

DIESE WOCH

PHYSIKALISCHES KOLLOQUIUM

des Fachbereichs Physik
der Johann Wolfgang Goethe-Universität Frankfurt

Mittwoch, den 30.04.2014, 16 Uhr c.t.
Großer Hörsaal, Raum _0.111,
Max-von-Laue-Str. 1

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*„A quantum information perspective
on Maxwell's demon“*

Maxwell's demon is a hypothetical nanoscale device able to distinguish fast from slow gas molecules and (without noticeable energy expenditure) “sort” them into separate chambers of a vessel. This would create a temperature difference from which usable work could be extracted, in apparent defiance of the second law of thermodynamics. However, as shown by Bennett in the 1980s, the paradox can be resolved using information-theoretic arguments.

In this talk, I will review Bennett's reasoning from a modern quantum information-theoretic perspective. In the quantum regime, certain thermodynamic laws (while keeping their validity) take on a somewhat unexpected form. This, in turn, has consequences for Maxwell's demon. As an example, I will demonstrate that a quantum Maxwell's demon could indeed transform heat into usable work, but would consume entanglement in doing so.

Die Dozierenden der Physik

Kolloquium