

WIENER PHYSIKALISCHES KOLLOQUIUM

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Einladung zum Vortrag von

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Stochastic thermodynamics: From principles to the cost of precision

Stochastic thermodynamics provides a framework for describing a large class of small driven systems. Examples are colloidal particles in time-dependent optical traps, single bio-molecules manipulated by optical tweezers or AFM tips, and transport through quantum dots. Thermodynamic quantities like work heat and entropy production can be identified on the level of an individual stochastic trajectory. Their distributions obey integral and detailed fluctuation theorems ^[1]. In the talk, I will give an introduction to the basic concepts, show representative examples and close with two of our recent results concerning the minimal thermodynamic cost of (bio-molecular) processes. The first one deals with the cost of acquiring information in the context of bacterial sensing ^[2]. Second, we found a general thermodynamic uncertainty relation implying, inter alia, that for any isothermal process the product of its uncertainty and the free energy dissipated in it is larger than $2 k_B T$ ^[3].

[1] For a review: U.S, Rep. Prog. Phys. 75, 126001, 2012.

[2] A.C. Barato, D. Hartich, and U.S, New J. Phys. 16, 103024, 2014.

[3] A.C. Barato and U.S., Phys. Rev. Lett. 114, 158101, 2015.

7. Dezember, 2015, 17:30 hrs

(ab 17 Uhr Kaffee)

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