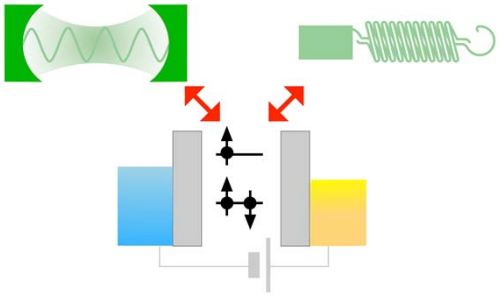
Physikalisches Kolloquium

Universität Konstanz

Di 29.10.19
15:15 Uhr
14:45 Uhr, Kaffee/Tee
R 513

Dr. Gianluca Rastelli
Universität Konstanz



Electron-vibration and electron-photon interaction in quantum dots: towards a mesoscopic QED

Quantum nanoscale conductors coupled to localized resonators such as microwave photon cavities or nanomechanical devices have become commonly studied systems. Quantum conductors show interesting and unique physics such as spin-dependent transport and nonlocal quantum correlations. Combining them with resonators adds a new dimension to cavity and circuit electrodynamics, beyond the usual paradigm of a single (artificial) atom coupled to a harmonic oscillator. They open the path to the exploration of the correlations between the charge transport and the nonequilibrium, eventually quantum, regime of the localized resonators. For example, electromechanical systems display a variety of interesting phenomena such as nonlinear dynamical effects induced by the electron transport or the crossover from classical to quantum behaviour of the resonator itself, a massive object formed by millions of atoms. As another example, I show that quantum dots can operate as electrically tunable single atom lasers when they are coupled to microwave cavities. Finally, I will present a few promising research directions and open challenges of this emerging field.