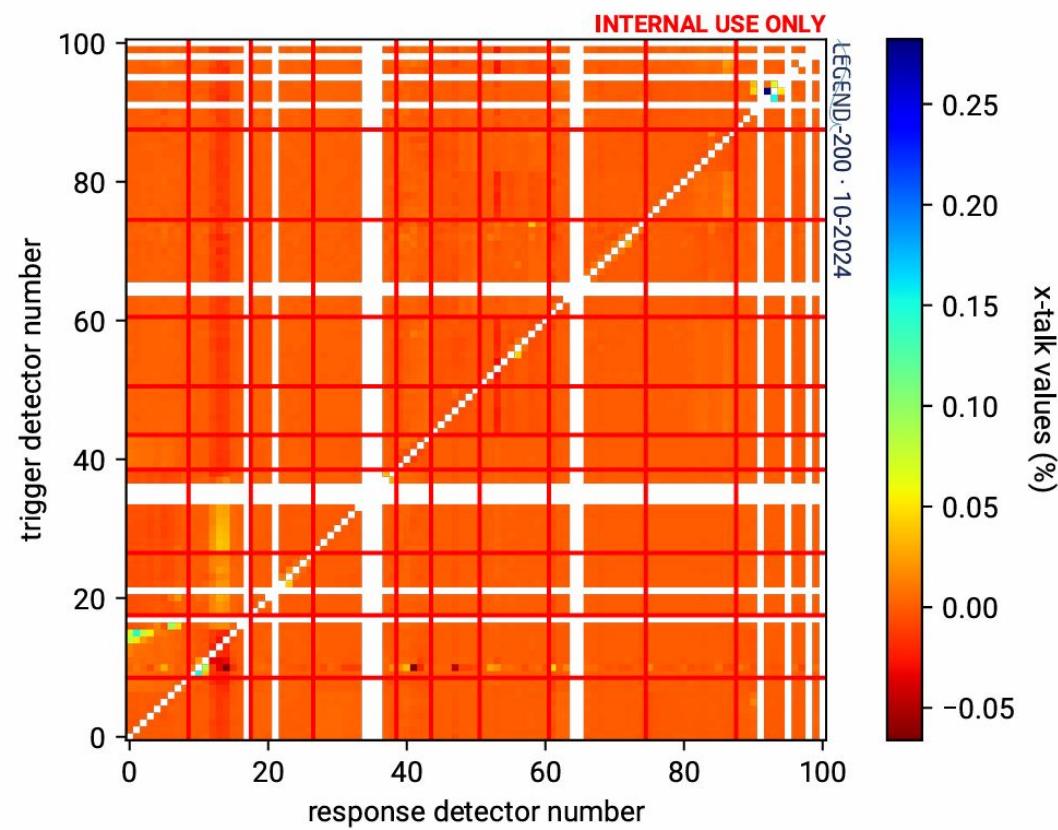


Cross Talk Matrix Reproduction

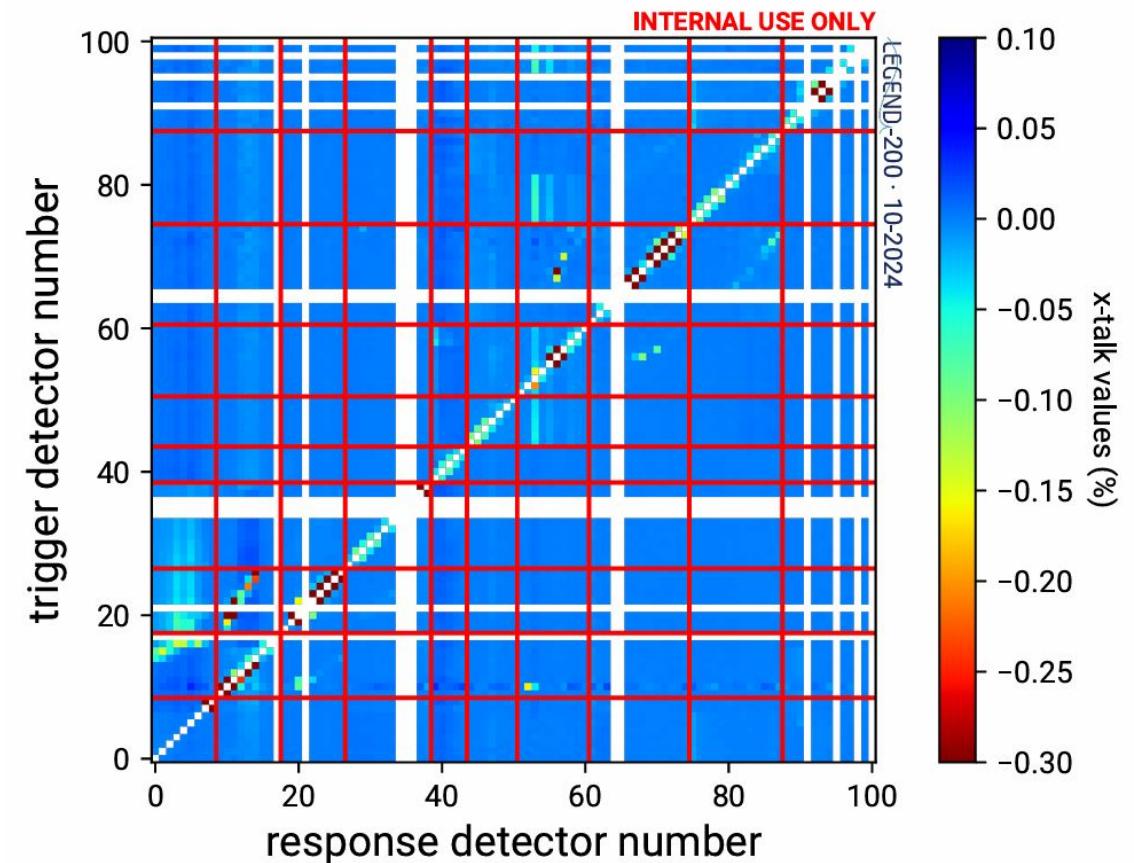
Speaker: Hung-Wei, Liu

Cross Talk Matrix

Goal: Reproduce the following matrices in LabNote_24_004:



- Positive Xtalk Matrix.



- Negative Xtalk Matrix.

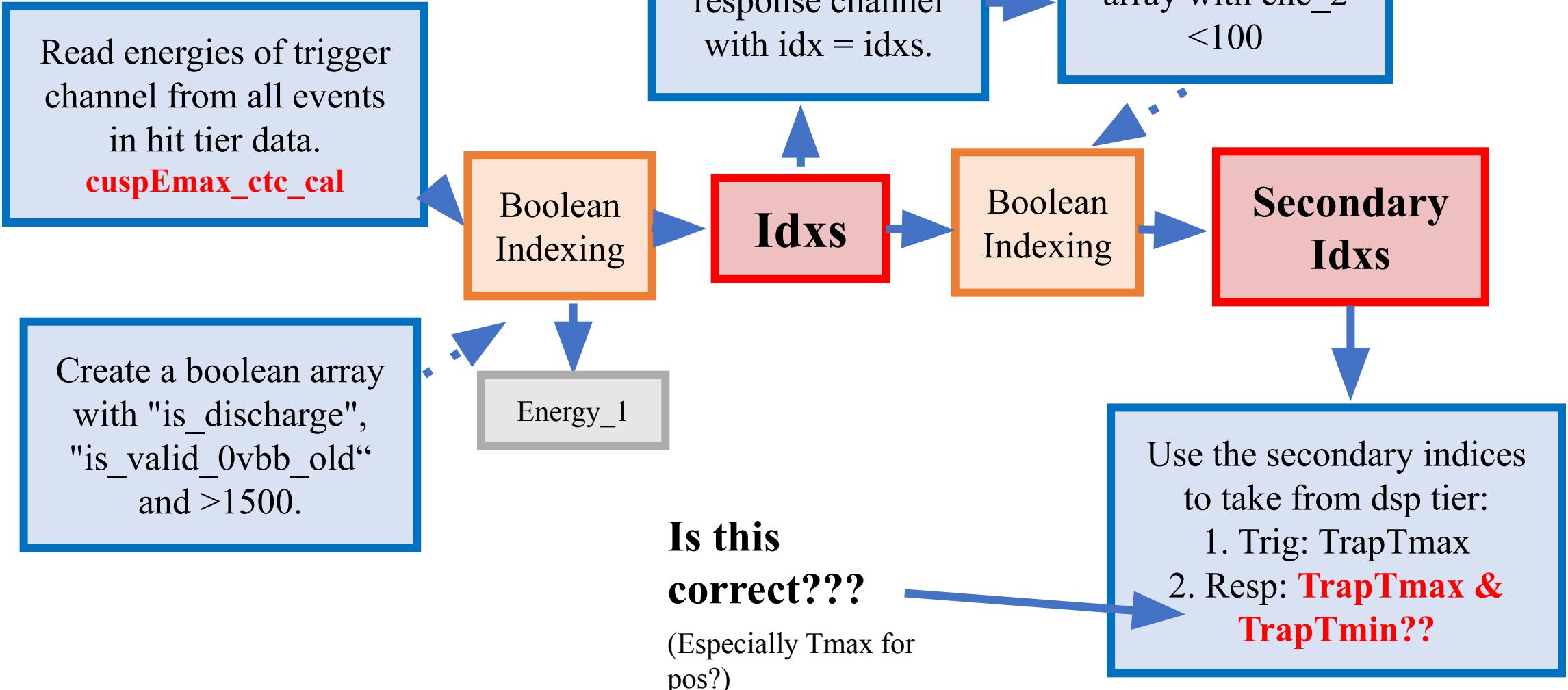
Cross Talk Matrix

- The dataset (p08, r015, ref 2.0.0) used for cross talk analysis is using **global trigger**.
- For each event i , define

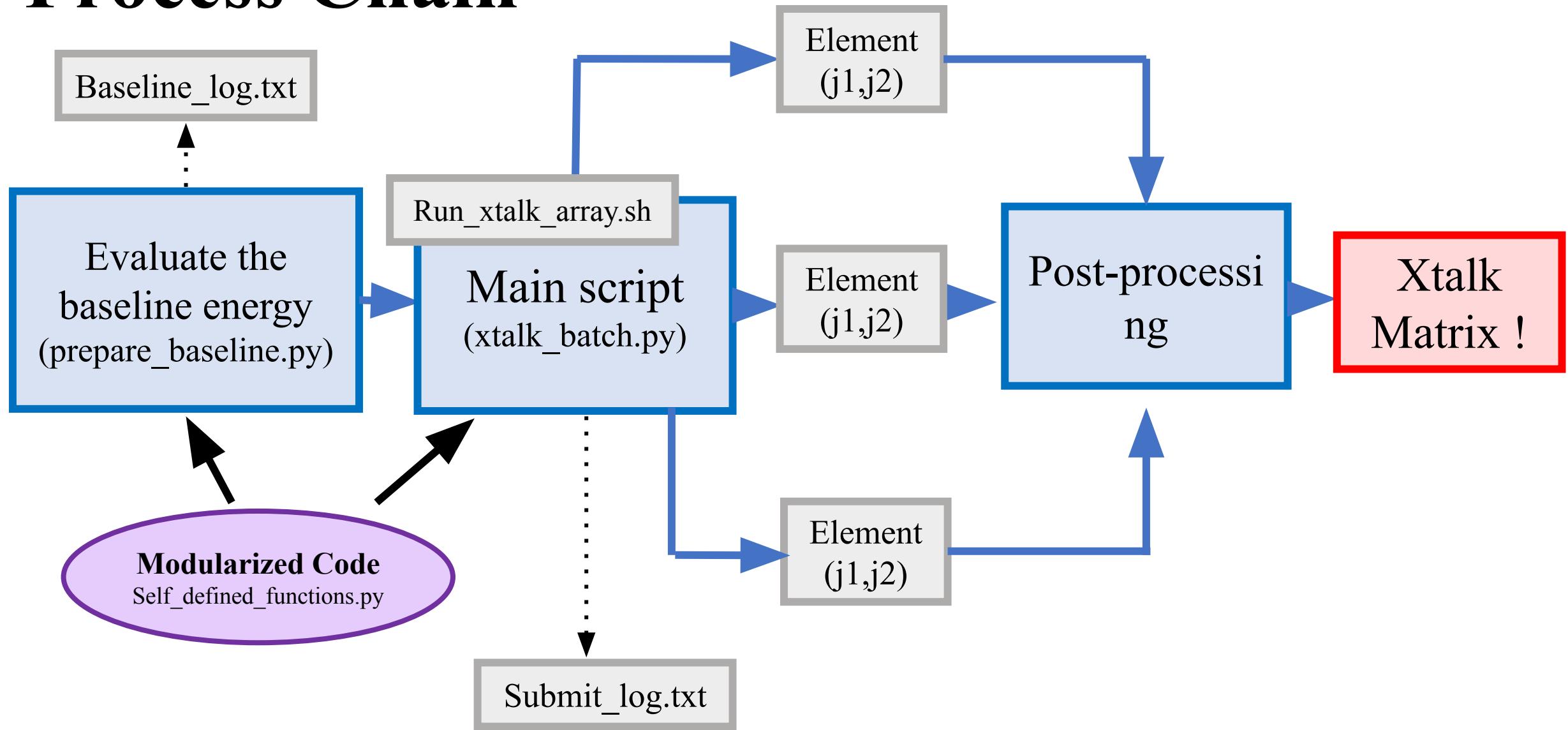
$$(R_{t \rightarrow r}^{norm})_i = \frac{(E_{resp})_i - \langle E_{bl} \rangle}{(E_{trig})_i}$$

Where E_{trig} and E_{resp} are estimated energies (uncalibrated, in ADC) measured by trigger detector and response detector. $\langle E_{bl} \rangle$ is the average response energy of the response detector for baseline events (with `is_baseline == 63`) in trigger detector.

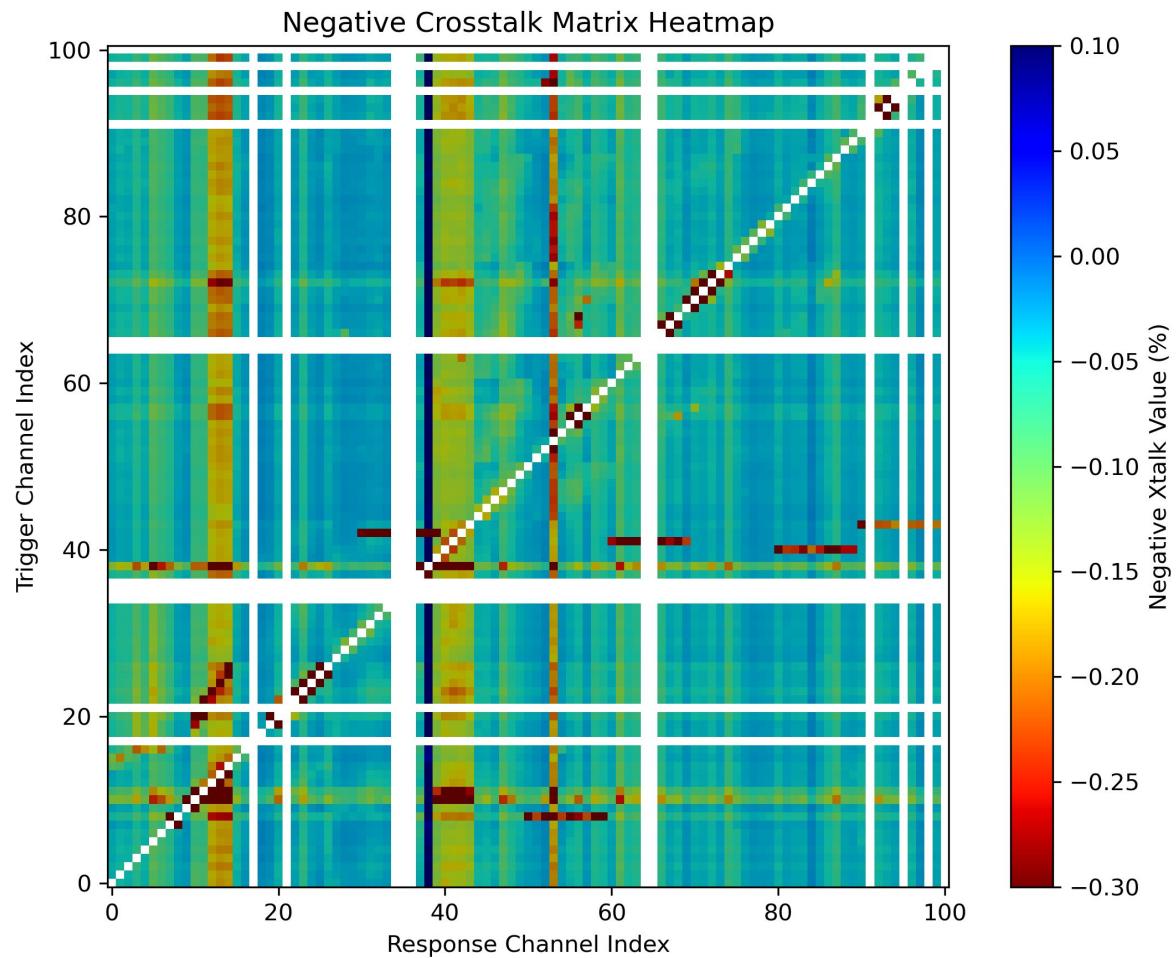
Event Selection



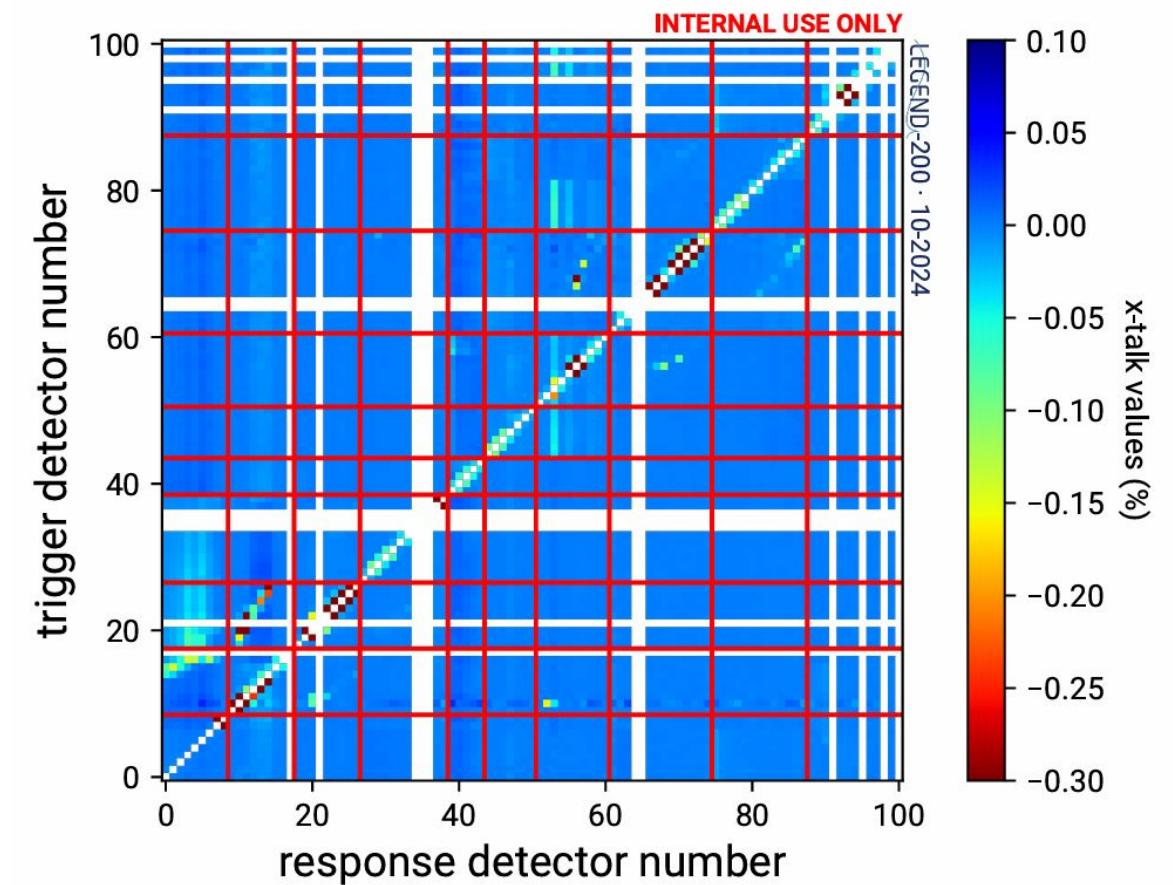
Process Chain



Results – Neg_xtc_matrix

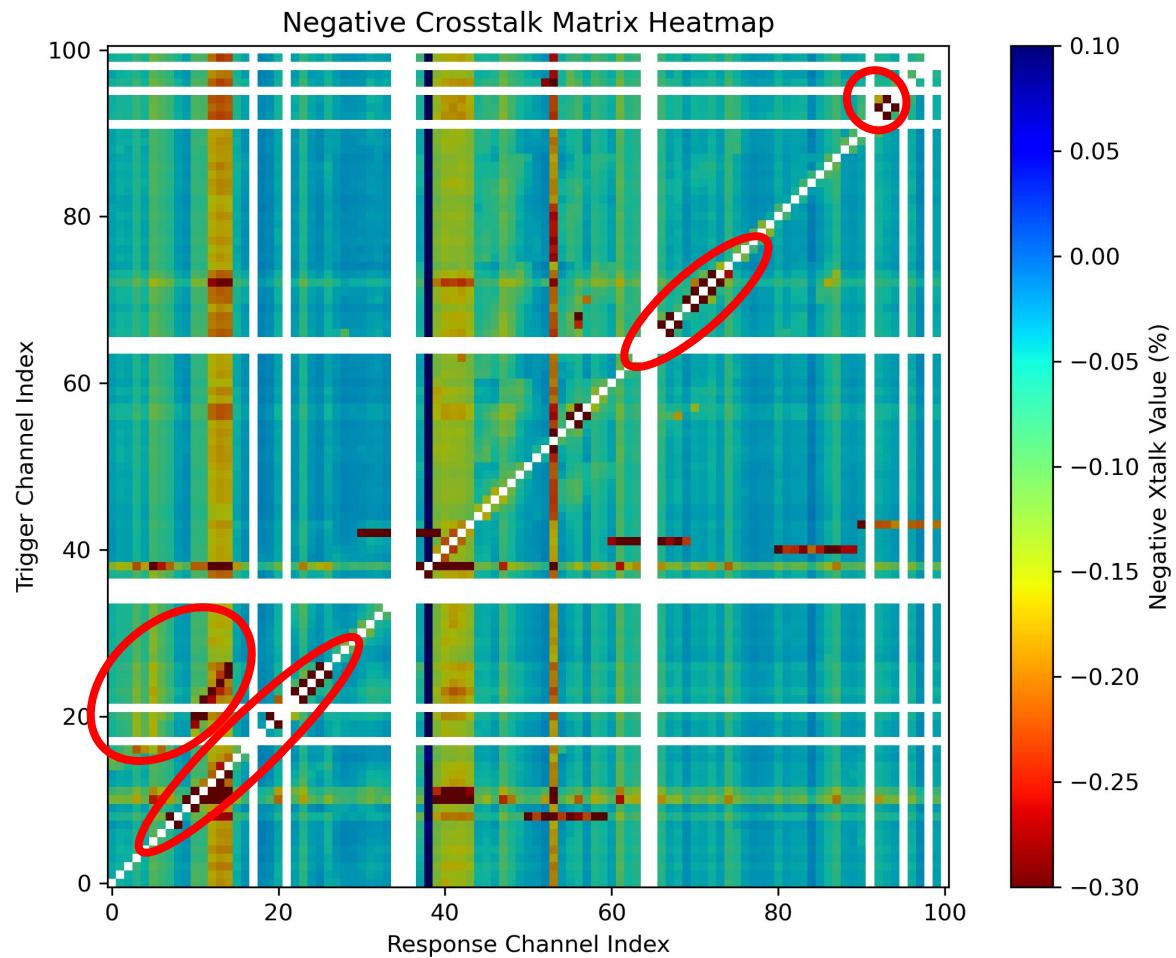


- Mine.

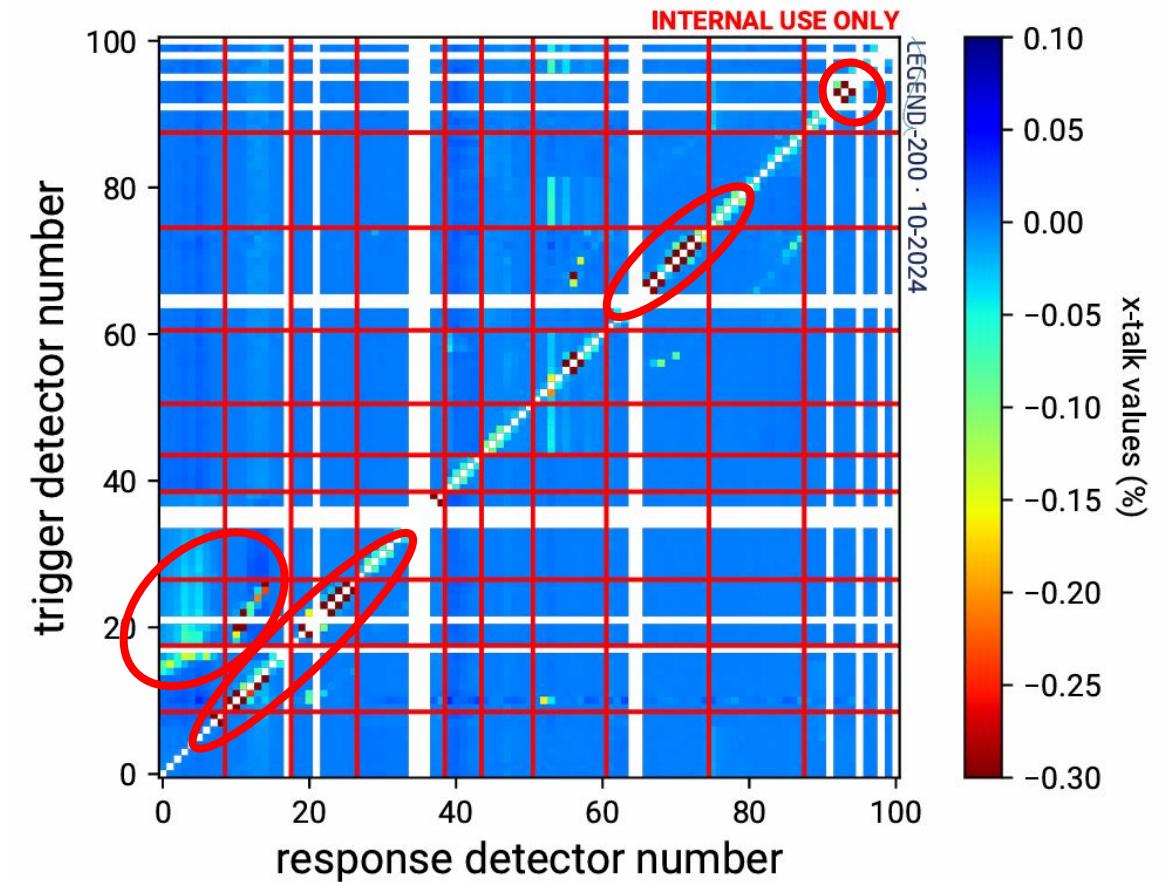


- Lab note version.

Results – Neg_xtc_matrix



- Mine.



- Lab note version.

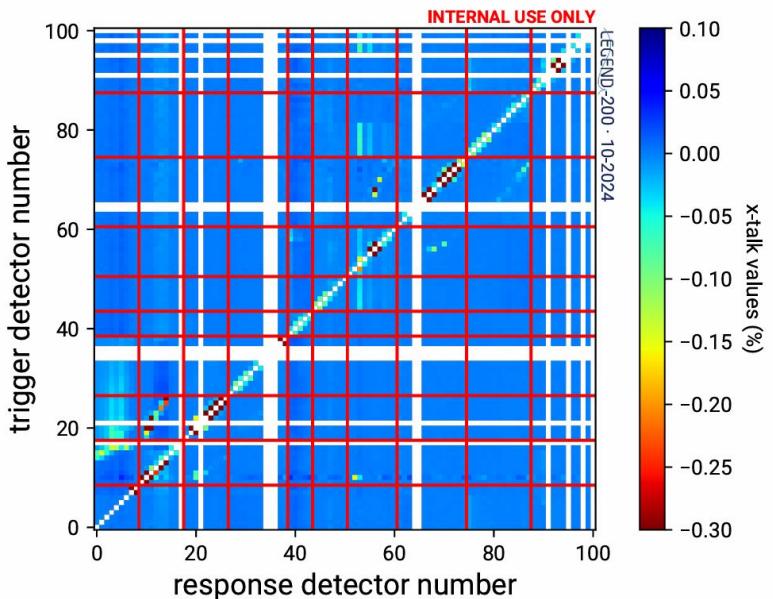
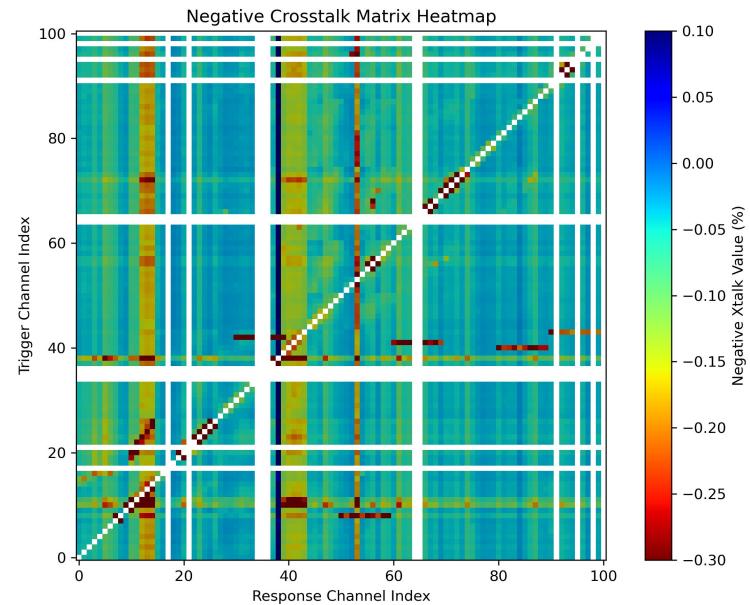
Results – Neg_xtc_matrix

Similarities:

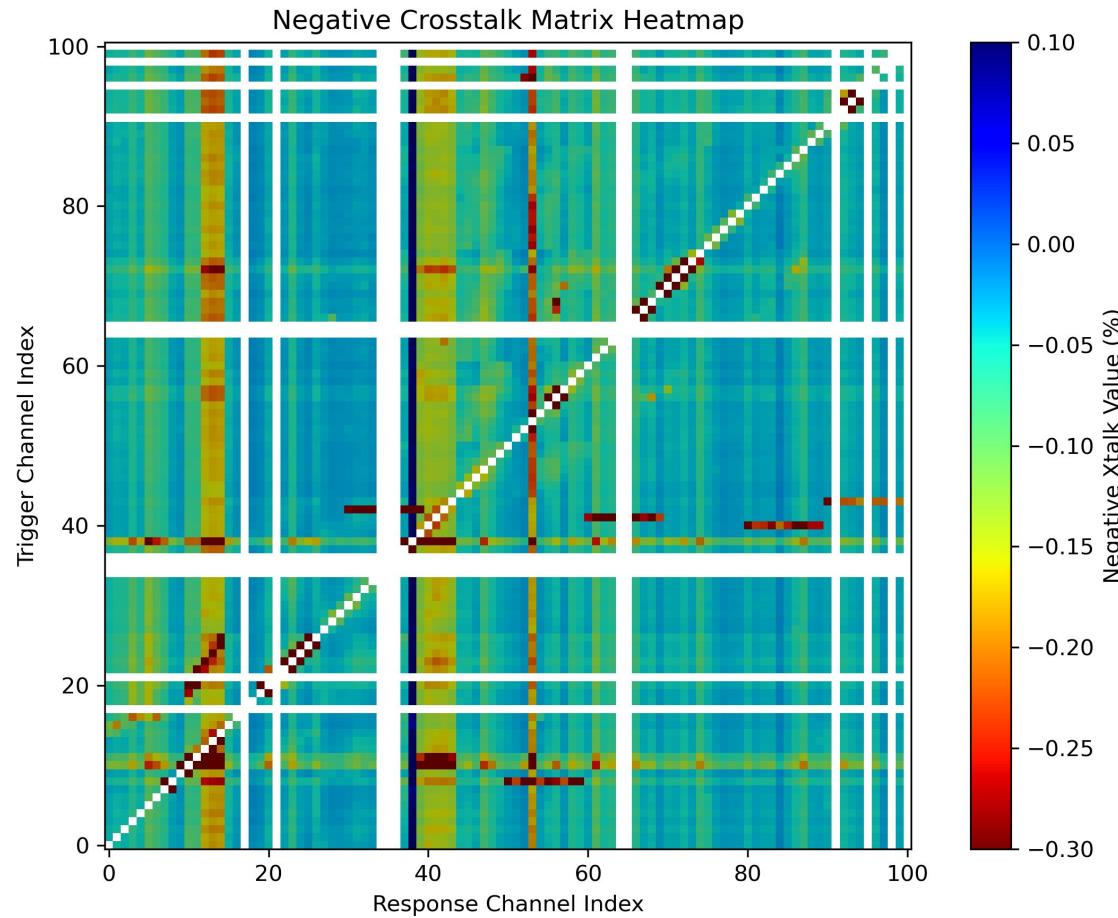
- The circled area showed that the high xtalk channel combinations match.

Bad News:

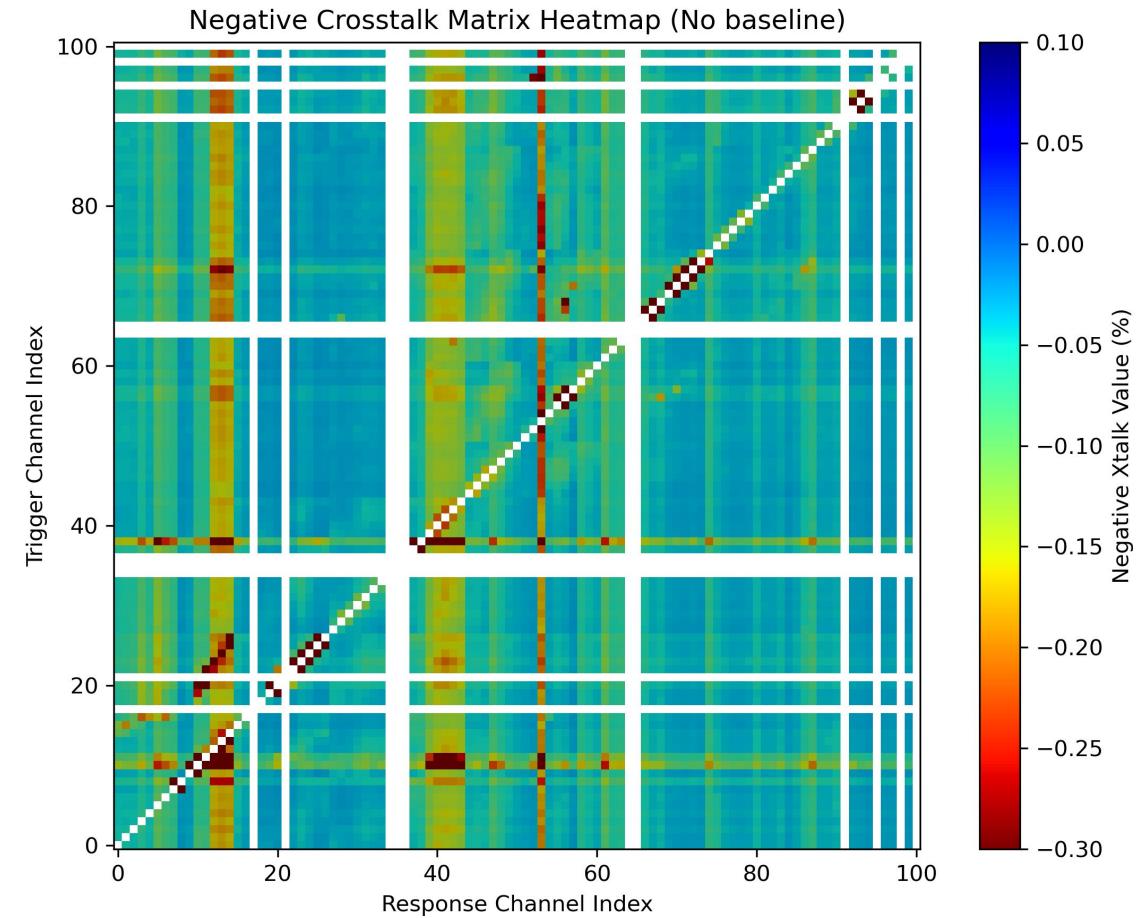
- My xtalk elements generally has larger magnitude
- Red Stripes in the Lab Note version?



Results – neg when baseline is removed

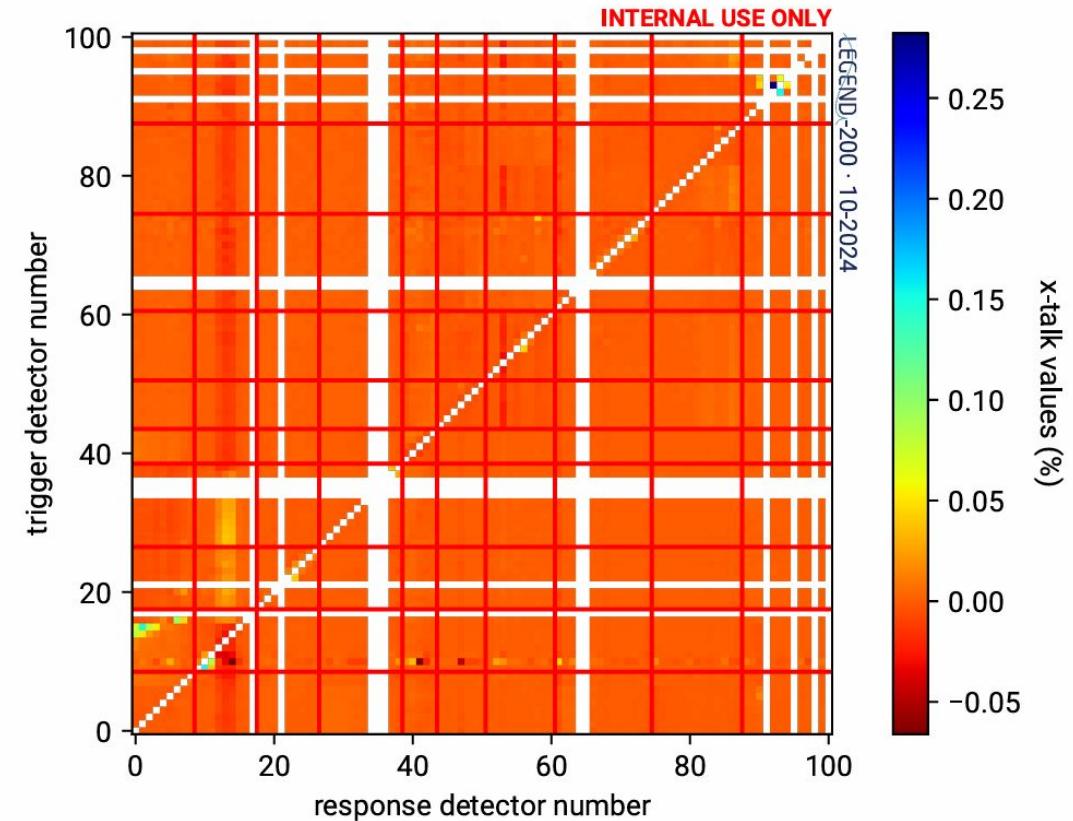
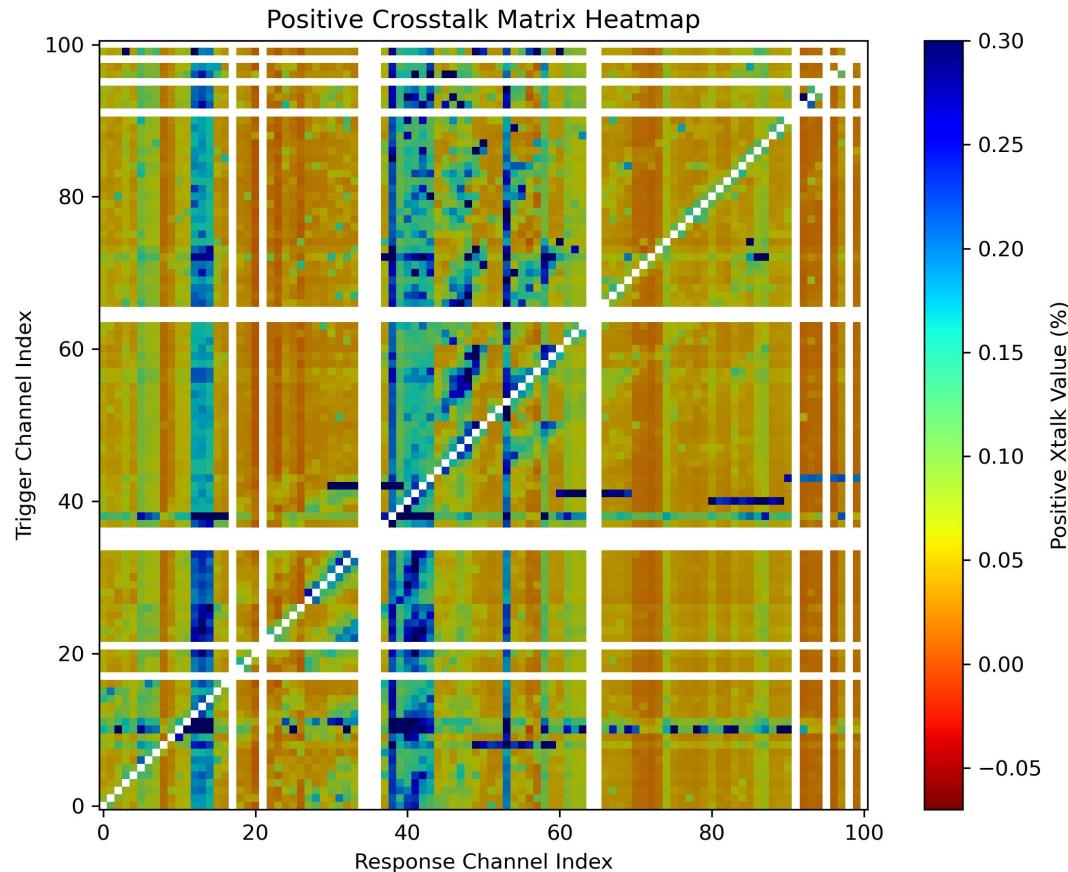


- With baseline.



- No baseline.

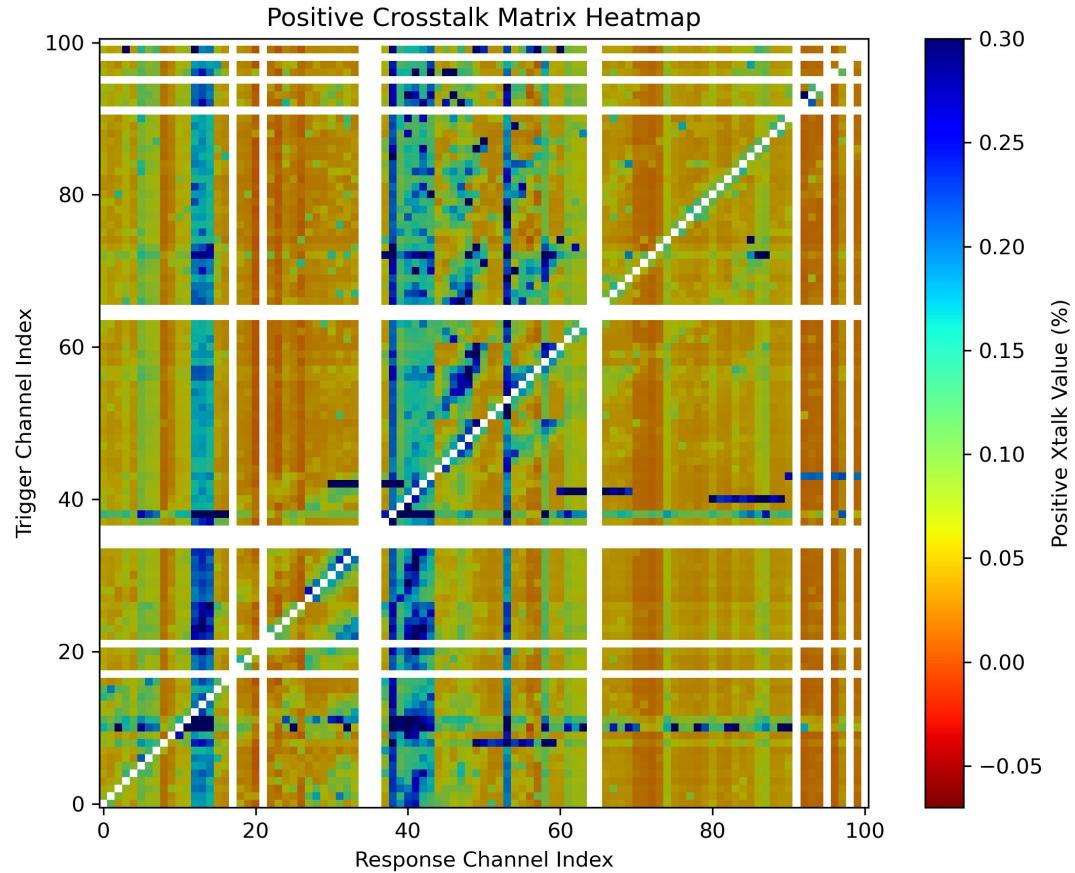
Results – pos_xtc_heatmap



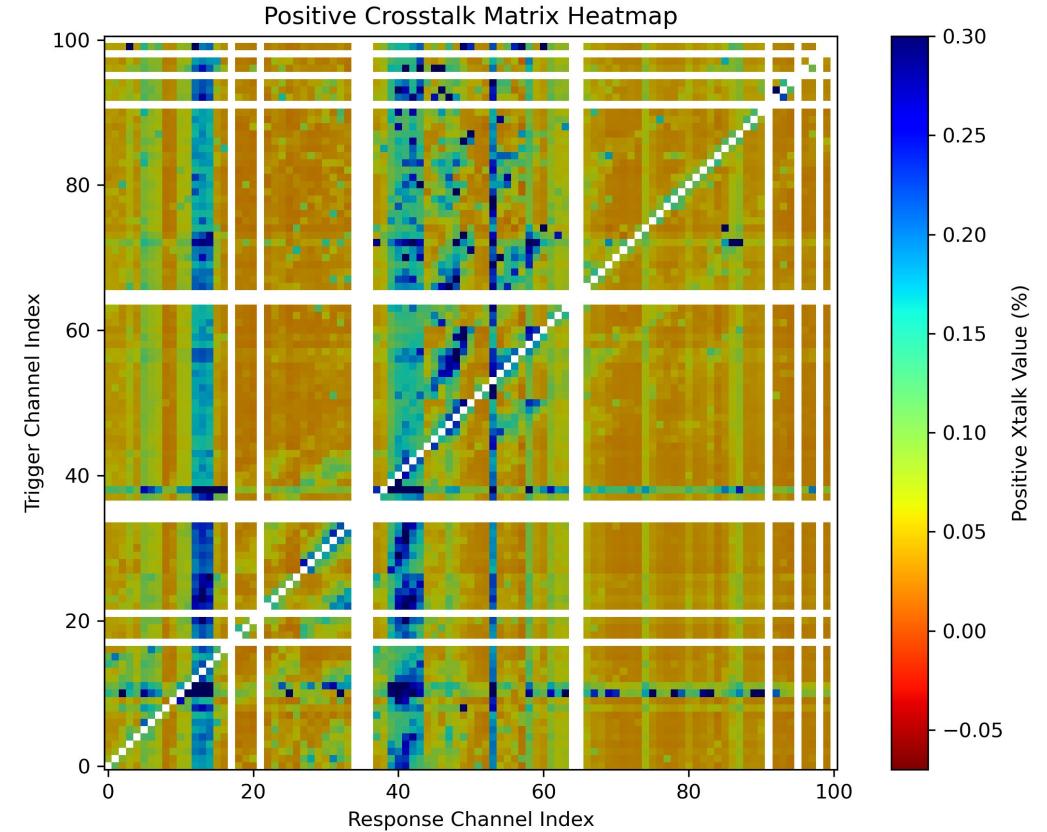
- Mine.

- Lab note version.

Results – when baseline is removed



- With baseline.



- No baseline.

Summary

- Attempted to use the same data set as LabNote_24_004 (p08 r015) to reproduce the cross talk heatmap.
- Obvious differences between mine's and lab note's version. (Background, red stripes)
- Suspected Causes:
 - i. Baseline subtraction -> False.
 - ii. Some dataset missing -> Attempt to run it at LNGS, still working on it.