

Complexity Science Group Seminar

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Science A 245

Noise focusing and the emergence of coherent activity in neuronal cultures

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Neuronal cultures provide an engaging model system to search for fundamental self-organization principles in non-equilibrium systems. A robust observation is that, at early stages of development, neuronal cultures spontaneously reach a coherent state of collective firing, where all the neurons appear to fire simultaneously in a pattern of nearly periodic bursts. In this talk I will show that these collective events are in fact controlled by the propagation of waves that nucleate randomly in a set of points that is specific to each culture and is selected by a non-trivial interplay between dynamics and topology. This phenomenon is explained by the noise focusing effect, i.e., a strong spatio-temporal localization of the noise dynamics that originates in the complex structure of avalanches of spontaneous activity.



Everyone is welcome!

