

Doubly stochastic continuous time random walk

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Since its introduction some 60 years ago, the Montroll-Weiss continuous time random walk has found numerous applications due its ease of use and ability to describe both regular and anomalous diffusion. Yet, despite its broad applicability and generality, the model cannot account for effects coming from random diffusivity fluctuations, which have been observed in the motion of asset prices and molecules. In this talk, I will introduce a doubly stochastic version of the continuous time random walk in which waiting times between jumps are replaced with a fluctuating jump rate. I will show that this newly added layer of randomness gives rise to a rich phenomenology while keeping the model fully tractable. The general properties of the model will be explored and illustrated with examples, showing that it provides an alternative pathway to Brownian yet non-Gaussian diffusion.

