Aarhus MEG Special 2014

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The functional role of oscillatory phase in coding and communication

Abstract:

Invasive and noninvasive studies in humans under physiological and pathological conditions converged on the suggestion that neural oscillations implement cognitive processes such as sensory representations, attentional selection, and dynamical routing/gating of information. However, most MEG/EEG studies investigating oscillations analyze temporal modulations of oscillatory amplitude or power differences between experimental conditions while ignoring phase. In contrast, computational models and invasive recordings (mostly in animals) provide compelling evidence about the functional role of phase dynamics in perception and cognition. These studies suggest that temporal phase coding could be advantageous in fundamental operations such as object representation and categorization by implementing efficient winner-takes-all algorithms, by providing robust sensory representations in unreliable environments, by lending themselves to multiplexing and by gating information flow in large-scale brain networks. Here, I aim to present recent evidence that highlights the functional role of oscillatory phase in coding and communication.