

Eugene Wigner Colloquium

joint event of GRK 1558 and SFB 910



Dr. Gernot Schaller

Technische Universität Berlin

“Thermodynamics of quantum transport”

In recent years, significant progress in the control of quantum systems has been achieved, enabling for example the implementation of feedback control schemes. This has also brought old paradoxes like Maxwell’s demon back to current research. The thermodynamics of quantum transport enables an interpretation of multi-terminal quantum systems e.g. as thermoelectric generators that convert temperature gradients to electric power. Within a master equation formalism, the second law also manifests in the fluctuation theorem for entropy production, which can be nicely obtained from Full Counting Statistics of energy and particle exchanges. In extreme parameter regimes, certain multi-terminal devices may function similar to Maxwell’s demon, integrating an external feedback loop into a single device. Instead of invoking Landauer’s principle, the excess entropy production due to the demon can then be quantitatively determined in full consistency with the second law.

T. Brandes

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