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*Non-Equilibrium Steady States for Networks of Oscillators*

Non-equilibrium steady states for chains of oscillators interacting with heat baths at different temperatures have been the subject of several studies. In this talk I will discuss how to generalize these results to multidimensional networks of oscillators. I will present conditions on the topology of the network and on the interaction potentials which imply the existence and uniqueness of the non-equilibrium steady state, as well as exponential convergence to it. The two main ingredients of the proof are (1) a controllability argument using Hörmander's bracket criterion and (2) a careful study of the high-energy dynamics which leads to a Lyapunov-type condition. I will also mention cases where the non-equilibrium steady state is not unique, and cases where its existence is an open problem. This is joint work with J.-P. Eckmann, M. Hairer and L. Rey-Bellet (arXiv:1712.09413).