Prof. Dr. Volker Meden

RWTH Aachen

Coherence and incoherence in open quantum systems

To understand the coherence properties of small quantum systems coupled to reservoirs is one of the 'classic' challenges of many-body physics. We revisit this problem focussing on the problem of a single spin coupled to a bosonic reservoir. We show that this seemingly simple model, which is heavily used in distinct fields such as condensed matter physics, quantum optics, physical chemistry, and quantum information science, shows a surprisingly rich variety of different dynamical regimes and a rich structure of corresponding transitions. We e.g. identify a parameter regime in which raising temperature leads to 'more coherent' behavior and show that non-Markovian memory effects can play a prominent role.