"Thermophoretic forces on DNA measured with a single-molecule spring balance"

Oder: "Tauziehen mit Erbgut"

SPEAKER: Henrik Flyvbjerg (Department of Micro- and Nanotechnology, Technical University of Denmark, Copenhagen)

We stretch a single DNA molecule with thermophoretic forces and measure these forces with a spring balance: the DNA molecule itself. It is an entropic spring which we calibrate, using as a benchmark its Brownian motion in the nanochannel that contains and prestretches it. We find the Soret coefficient per unit length of DNA at various ionic strengths [1]. It agrees, with novel precision, with results obtained in bulk for DNA too short to shield itself and with the thermodynamic model of thermophoresis. If time permits, I will briefly describe two other applications of statistical mechanics to Mbp DNA-molecules in microfluidic environments, one for optical reading of their sequence [2], another for concentrating molecules [3].

REFS:

[1] J. N. Pedersen, C. J. Lüscher, R. Marie, L. H. Thamdrup, A. Kristensen, and H. Flyvbjerg.
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[2] J. N. Pedersen, R. Marie, A. Kristensen, and H. Flyvbjerg.
How to determine local stretching and tension in a flow-stretched DNA molecule
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[3] Y. Chen, E. S. Abrams, T. C. Boles, J. N. Pedersen, H. Flyvbjerg, R. H. Austin, and J. C. Sturm.
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