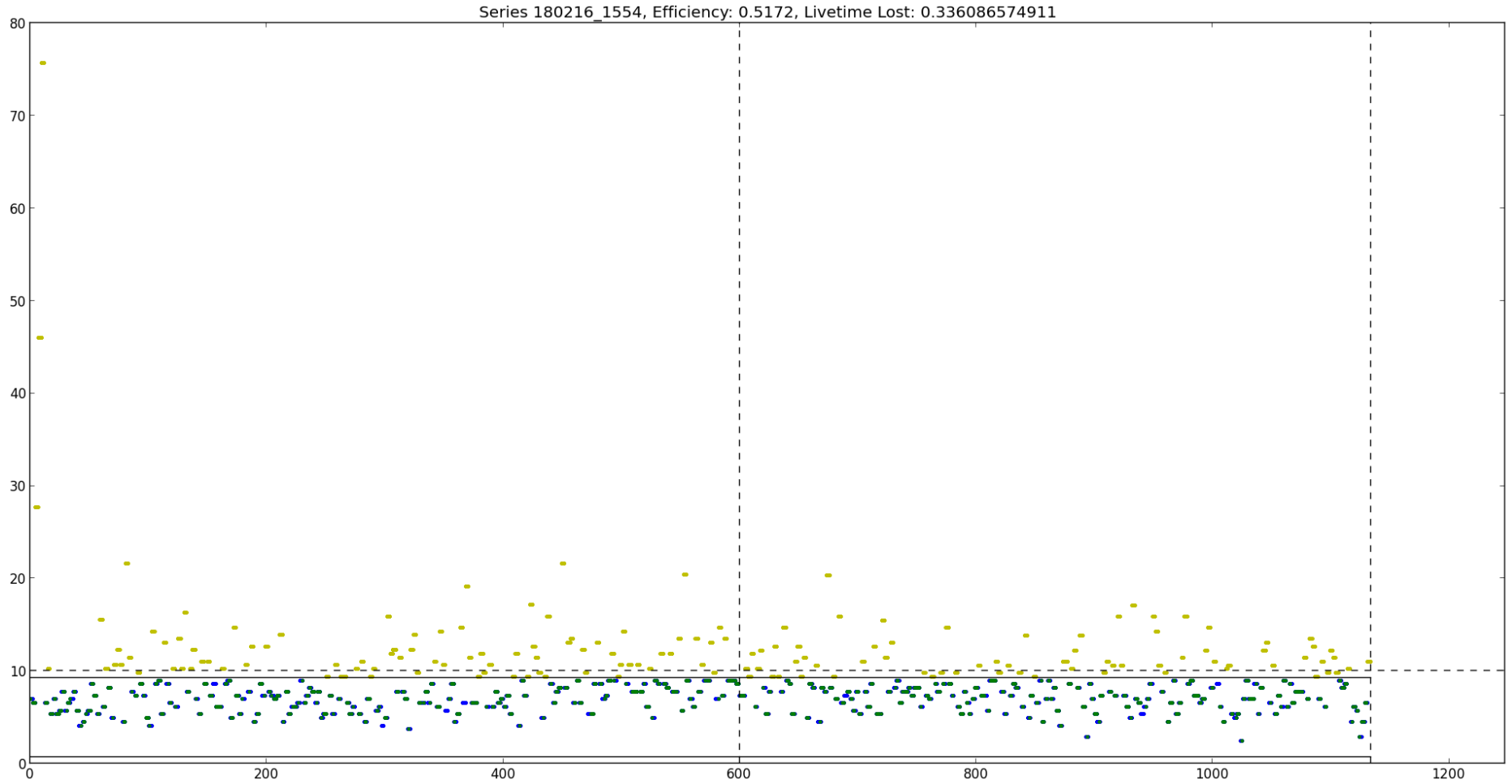
Weekly Meeting

Feb 14th 2018

Trigger Burst Cut

- I’ve added this cut to the analysis repository – it is working as it should.
- Plan to have documentation up this week.
- I’ve looked at how this cut acts on some of the newer data series taken
- Seems to be a much larger variance in trigger rate, and cut is removing data due to high variance rather than trigger bursts.

Trigger Burst Cut

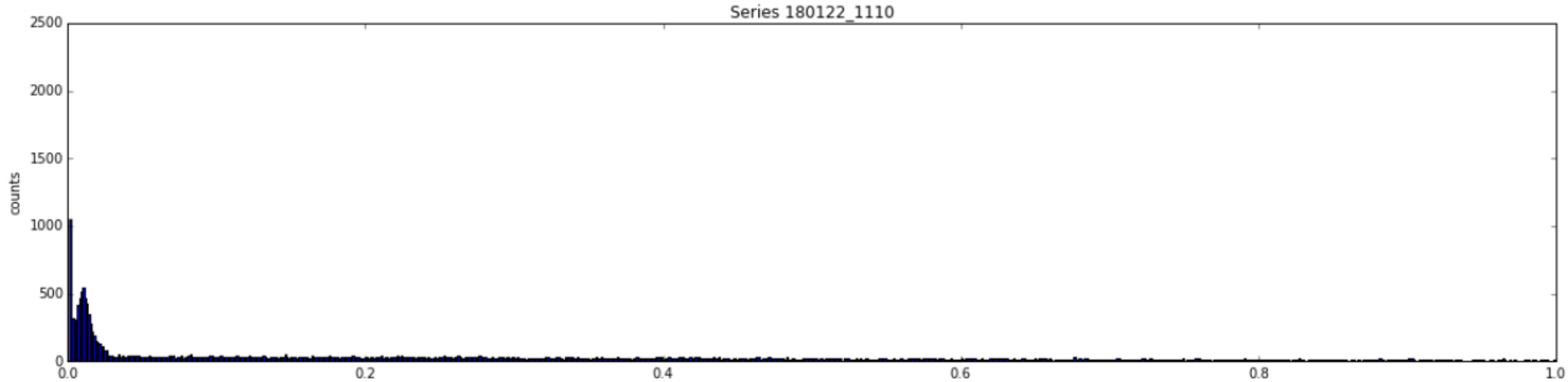


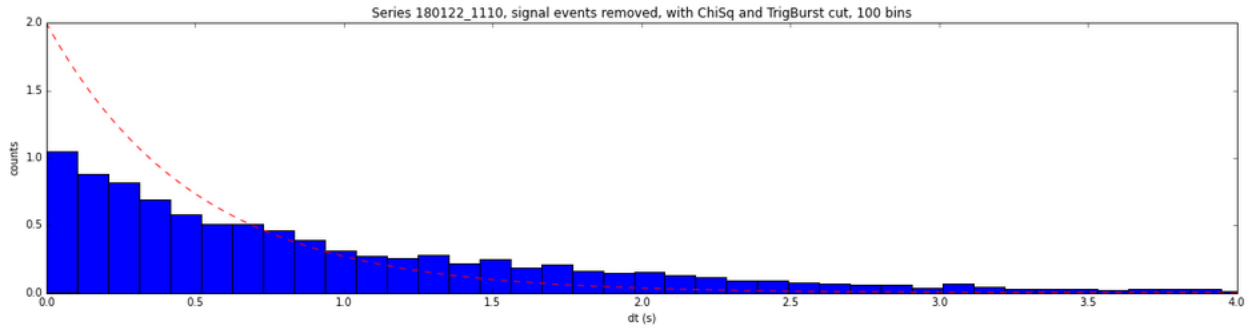
Trigger Burst Cut

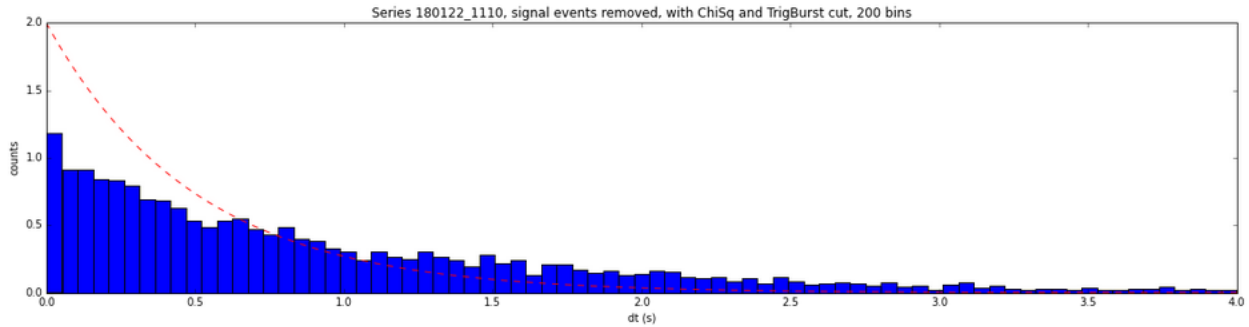
- Talking to Noah – says this is because trigger threshold was lowered, so triggering on more noise than before.
- His suggestions is to calculation the ‘real event’ trigger rate:
  - Real event rate = ‘positive amp’ trigger rate – ‘negative amp’ trigger rate
  - If threshold is high enough, ‘negative amp’ trigger rate is 0
  - If threshold is too low, we predominately trigger on noise, and we throw out a lot of data
- What is the difference between positive amp vs negative amp?

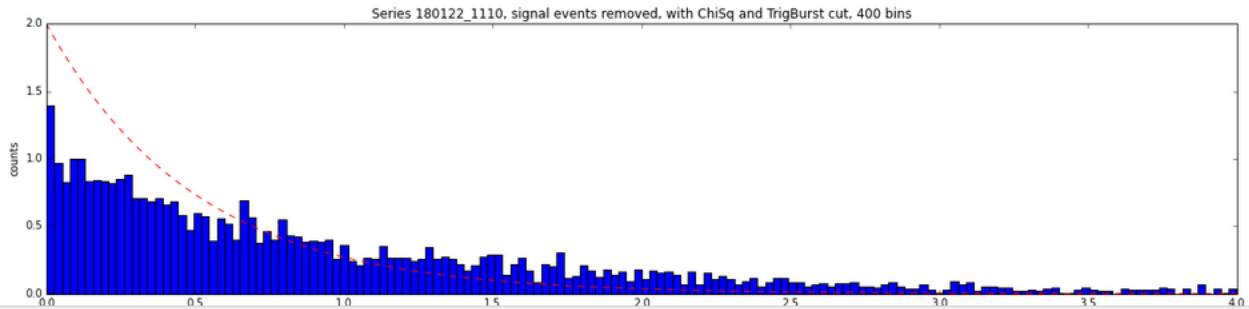
dt Cut

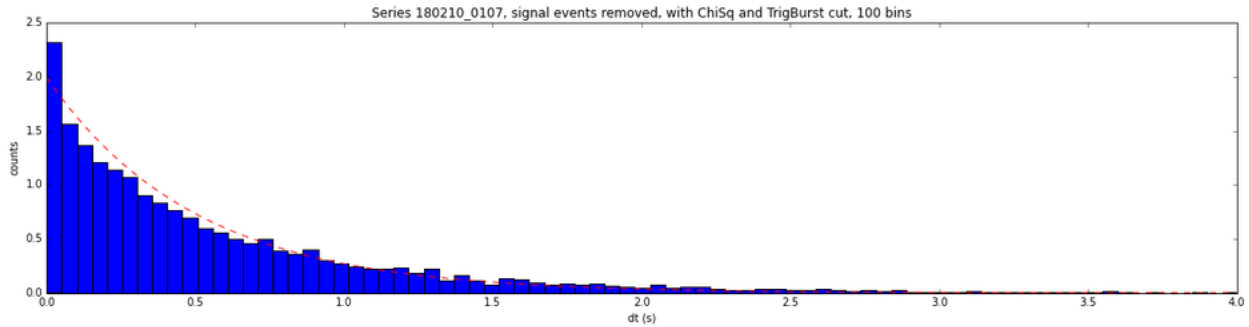
- We want to cut out bad events by removing excess of events with very low dt.
- Poisson distribution for event rate Γ, over time t:
- $p(n, \Gamma, t) = \frac{(\Gamma t)^n e^{-\Gamma t}}{n!}$
- Probability of finding zero events is:
- $p(0, \Gamma, t) = e^{-\Gamma t}$
- Probability of finding at least one event in time t is
- $p(> 1, \Gamma, \mathrm{t}) = 1 - \mathrm{e}^{-\Gamma \mathrm{t}}$
- Take derivative to get the arrival time probability distribution:
- $p_{arrival}(\Gamma, t) = \Gamma e^{-\Gamma t}$

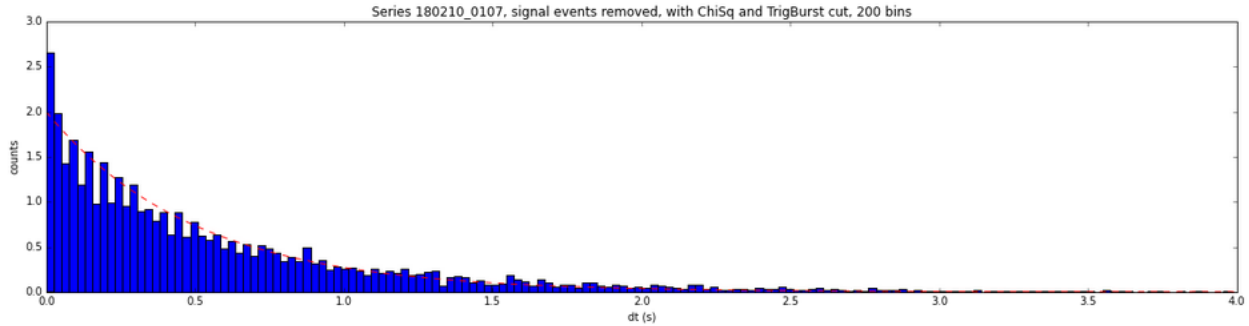

Series 180122_1110
counts
2500
2000
1500
1000
500
0
0.0
0.2
0.4
0.6
0.8
1.0

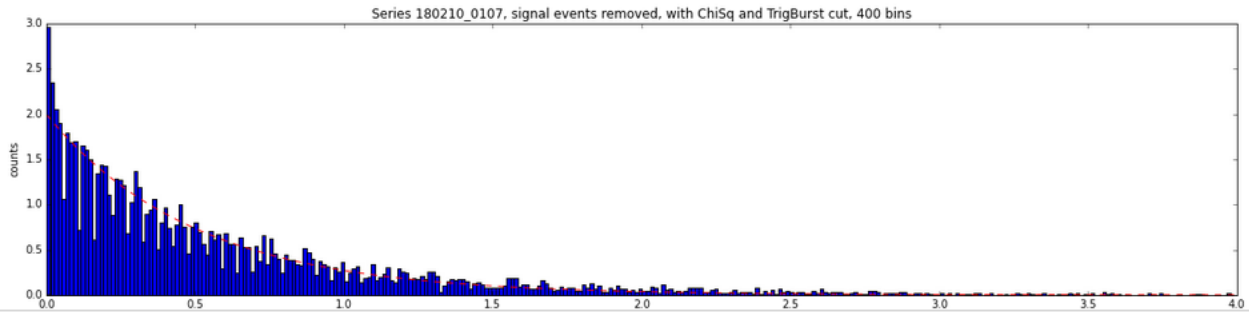












dt Cut

- Excess in lower bins would indicate non-poissonian noise which is not consistent with our signal, so we should just remove it.
- The fact that the excess seems more prevalent at smaller bins means there is some real spike where events are more correlated then they should be at short times
- Wants me to look at events between 0 and 1 eh pairs:
  - Figure out where the first peak is in the laser data and focus on amplitudes between 0 and that value