

Seminar of SFB 910



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“Asynchronous states in networks of randomly coupled oscillators”

Although many studies of coupled oscillators have focused on their synchronization, some systems of interest (the neural networks in the brain) remarkably show an asynchronous activity with nontrivial temporal correlations. The corresponding correlation functions are determined by a self-consistency condition. As I will discuss in my talk, in some cases (rotator network with random coupling coefficients) this self-consistency condition leads us to an explicit differential equation for the correlation function, in others (e.g. networks of spiking neurons) to an iterative scheme for the determination of power spectra. For the latter problem, an alternative approach is given by a multidimensional Fokker-Planck equation for the membrane potential that includes an arbitrarily correlated Gaussian noise via a Markovian embedding. I will show how to use the framework of such a Fokker-Planck equation for the open-loop problem of a colored-noise driven neuron and will also sketch the difficulties to 'close the loop'.

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