

[Talk 1] Anomalous diffusion in membranes and cytoplasm of biological cells

Ralf Metzler, University of Potsdam

A surging amount of experimental and simulations studies reveals persistent anomalous diffusion in both cellular membranes and the cytoplasm [1,2]. The anomalous diffusion is observed for micron-sized objects down to labelled single molecules such as green fluorescent proteins [3].

This talk will first present results from large scale computer simulations and stochastic analysis of the motion of lipids and embedded proteins in lipid bilayer model membranes [4], indicating that increased disorder leads to longer and longer lasting anomalous diffusion. In particular, the motion of lipids and proteins can become non-Gaussian [4]. In the membranes of living cells anomalous diffusion of embedded protein channels can last over several hundreds of seconds [5]. In particular, this anomalous diffusion can become non-ergodic and exhibit ageing, two topics explained and discussed in this talk [6].

The findings of anomalous diffusion in membranes will be complemented by a brief summary of anomalous diffusion in the cellular cytoplasm, referring to both subdiffusion of passive tracers and superdiffusion due to active motion in cells.

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