Color-blindness of direction-selective units in the optic tectum

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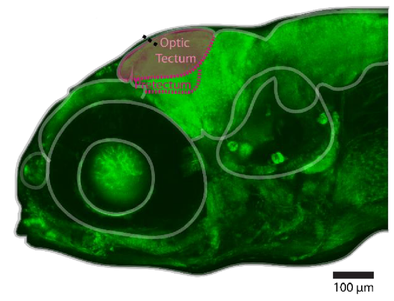
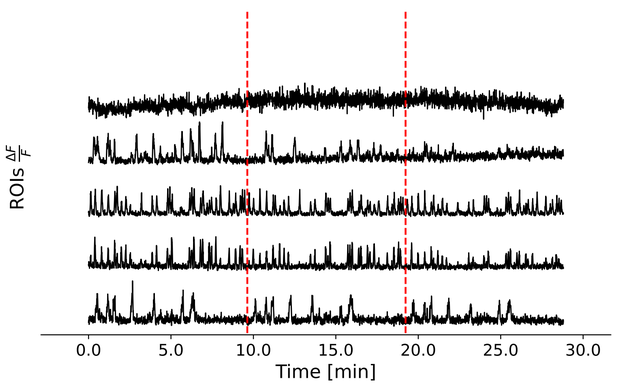


Introduction

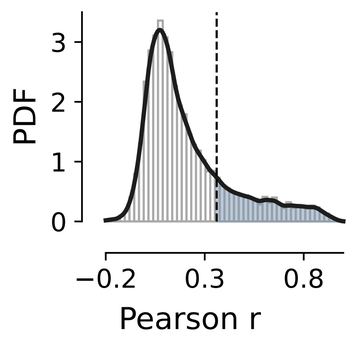
Color has a big influence on motion vision in zebrafish. Orger and Baier (2004) displayed with the optomotor response of zebrafish that motion blindness can be indueced to a grating of different colors.
But little is known about the cortical structures conveing the „color-motion“ perception. We wanted to the investigate the optic tectum of the zebrafish larvae with calcium imaging.

Preprocessing:

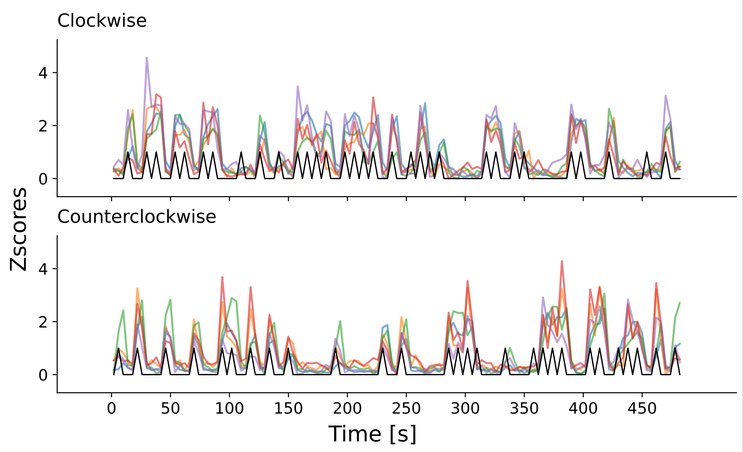
1. Region of Interests (ROI): corrosponds to neurons with genetically. The lumiance F of the calcium imaging is calculated from the change of luminance normalized to the average luminance $F = \frac{\Delta F}{F}$.



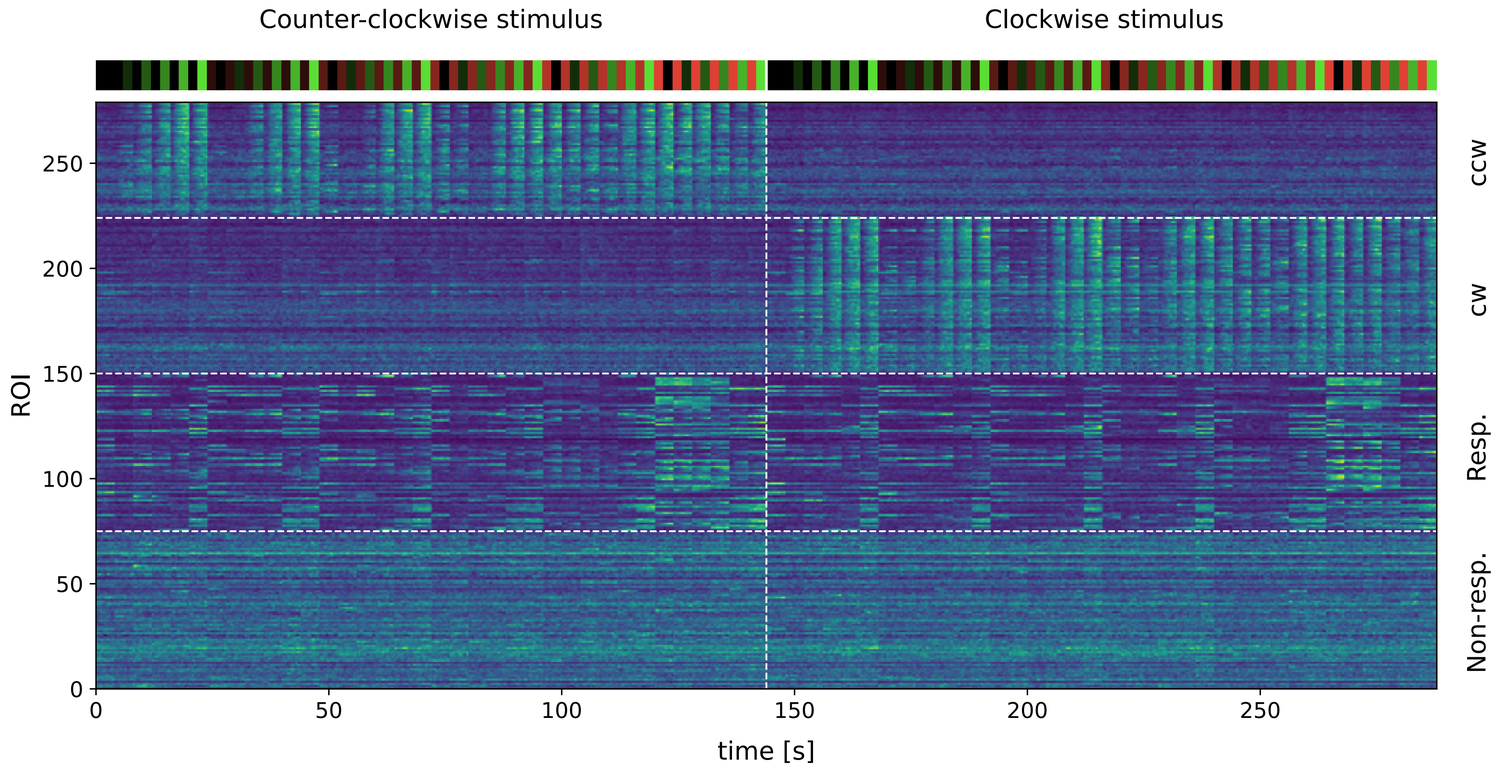
2. Active ROIs: To get the active ROIs we computed the correlation within 3 repeats of the same stimulus.

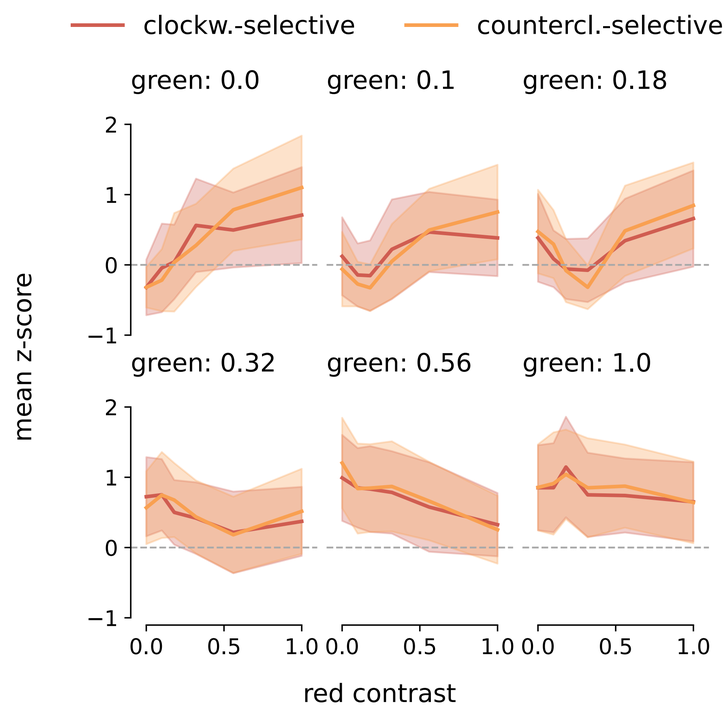


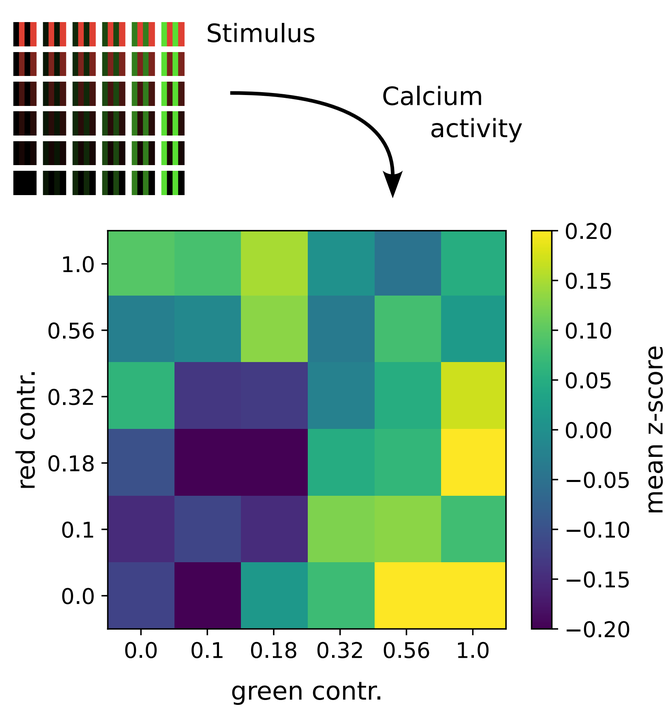
2. Direction selective ROIs: next Step was to search for ROIs that correlated with a direction selective regressor (1 for clockwise = CW or counterclockwise = CCW, else is 0).



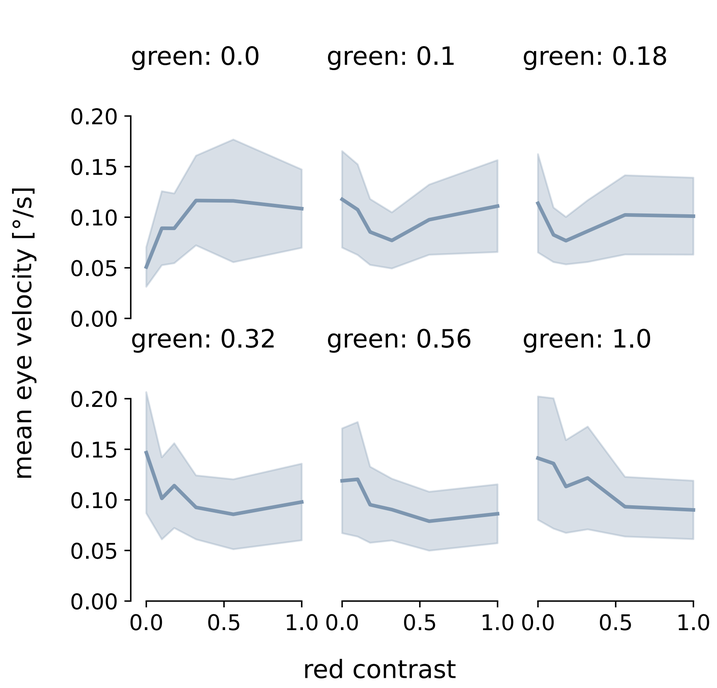
2-photon calcium imaging

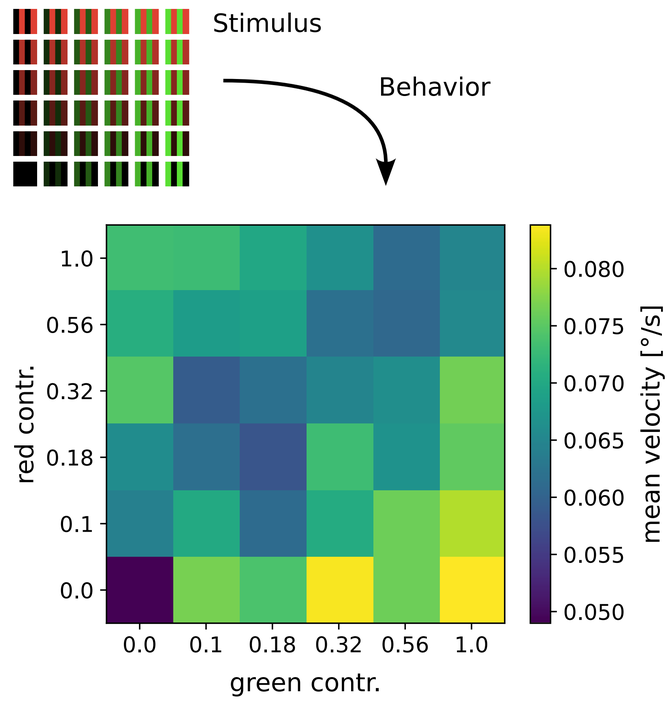






Behavior





Conclusion

- The optic tectum is mottion blind for various contrast levels