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A predictive coding perspective on oscillatory travelling waves

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This talk presents a few studies that aim to interpret oscillatory travelling waves in the predictive coding framework. In the first part, I'll introduce a simple model of the visual cortex based on predictive coding mechanisms, in which physiological communication delays between levels generate alpha-band rhythms. Interestingly, these oscillations propagate as traveling waves across levels, both forward (during visual stimulation) and backward (during rest). Remarkably, experimental EEG data matched the predictions of our model. In the second part of the talk, I'll present two studies that indirectly investigate the link between predictive coding mechanisms and traveling waves experimentally: the first one investigates the effect of a powerful psychedelics drug, N,N, dimethyltryptamine (DMT), on alpha-band oscillations, and the second one interprets the pattern of oscillatory traveling waves in schizophrenic patients in the light of Predictive Coding. In the last part of the talk, I will show some preliminary results on a statistical learning paradigm that directly explores the link between traveling waves and predictive coding processes.

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