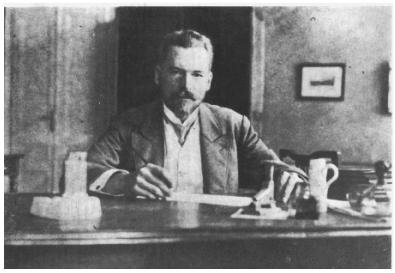

Contribution ID: **10** Type: **Poster**

Random walks in correlated diffusivity landscapes

Sunday, September 18, 2022 5:15 PM (3 minutes)

The probability density function (PDF) of the displacement of particles moving in strongly disordered diffusivity landscapes shows an unusual way of convergence to a Gaussian under homogenization[1]. Namely, at finite times the PDF exhibits a sharp central peak, and the convergence to a Gaussian follows not by smoothing of the PDF but by narrowing of this central peak, which stays sharp even at long times. This particular feature is absent in all pre-averaged (mean field) approaches. In our poster we discuss this situation, and present the results of new numerical simulations of random walks on lattices with correlated waiting times on the sites. We show that the existence of the central peak is connected with strong correlations between the spatial and temporal aspects of walks on such landscapes, and that decoupling these correlations leads to a mean-field-like behavior without central peak. The correlations in waiting times along the trajectory of a walk alone (as taken into account in the diffusing-diffusivity type of models) are not able to reproduce the behavior. This understanding is important for building a mathematical model which could be able to describe the above mentioned features.

1. Adrian Pacheco-Pozo, Igor M Sokolov, Convergence to a Gaussian by narrowing of central peak in Brownian yet non-Gaussian diffusion in disordered environments, PRL 127 120601 (2021)

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