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Title: **Characteristic crossover anomalous dynamics: tempered memory vs stochastic resetting**

The diffusion processes that are characterised by a power-law dependence of the mean squared displacement (MSD) on time, i.e.,⟨x2(t)⟩ ∼tα, are referred to as anomalous. Depending on the values of the anomalous diffusion exponentα, one distinguishes the cases of subdiffusion for 0<α<1, normal diffusion for α= 1 and superdiffusion for α >1. Such anomalous transport has been observed in a variety of complex liquids, chaotic laminar flows, living biolog-ical cells, protein-crowded lipid bilayer membranes, porous inhomogeneous media, constrained comblike structures, etc. In this talk, several distinguished cases of anomalous diffusion will be addressed. One part of the talk will be dedicated to the recent findings on the anomalous diffusion modelled by continuous time random walk with long-tailed distribution of waiting times.Additionally, we will also consider processes governed by generalised Langevin equation with power-law correlations of the driving noise, as well as heterogeneous diffusion processes governed by Langevin equation with multiplicative noise. At sufficiently long times, the anomalous diffusion may turn to normal, or approach to a steady state with saturated MSD. The first realisation may occur when the system's temporal evolution exceeds some characteristic correlation time. We model this case by introducing tempered memory kernels [1] in the corresponding equations of motion and tempered fractional Gaussian noise, which is in fact a noise with Gaussian amplitude and power-law correlations having a cutoff at some mesoscopic time scale [2].The second realisation may occur due to a given stochastic resetting mechanism [3, 4, 5], resulting in a non-trivial transition dynamics to the non-equilibrium steady state, quantified in terms of a large deviation function. The latter defines the region within which the relaxation has been achieved, while outside of this region the system is still relaxing, i.e., is in transient state. Such transient anomalous diffusion was also found in heterogeneous media in which the diffusion coefficient depends on the particle position [6], including inhomogeneous diffusion processes [7], and geometric Brownian motion [8].

References:

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