University of Zurich[UZH]

Department of Economics – Neuroeconomics Seminar

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Mapping of brain network dynamics at rest with EEG microstates

Brain states at rest can be defined in two fundamentally different time scales: slowly fluctuating coherent large-scale networks, as observed with functional MRI, and fast switching spatial patterns of global neural activity in sub-second time scale, observable with EEG. EEG studies focusing on the spatial pattern of the global scalp electric field have shown that these fields remain stable for time periods of about 100 ms and then rapidly switch to a new configuration within which they remain stable again. It is hypothesized that these short-lasting states (so-called microstates) represent subsequent time periods during which cooperating brain areas of large-scale networks are activated in a coordinated fashion. Each of these states represents a microstate of cognition so that cognitive processing evolves through a succession of such states. Consequently, changes in mental states are characterized by changes of the temporal syntax of the EEG microstates. The temporal variation of microstates could thus represent a sensitive biomarker for different mental diseases.