

# Motion blindness induced by color in zebrafish larvea

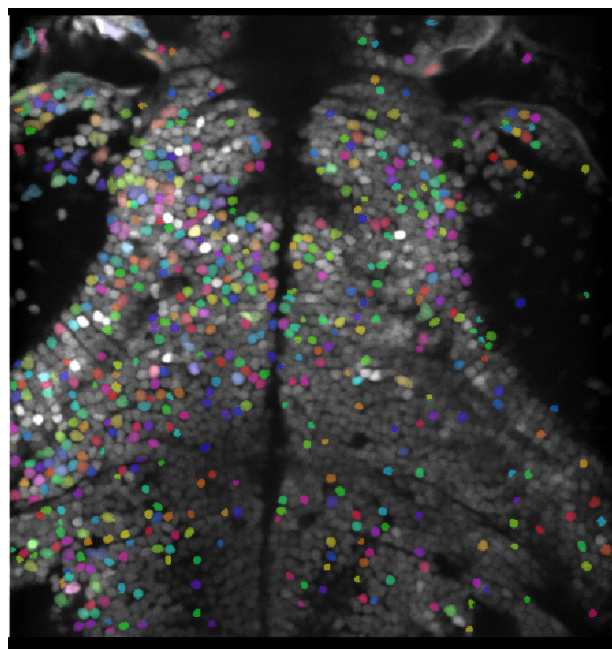
## Danio rerio

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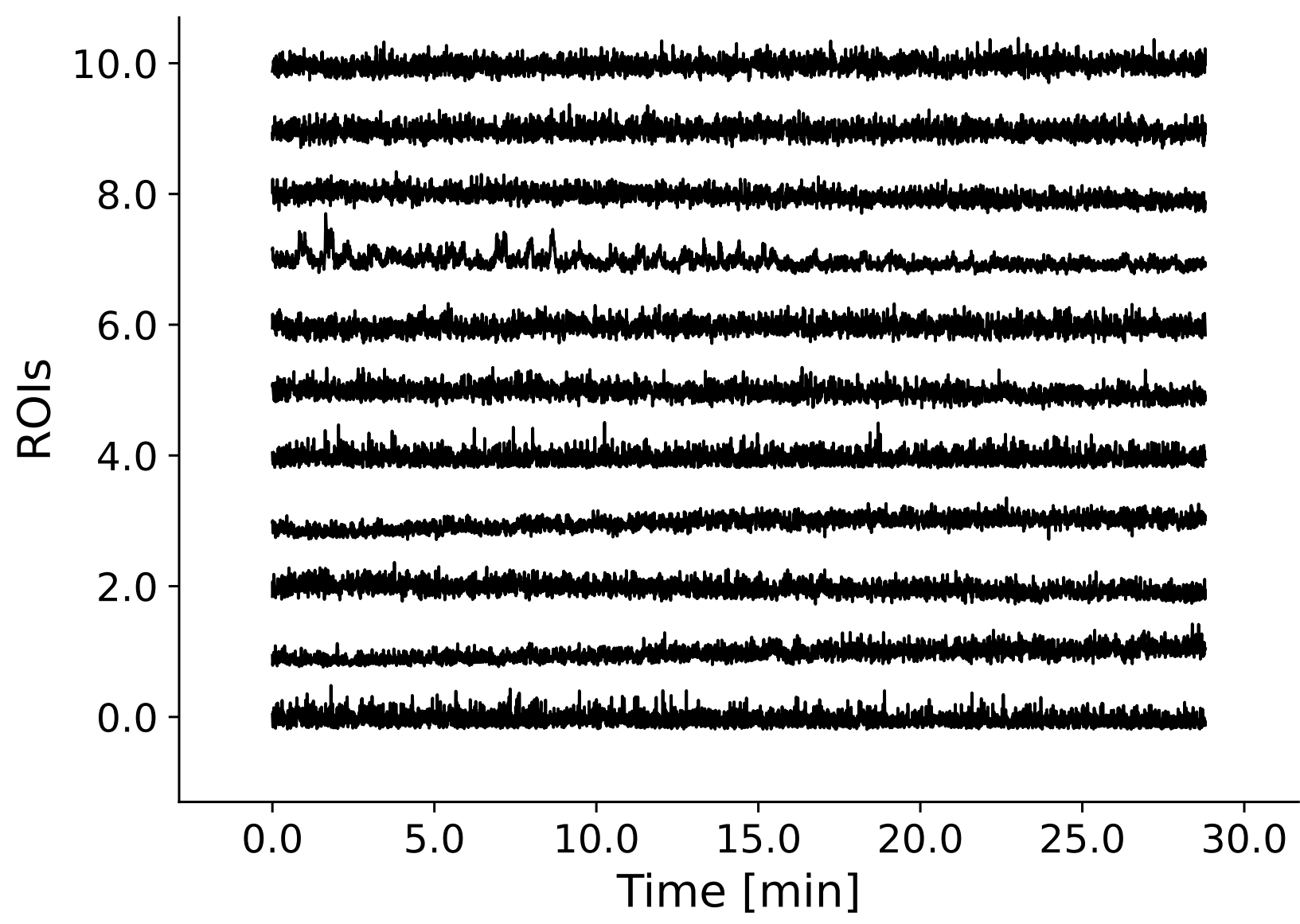
### Introduction

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.

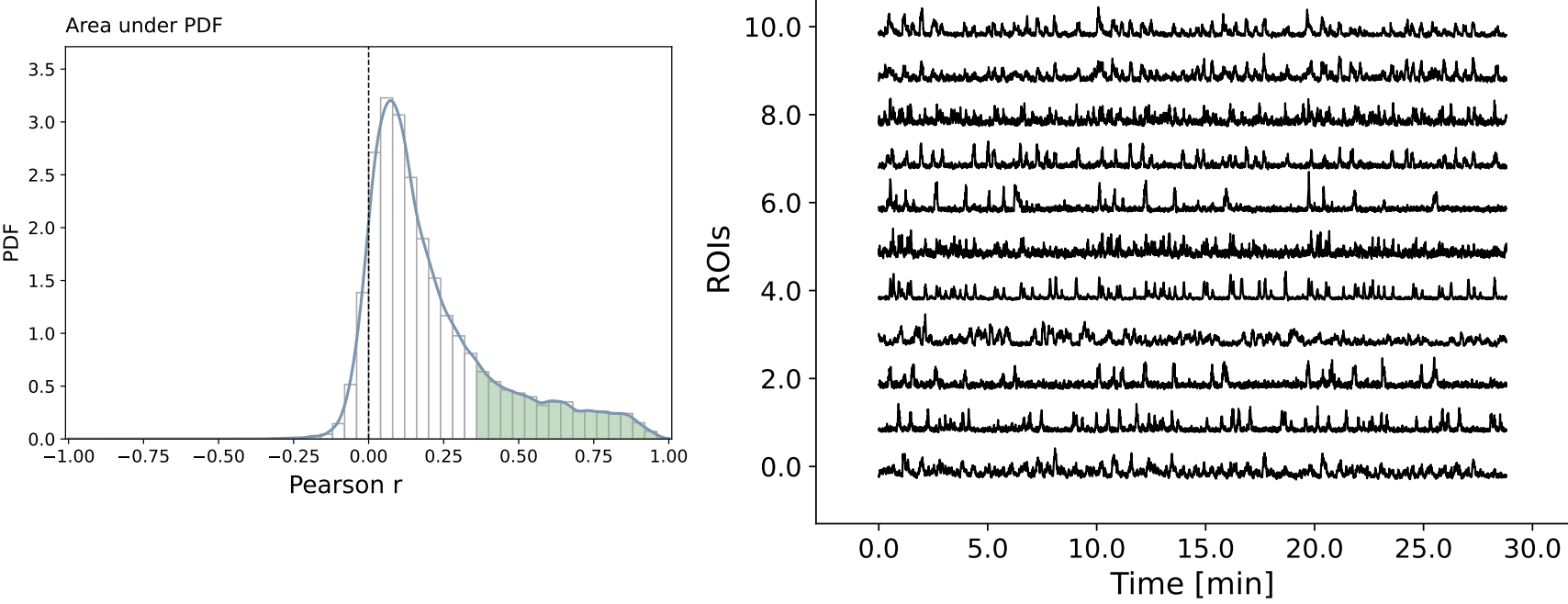


### Preprocessing:

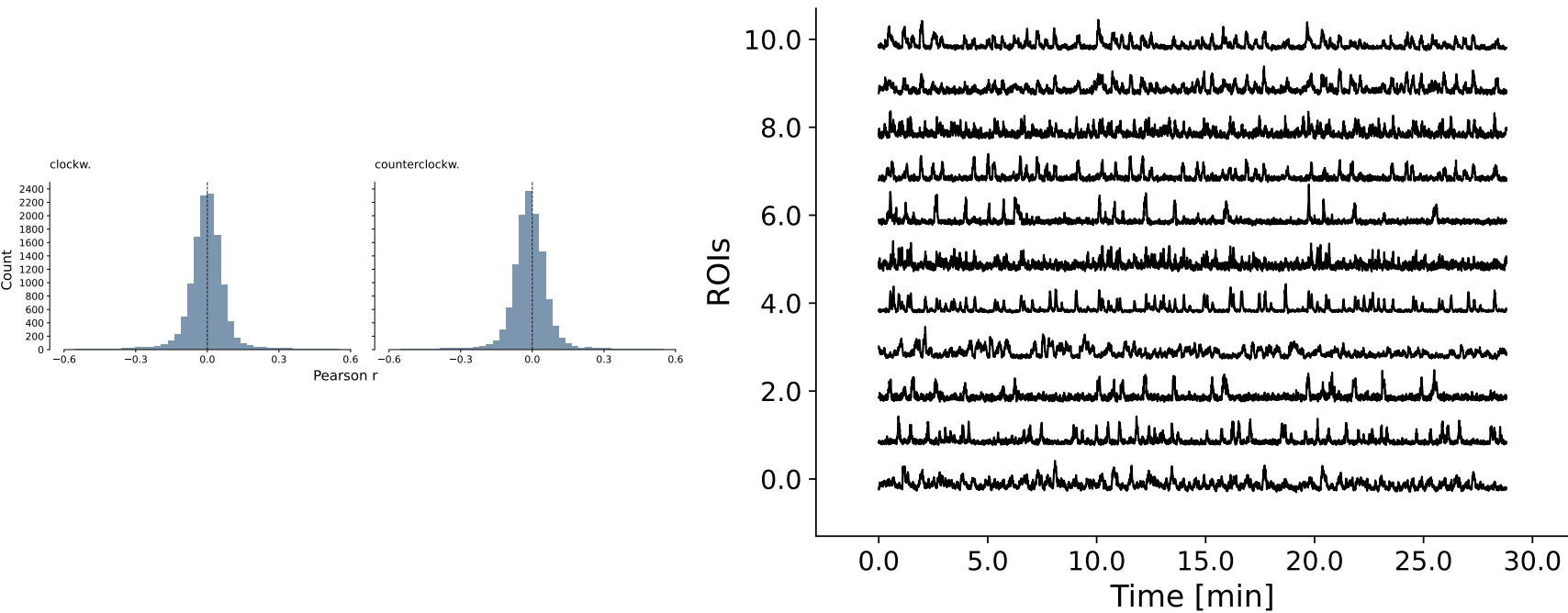
**1. Region of Interests (ROI):** corrsponds to neu-rons with genetically encoded caclium indicators. The lumiance  $f$  of the calcium imaging is calcula-ted from the change of luminance normalized to the average luminance  $f = \frac{\Delta f}{f}$ .



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



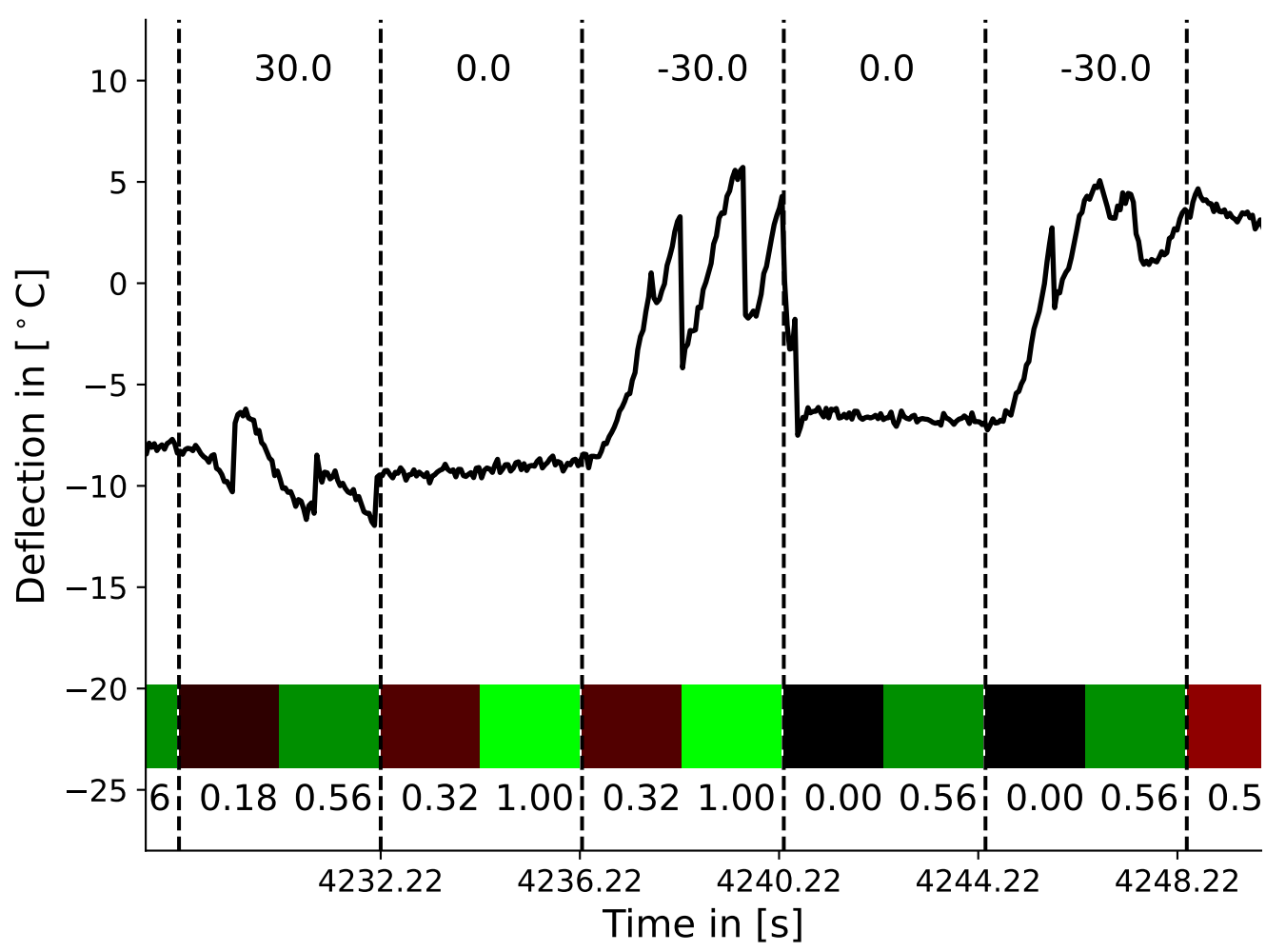
**2. Direction selective ROIs:** next Step was to search for ROIs that correlated with a direction se-lective regressor (1 for clockwise / counter, else is 0)



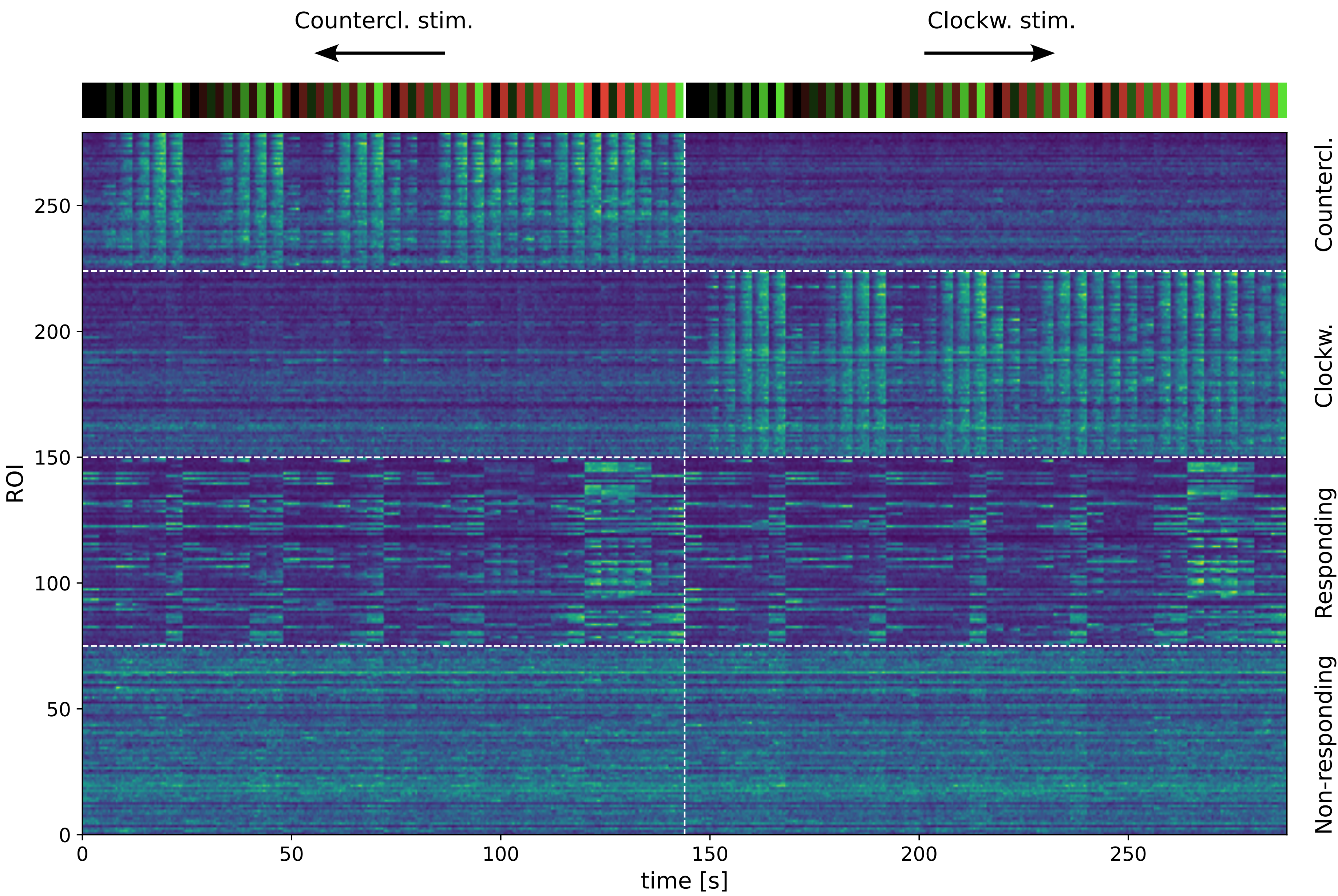
### Motion blindness calcium data vs behaviour

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.