of ± 40 msec.

Summary

The heart beat in the trigger stream needs to be added fixed.

In the online software we need a spidertime correction (Sander).

The timing remains a puzzle; The internal concentrator timing looks sharp and precise. Why is the time wrt the trigger washed out even after selecting the closest heartbeat?

Details on the structure of the heartbeat and the spider times have been presented. This could lead to a better understanding.