

Seminar on Condensed Matter Theory

Group of Theoretical Physics at the Department of Condensed Matter Physics
of Charles University has a pleasure to invite you to attend the seminar

on 4 October 2018 at 14:00

at Faculty of Mathematics and Physics of Charles University, Ke Karlovu 5, 121 16 Praha 2

Lecture Hall F2



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Cycling Tames Power Fluctuations near Optimum Efficiency

joined with Nanoseminar (note different time and place)

According to the laws of thermodynamics, no heat engine can beat the efficiency of a Carnot cycle. This efficiency traditionally comes with vanishing power output and practical designs, optimized for power, generally achieve far less. Recently, various strategies to obtain Carnot's efficiency at large power were proposed. However, a thermodynamic uncertainty relation implies that steady-state heat engines can operate in this regime only at the cost of large fluctuations that render them immensely unreliable. Here, we demonstrate that this unfortunate trade-off can be overcome by designs operating cyclically under quasistatic conditions. The experimentally relevant yet exactly solvable model of an overdamped Brownian heat engine is used to illustrate the formal result. Our study highlights that work in cyclic heat engines and that in quasistatic ones are different stochastic processes.

V. Holubec and A. Ryabov, Phys. Rev. Lett. 121, 120601 (2018).

