

Wavelet-based localization of oscillatory and synchronous sources in Brainstorm

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Brain Entropy in space and time (BEst) is a software toolbox dedicated to localizing the neural sources of electromagnetic activity recorded over the scalp. It implements an inverse problem solving technique based on the statistical entropy, called Maximum Entropy on the Mean (MEM, Amblard et al., 2004). In addition, BEst also implements time-frequency decomposition tools based on discrete and continuous wavelets. In conjunction with the MEM, these spectral decompositions are used to localize specifically neural sources of oscillatory activity (Lina et al., 2012) and also networks of synchronous sources (Zerouali et al., 2011).

BEst is distributed as part of BrainStorm software to facilitate analysis of physiological time series. This presentation emphasizes the main functionalities of the toolbox, illustrated with results from real data from a sleep protocol recorded in MEG. We localize the neural sources of sleep spindles using the MEM, then we show how time-frequency decompositions improve spatial accuracy of these reconstructions to provide better resolved images of the functional networks at play during sleep spindles.