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Self-similarity and multifractality in human brain activity: a wavelet-based analysis of scale-free brain dynamics[☆]

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Abstract

– **Background:** The temporal structure of macroscopic brain activity displays both oscillatory and scale-free dynamics. While the functional relevance of neural oscillations has been largely investigated, both the nature and the role of scale-free dynamics in brain processing have been disputed.

-New Method: Here, we offer a novel method to rigorously enrich the characterization of scale-free brain activity using a robust wavelet-based assessment of self-similarity and multifractality. For this, we analyzed human brain activity recorded with magnetoencephalography (MEG) while participants were at rest or performing a visual motion discrimination task.

–**Results:** First, we report consistent infraslow (from 0.1 to 1.5 Hz) scale-

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