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Scale-free correlations in the dynamics of a small ($N \sim 10000$) cortical network

Wednesday, 21 September 2022 09:00 (45 minutes)

The advent of novel opto-genetics technology allows the recording of brain activity with a resolution never seen before. The characterisation of these very large data sets offers new challenges as well as unique theory-testing opportunities. Here we discuss whether the spatial and temporal correlation of the collective activity of thousands of neurons are tangled as predicted by the theory of critical phenomena. The analysis shows that both the correlation length ξ and the correlation time τ scale as predicted as a function of the system size. With some peculiarities that we discuss, the analysis uncovers new evidence consistent with the view that the large scale brain cortical dynamics corresponds to critical phenomena.

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