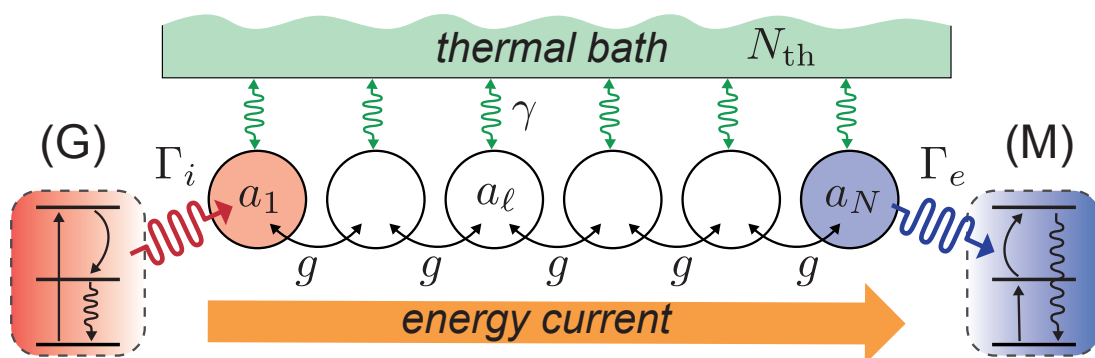




Microscopic energy transport and (quantum) PT-symmetry breaking

Prof. Dr. Peter Rabl

Atominstitut, TU Wien



In this talk I will address the topic of active energy transport in microscopic networks of coupled quantum machines. After a brief motivation, I will first discuss the energy exchange between a microscopic generator and a microscopic machine through a coherent oscillator network, as it can be realized with superconducting microwave circuits, arrays of micromechanical resonator, etc. Even in such a simple setting, a variety of unexpected transport phenomena can occur. Specifically, I will show that such networks generically exhibit a non-equilibrium phase transition between a noise-dominated and a coherent transport regime, which is closely related to the phenomenon of PT-symmetry breaking in classical balanced gain-loss systems. In the second part of the talk I will extend these ideas to large lattices of quantum spin systems with gain and loss. I will argue that this general behavior prevails even deep in the quantum regime and provides new insights on our understanding of non-equilibrium phase transitions in driven-dissipative spin systems and active quantum networks in general.