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Measurement of phase resetting curves using optogenetic barrage stimuli

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Highlights

- Optogenetic methods were adapted to measure phase resetting curves (PRCs).
- The PRCs yielded phase models that predicted inter-spike intervals.
- Optogenetic PRC estimation is potentially suitable for *in vivo* applications.

Abstract

Background: The phase resetting curve (PRC) is a primary measure of a rhythmically firing neuron's responses to synaptic input, quantifying the change in phase of the firing oscillation as a function of the input phase. PRCs provide information about whether neurons will synchronize due to synaptic coupling or shared input. However, PRC estimation has been limited to *in vitro* preparations where stable intracellular recordings can be obtained and background activity is minimal, and new methods are required for *in vivo* applications.

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