

Einladung
 zum
Physikalischen Kolloquium
Montag, 30.04.2018
16:15 Uhr in N24/H13

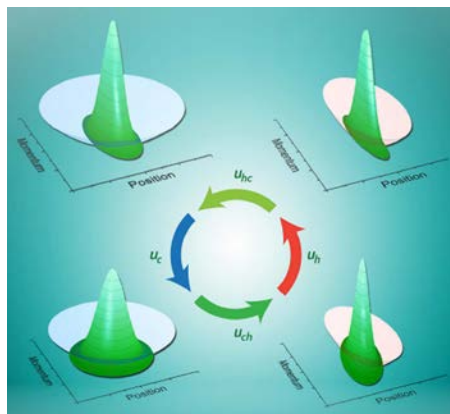


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 The Hebrew University, Israel

Thermodynamics of quantum devices

Quantum thermodynamics addresses the emergence of thermodynamical laws from quantum mechanics. The viewpoint advocated is based on the intimate connection of quantum thermodynamics with the theory of open quantum systems. Quantum mechanics inserts dynamics into thermodynamics giving a sound foundation to finite-time-thermodynamics. The emergence of the 0-law I-law II-law and III-law of thermodynamics from quantum considerations will be presented through examples. I will show that the 3-level laser is equivalent to Carnot engine. I will reverse the engine and obtain a quantum refrigerator. Different models of quantum refrigerators and their optimization will be discussed. A heat-driven refrigerator (absorption refrigerator) is compared to a power-driven refrigerator related to laser cooling. This will lead to a dynamical version of the III-law of thermodynamics limiting the rate of cooling when the absolute zero is approached. The thermodynamically equivalence of quantum engines in the quantum limit of small *action* will be discussed. I will address the question why we find heat exchangers and flywheels in quantum engines. I will present a molecular model of a heat rectifier and a heat pump in a non-Markovian and strong coupling regime. [1–10]

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 [2] A. Levy, R. Alicki, and R. Kosloff, Physical Review E **85**, 061126 (2012), URL <http://link.aps.org/doi/10.1103/PhysRevE.85.061126>.
 [3] R. Kosloff, Entropy **15**, 2100 (2013).
 [4] R. Kosloff and A. Levy, Annual Review of Physical Chemistry **65**, 365 (2014).
 [5] R. Uzdin and R. Kosloff, New Journal of Physics **16**, 095003 (2014).
 [6] R. Uzdin, A. Levy, and R. Kosloff, Phys. Rev. X **5**, 031044 (2015).
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 [9] A. Levy, L. Diósi, and R. Kosloff, Phys. Rev. A **93**, 052119 (2016), URL <http://link.aps.org/doi/10.1103/PhysRevA.93.052119>.
 [10] R. Kosloff and Y. Rezek, Entropy **19**, 136 (2017).



Ab 16.00 Uhr Kaffee, Tee und Kekse vor dem Hörsaal H13
Organisation: Prof. Dr. F. Jelezko, Tel. 23750
Host: Prof. Dr. J. Ankerhold, Tel. 22831, off.: 22830