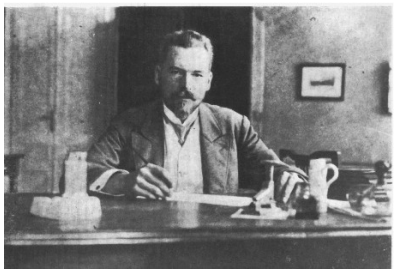

Contribution ID: **30** Type: **Invited talk**

Extreme robustness of subdiffusion as described by a generalized Langevin equation.

Wednesday, 18 September 2024 10:00 (40 minutes)

More than a decade ago, I. Goychuk reported on a universal behavior of subdiffusive motion (as described by the generalized Langevin equation) in a one-dimensional bounded periodic potential [1], where the numerical findings show that the long-time behavior of the mean squared displacement is not influenced by the potential, so that the behavior in the potential, under homogenization, is the same as in its absence. This property may break down if the potential is unbounded.

Motivated by biophysical prblems, we discuss spread of subdiffusive particles in domains with solid impenetrable walls which however do not fully constraint the particle motion. Two situations are considered so far: arrays of solid obstacles, and channels of different shapes.

The discussion of periodic arrays of solid obstacles [2] reveals that the universal subdiffusive behavior at long times is not influenced by the presence of solid scatterers, whose presence influences the behavior at intermediate times only. Similarly, the simulation of subdiffusion in channels of indefinite length in x-direction of varying width, and in channels with sinusoidal midline shows that the subdiffusion in x-direction is not affected by constraints put by the channel [3], in spite of the fact that the midline of a channel might be much longer than the displacement in x-direction. The same behavior is seen in a holonomic model of a bead on a sinusoidal and more strongly meandering wires, where some analytic insights are possible.

[1] I. Goychuk, Viscoelastic subdiffusion: From anomalous to normal, Phys. Rev. E 80 046125 (2009)
[2] E.B. Postnikov, I.M. Sokolov, Subdiffusion in an array of solid obstacles, J. Phys. A: Math. Theor. 57 055002
[3] E.B. Postnikov, I.M. Sokolov, Generalized Langevin subdiffusion in channels: The bath always wins!, submitted

Primary author: SOKOLOV, Igor (Humbold University at Berlin)

Presenter: SOKOLOV, Igor (Humbold University at Berlin)

Session Classification: Session 7