

Scale-invariant Markov processes in non-homogeneous and non-stationary media

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We give a short review of the recent results obtained on stochastic processes with space and time dependent diffusivities. In the first part of the talk the properties of heterogeneous diffusion process with space-dependent diffusivity of a power-law form $D(x) \sim |x|^\alpha$ are considered. In the second part we discuss the properties of scaled Brownian motion with time-dependent diffusivity $D(t) \sim t^\alpha$. For both processes we study correlation properties, non-ergodic behavior and behavior in a confinement. We also study how ergodicity is violated in granular gases, and disclose similarities and dissimilarities in their non-ergodic behavior in comparison with scaled Brownian motion.

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