UNIKASSEL VERSITÄT

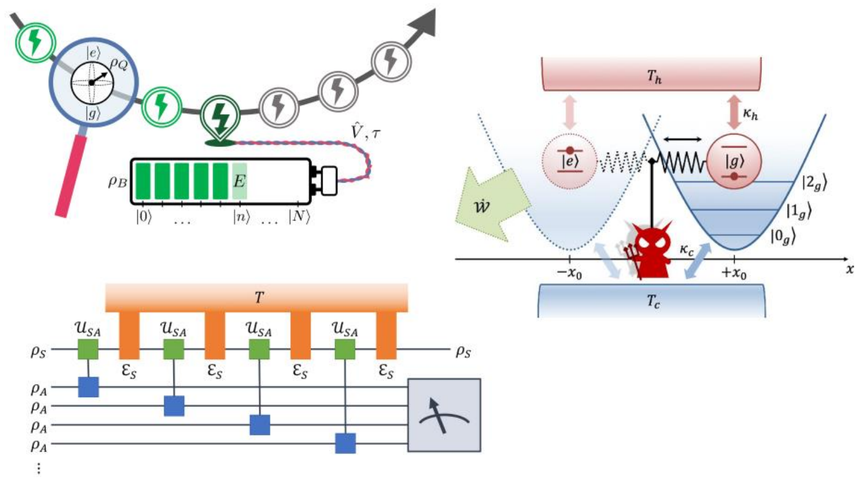
Physikalisches Kolloquium

Thursday, 23.06.2022, 16:15, HS 100
In presence

Prof. Dr. Stefan Nimmrichter, Universität Siegen:

Quantum Thermometers, Quantum Batteries, and lesser demons

Abstract
Quantum thermodynamics bridges the gap between statistical physics and quantum information theory, reformulating the laws of thermodynamics for small open quantum systems under external control and leading to quantum-enhanced thermal devices.
For example, a quantum thermometer that infers the temperature of a thermal reservoir by locally probing it through collisions with a fast sequence of qubits can achieve higher accuracy than a conventional equilibrium thermometer.
Quantum coherence can also result in improved performance of thermodynamic protocols extracting useful work from thermal resources. When storing work in a quantum battery, for instance, we can gain an advantage in the battery charging time if the work is stored in a quantum-coherent form.
Finally, quantum measurement-feedback channels can be used to design so-called Maxwell demon engines that extract work from heat via continuous observation of the working medium, e.g., with help of a pointer degree of freedom. Such a scheme alleviates Maxwell's demon paradox and incorporates Landauer's erasure principle in a self-contained model that can operate in temperature regimes where simple quantum Otto engines would fail.



All of you interested in physics are cordially invited!

Contact: Prof. Dr. Kilian Singer, Experimental Physics I, More Information: uni-kassel.de/go/physikalisches_kolloquium