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Encoding of sensory stimuli by LFP spectra in cortical networks

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ABSTRACT OF THE TALK

To understand the rules of translation between the structure of sensory stimuli and the fluctuations of cortical responses, we simulated a sparsely-connected network of excitatory and inhibitory neurons modeling a local cortical population, and we determined how the LFPs generated by the network encode information about input stimuli.

We first considered simple static and periodic stimuli, and then naturalistic input stimuli based on electrophysiological recordings from the thalamus of anesthetized monkeys watching natural movie scenes. We found that the simulated network produced stimulus-related LFP changes which were in striking agreement with the LFPs obtained from primary visual cortex. The model cortical network processed dynamic stimuli with naturalistic temporal structure by using low and high response frequencies as independent communication channels, again in agreement with recent reports from visual cortex responses to naturalistic movies.