

Motion blindness induced by color in zebrafish larvea

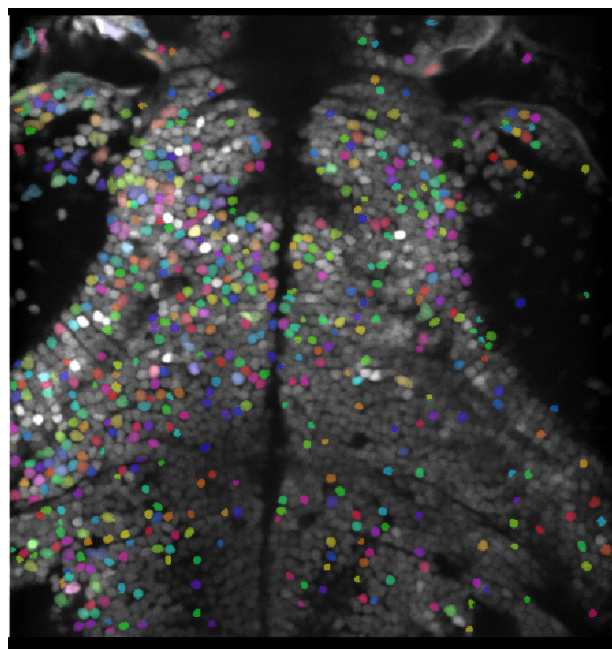
Danio rerio

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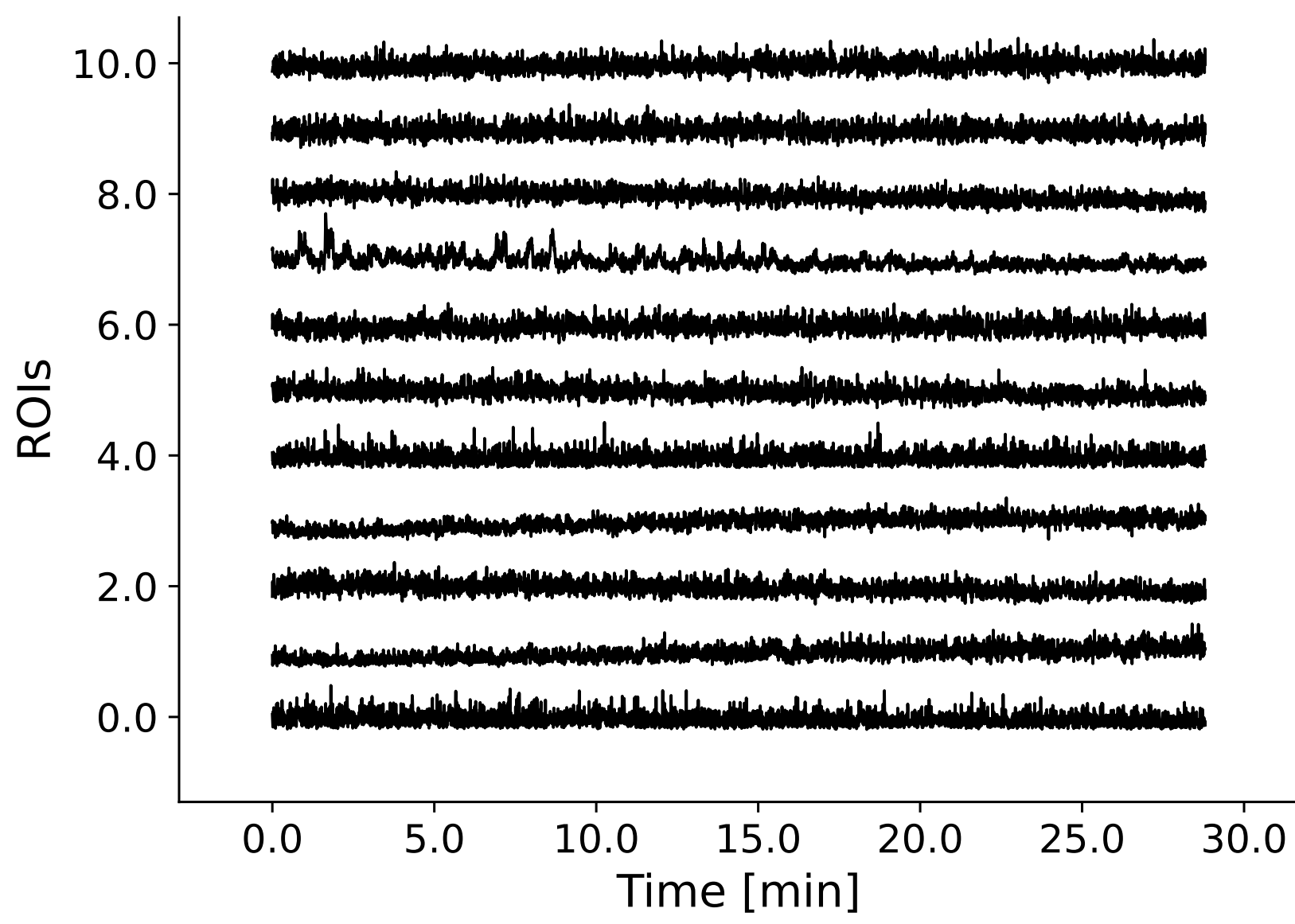
Introduction

Color has a big influence on motion vision in zebra-fish. Michael B. Orger (2004) displayed that zebra-fish in behavioural experiments show motion blind-ness to a grating of different colors, but little is known about the cortical structures conveying the „color-motion“ perception. We wanted to the investigate the optic tectum of the zebrafish larvae with calci-um imaging.

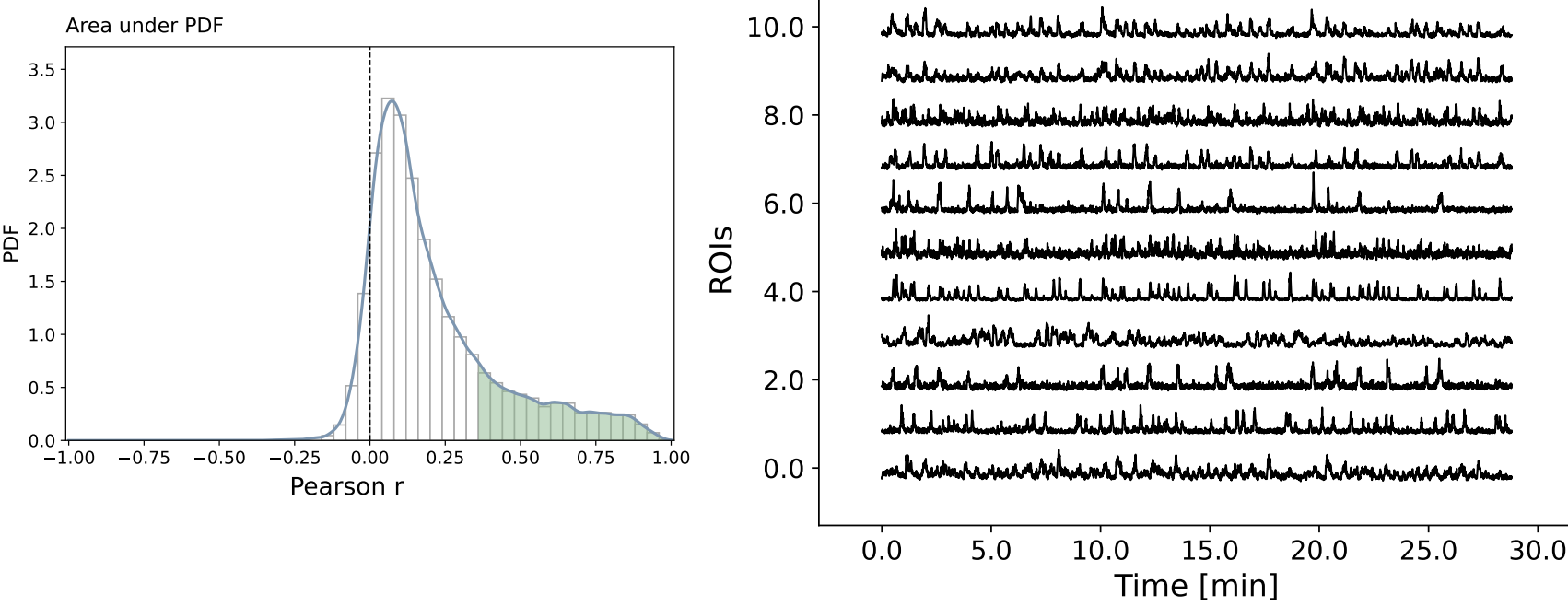


Preprocessing:

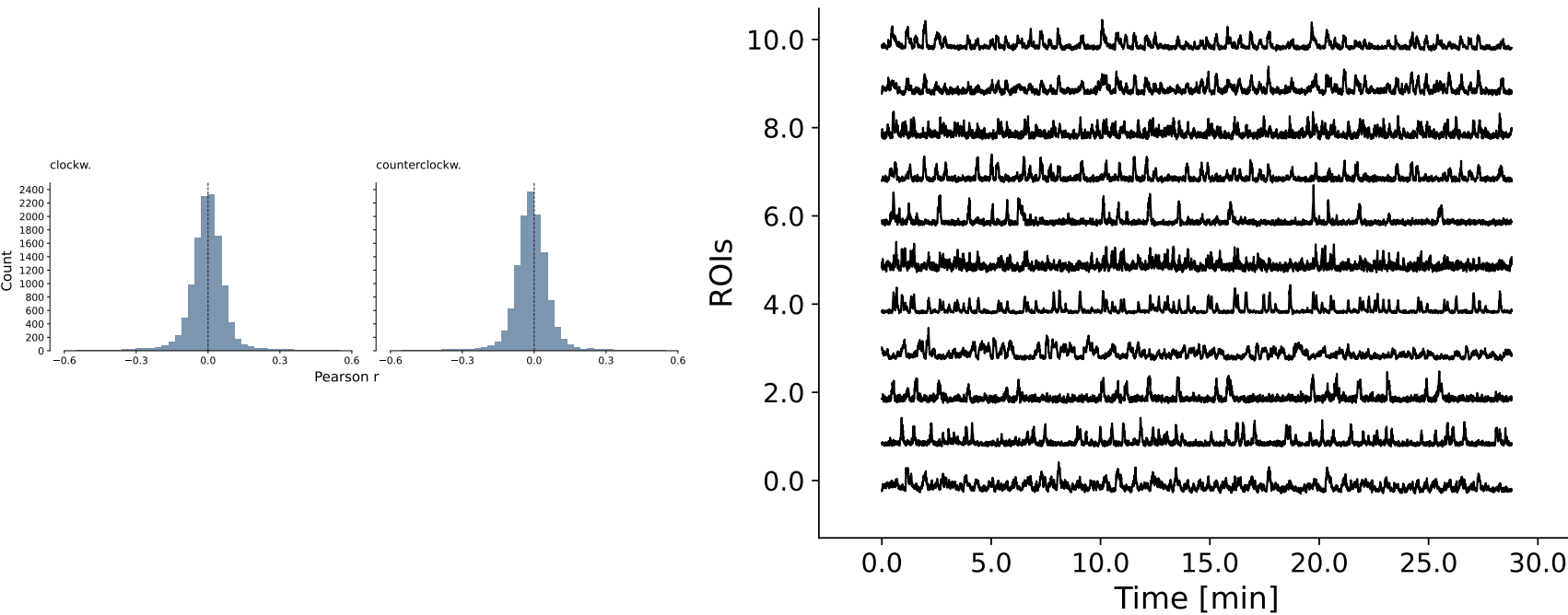
1. Region of Interests (ROI): corrsponds to neu-rons with genetically encoded caclium indicators. The lumiance f of the calcium imaging is calcula-ted from the change of luminance normalized to the average luminance $f = \frac{\Delta f}{f}$.



2. Active ROIs: To get the active ROIs we computed the correlation within 3 repeats of the same stimu-lus.



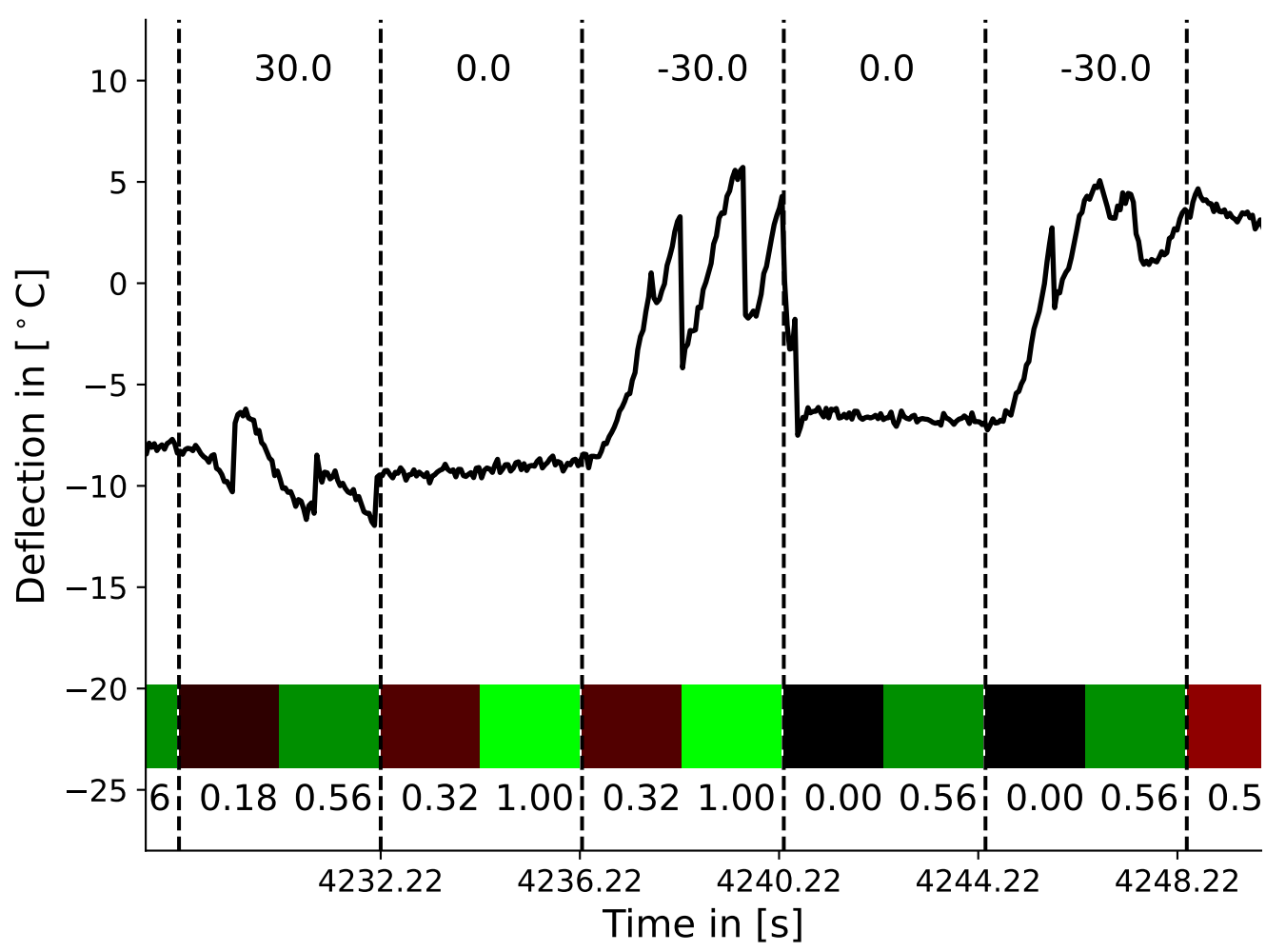
2. Direction selective ROIs: next Step was to search for ROIs that correlated with a direction se-lective regressor (1 for clockwise / counter, else is 0)



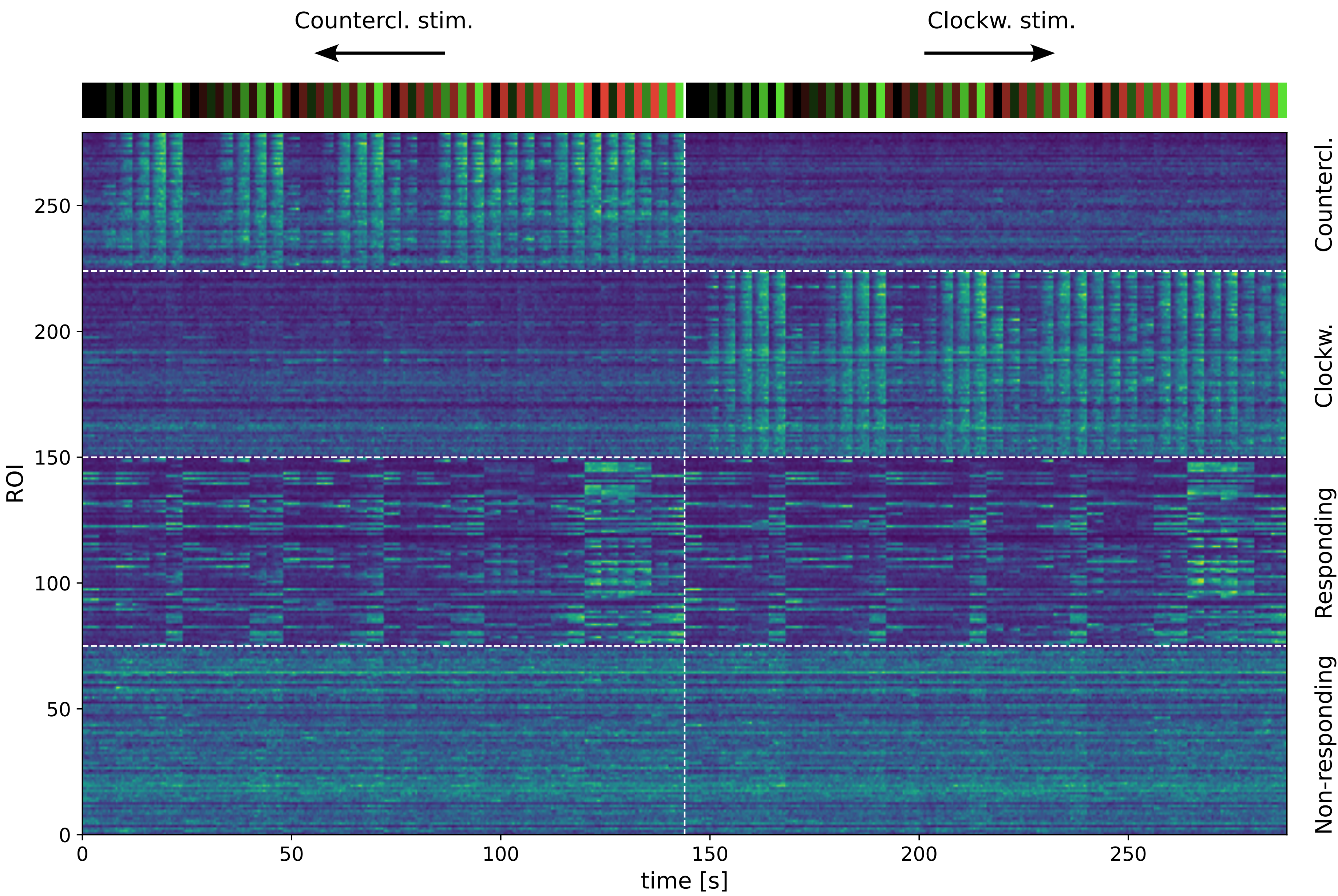
Motion blindness calcium data vs behaviour

Calcium 1. Stimulus

Bahviour



Interactions at modulations



- $\Delta EODf$ does not appear to decrease during synchro-nous modulations (A).
- Synchronized fish keep distances below 1 m (C) but distances over 3 m also occur (see **movie**).
- Individuals that rise their EODf first appear to rise their frequency higher compared to reactors (B).
- Spatial interactions increase **after** the start of a syn-chronous modulation (D).

Conclusion

- Our analysis is the first to indicate that *A. leptorhynchus* uses long, diffuse and synchronized EODf signals to communicate in addition to chirps and rises.
- The recorded fish do not exhibit jamming avoidance behavior while close during synchronous modulations.
- Synchronous signals **initiate** spatio-temporal interactions.