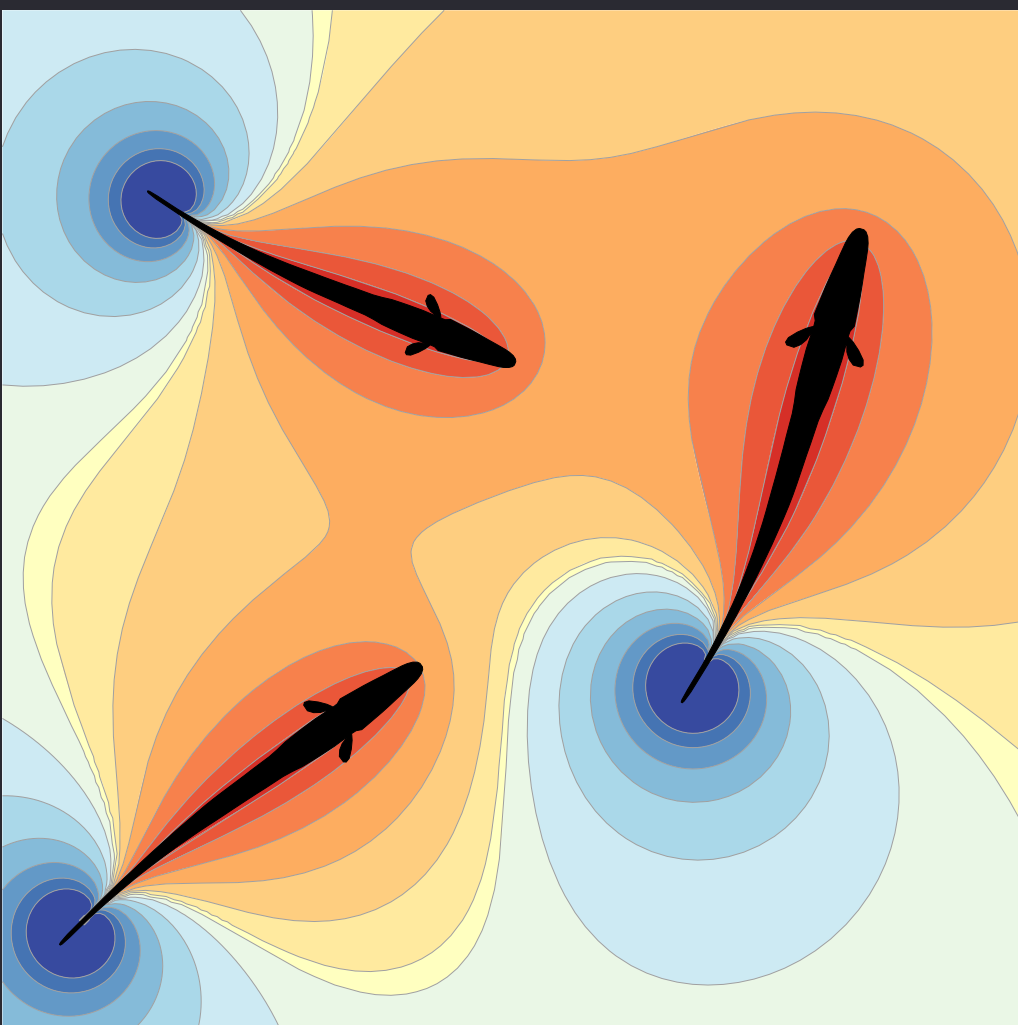


# Bypassing time-frequency uncertainty in the detection of transient communication signals in weakly electric fish

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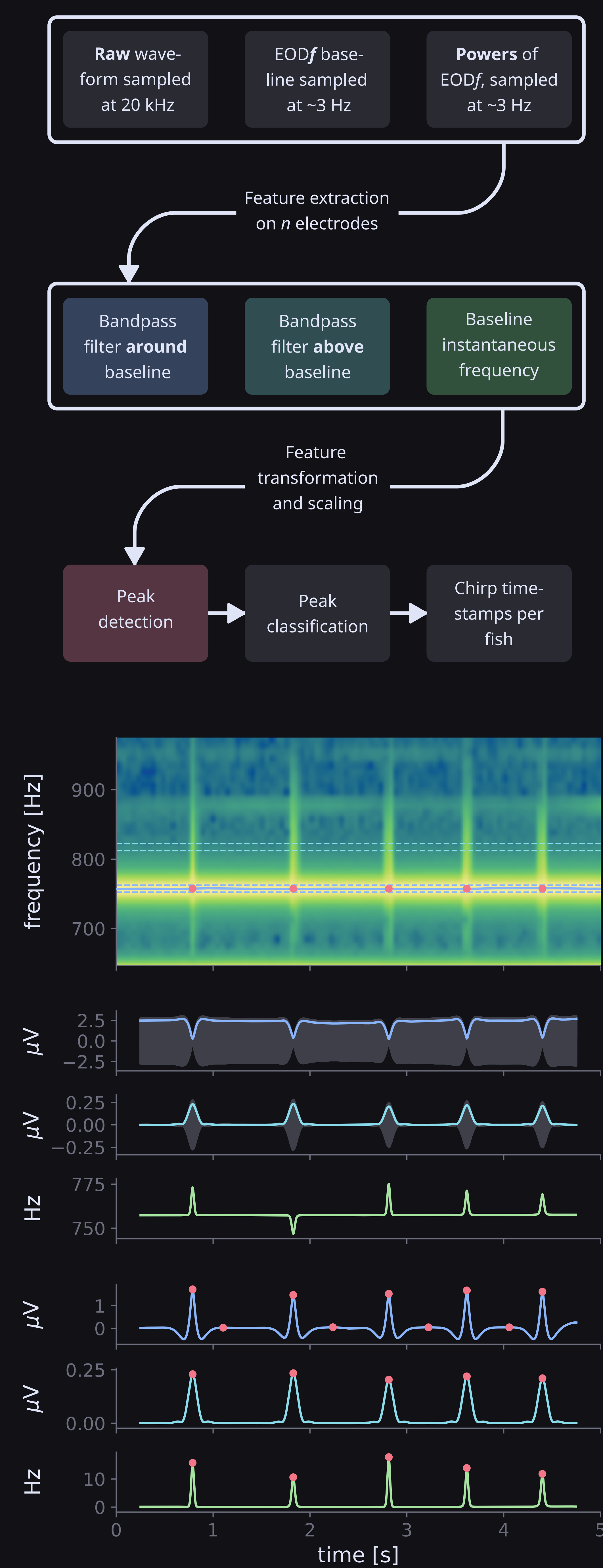
Supervised by Till Raab & Jan Benda, Neuroethology Lab, University of Tuebingen



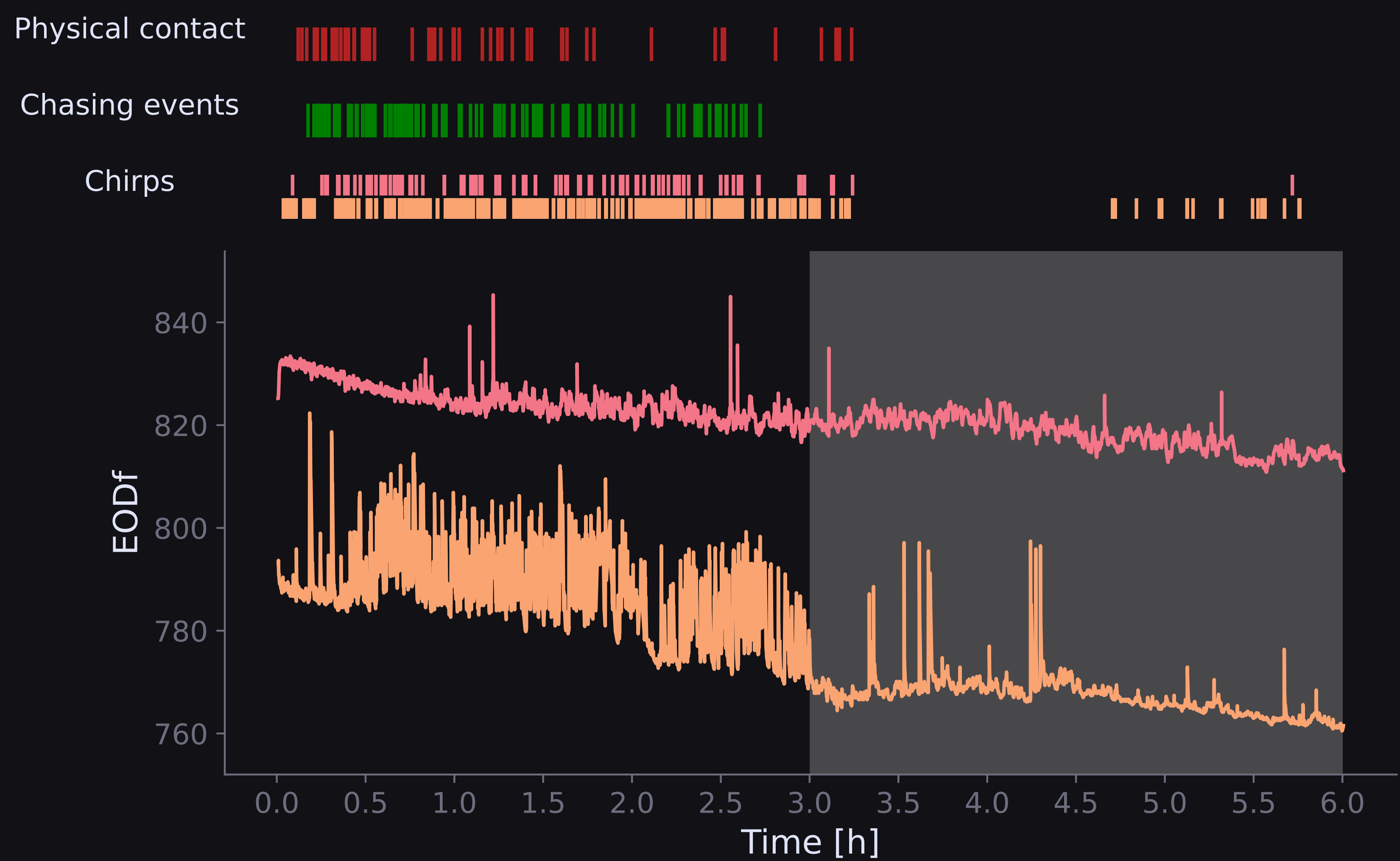
## Introduction

The time-frequency tradeoff makes reliable signal detection and simultaneous sender identification by simple Fourier decomposition in freely interacting weakly electric fish impossible. This profoundly limits our current understanding of chirps to experiments with single - or physically separated - individuals.

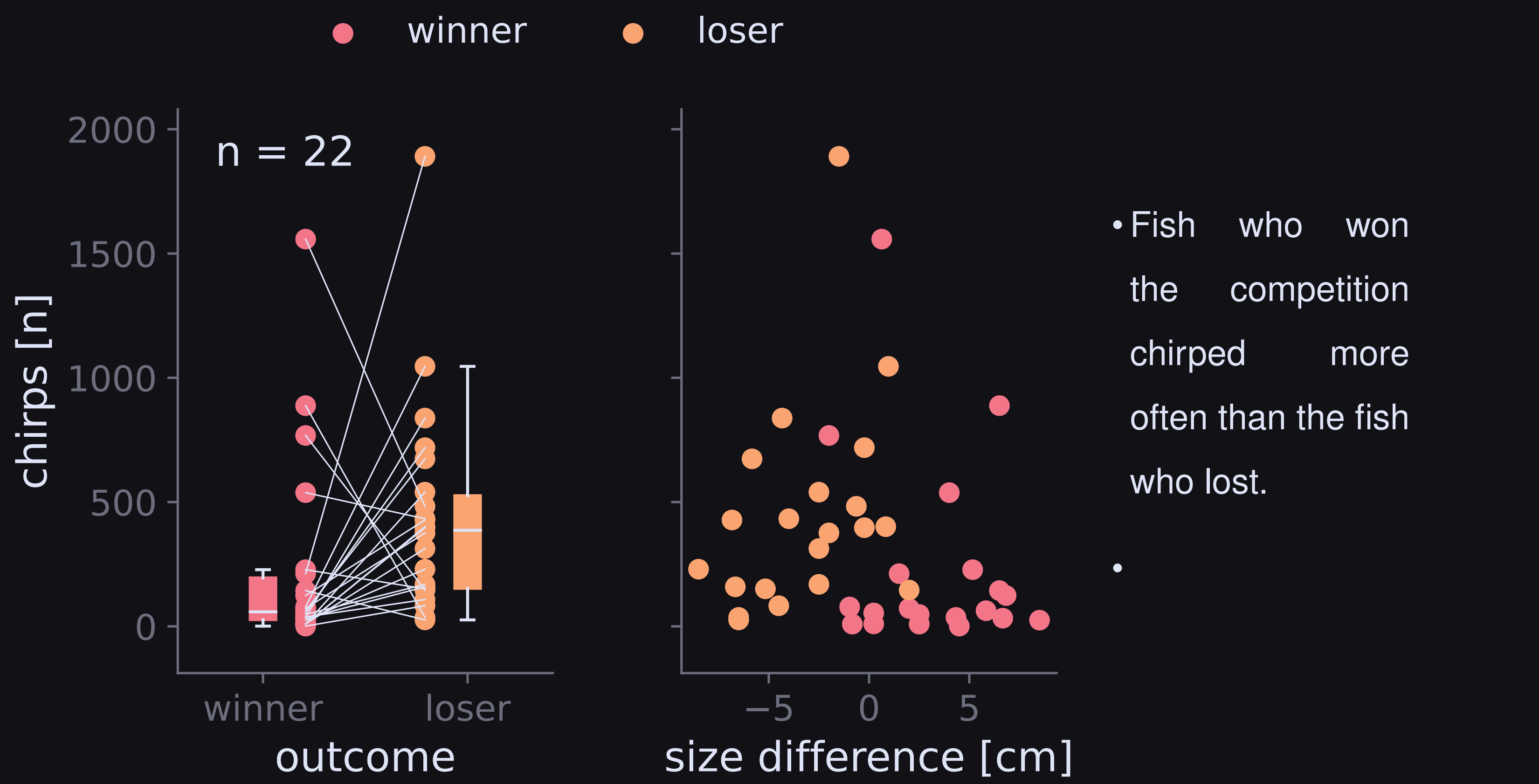
## Chirp detection



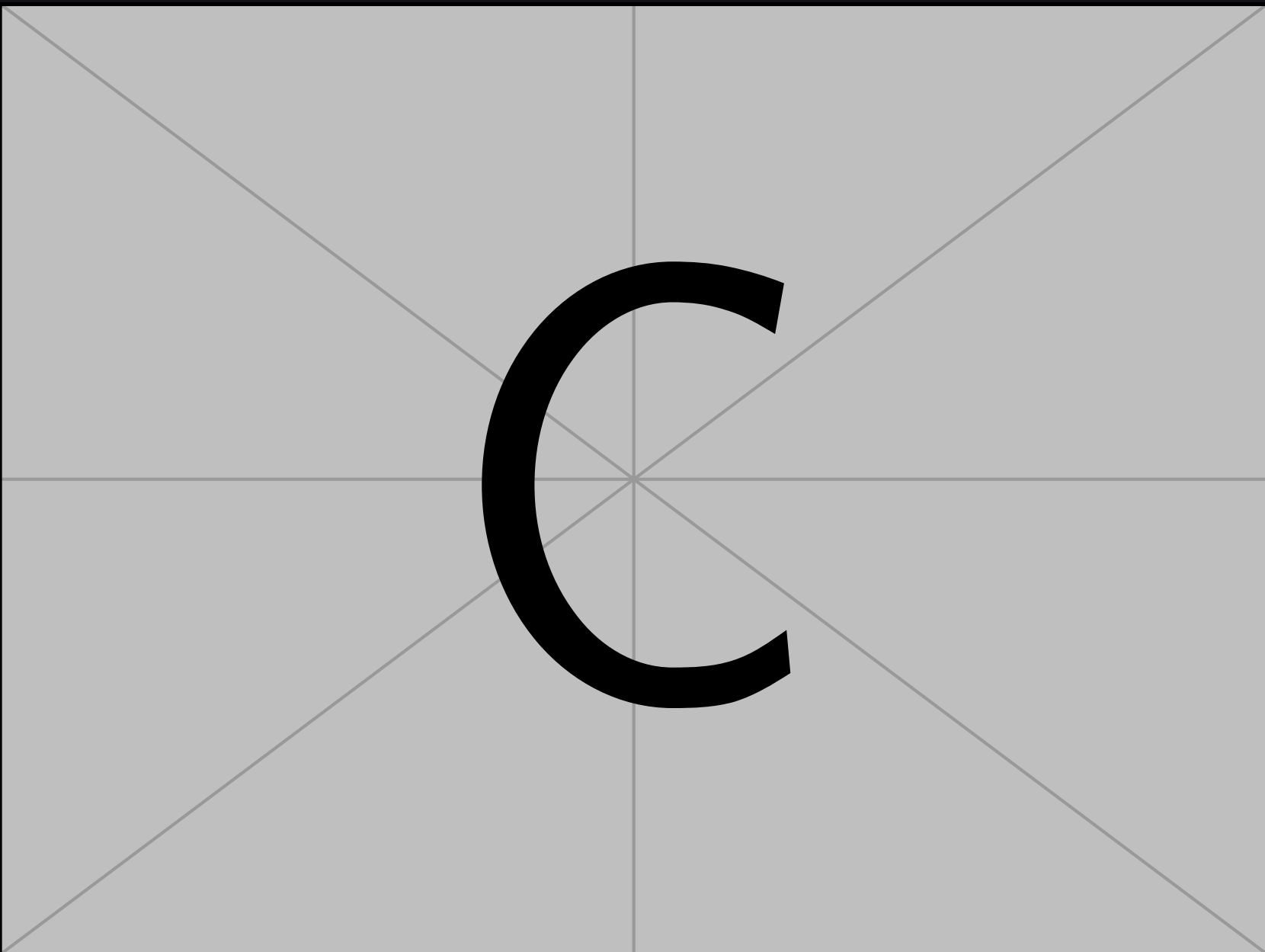
## Chirps during competition



- Two fish compete for one hiding place in one tank,
- Experiment had a 3 hour long darkphase and a 3 hour long light phase.



## Interactions at modulations



## 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 mod-