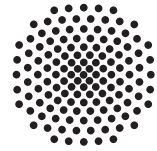


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Stuttgarter Physikalisches Kolloquium

Max-Planck-Institut für Festkörperforschung
Fachbereich Physik, Universität Stuttgart

Ansprechpartner: Dirk Manske
E-Mail: D.Manske@fkf.mpg.de
Telefon: 0711 689-1552



Hybrid

Login data will be announced by e-mail and on the colloquium webpage.

Dienstag, 23. Mai 2023

16.15 Uhr

Lecture Hall 2D5

Max-Planck-Institut für Festkörperforschung, Heisenbergstraße 1, 70569 Stuttgart-Büsnau

Quantum thermodynamics in superconducting circuits

Jukka Pekola

Aalto University, Helsinki, Finland

Abstract

Modern superconducting circuits form open quantum systems that are coupled to their environment. For qubits this coupling means unavoidable decoherence, which limits the current potential of quantum information processing. In our quantum thermodynamics experiments we investigate these phenomena in a quantitative way by coupling the quantum circuits to engineered heat baths. Besides fundamental interest, this approach allows us to develop different types of quantum thermodynamic devices like quantum heat valves and rectifiers, refrigerators and heat engines, quantum thermometers, and ultrasensitive calorimeters. In this talk I will describe our recent and on-going work in these directions. I will also discuss the concept of temperature in quantum circuits, potential quantum advantage of the devices, and the "boundary" separating the quantum circuits from the classical environment. Finally I try to give an outlook towards interesting future challenges.