Motion blindness induced by color in zebrafish larvea *Danio rerio*

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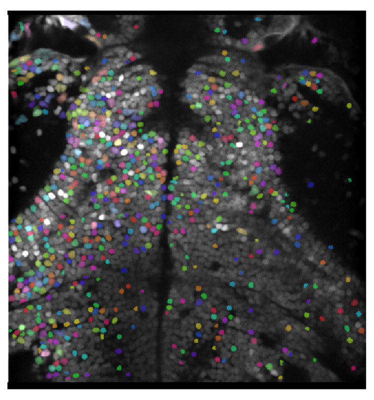
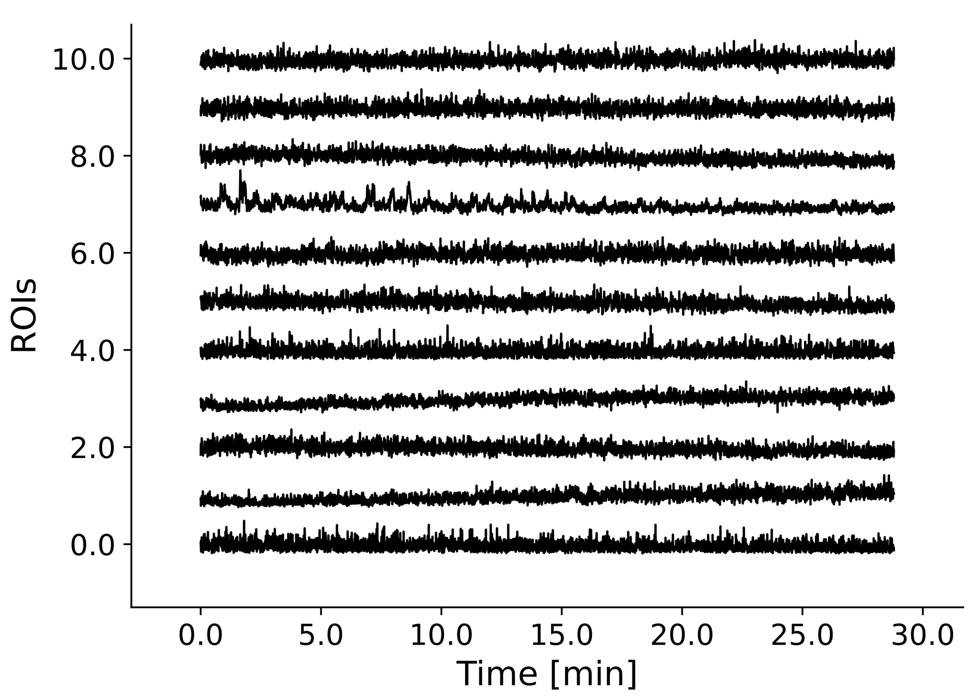
Introduction

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

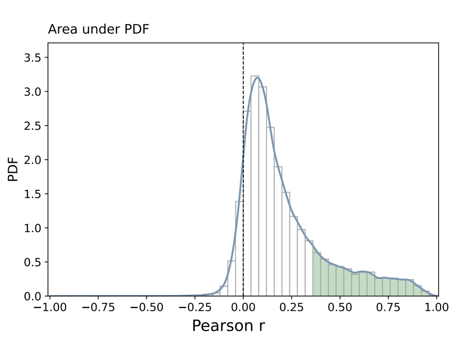


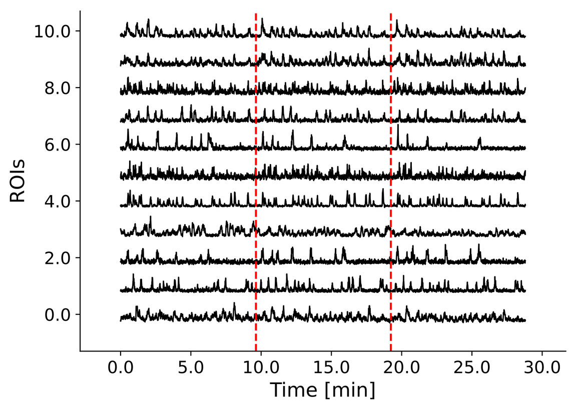
Preprocessing:

1. Region of Interests (ROI): corrosponds to neurons with genetically encoded caclium indicators. The lumiance f of the calcium imaging is calculated from the change of luminance normalized to the average luminance $f = \frac{\Delta f}{f}$.

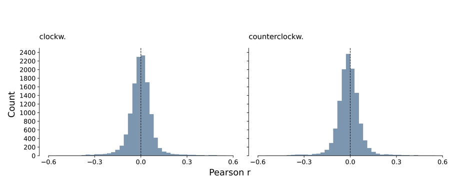


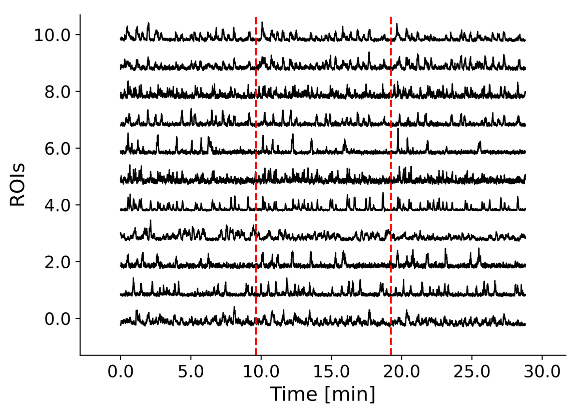
2. Active ROIs: To get the active ROIs we computed the correlation within 3 repeats of the same stimulus.





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

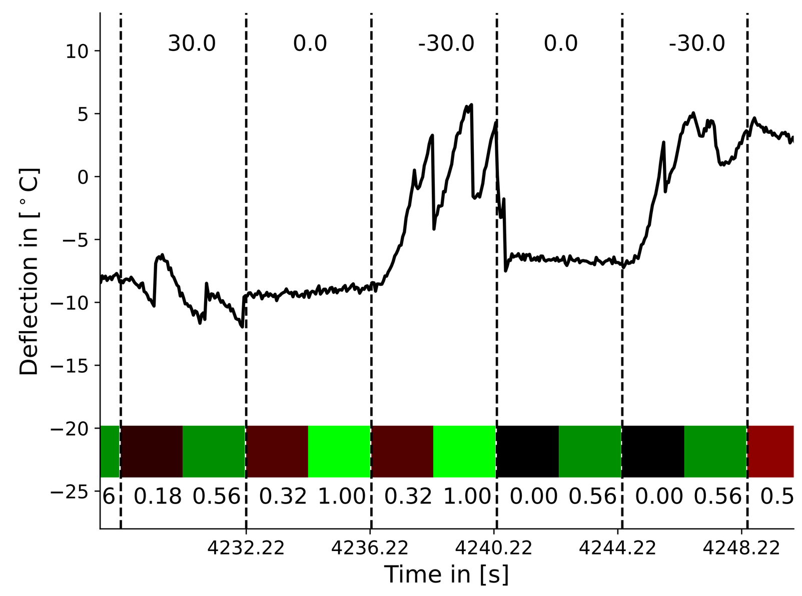




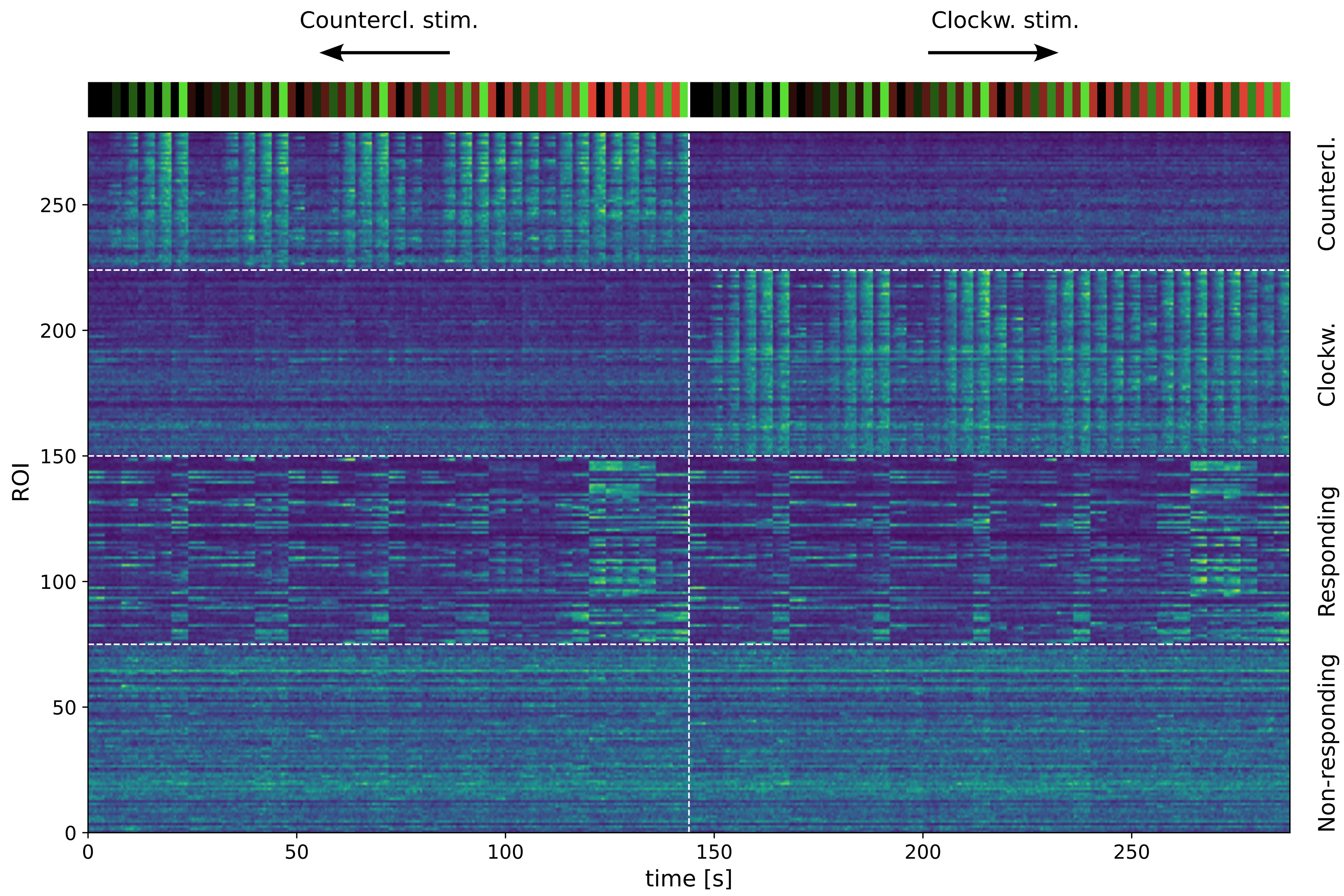
Motion blindness calcium data vs behaviour

Calcium 1. Stimulus

Bahviour



Interactions at modulations



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

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