COLLOQUIUM

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A Few "Paradoxes" of Lévy Flights From a Physicist's Point of View

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A405 Wells Hall
10:20 a.m. - 11:10 a.m.
Refreshments: 10:00 a.m.

Abstract

Alpha-stable Lévy motion, also referred to in physics literature as Lévy flights, stand for a class of non-Gaussian Markovian random processes whose stationary increments are distributed according to the Lévy stable probability distributions. Lévy stable laws appear as statistical description for a broad class of processes in physical chemical, biological, geophysical, or financial contexts, among others. However, despite their popularity and numerous applications, Lévy flights are far from being well understood. Here I review the properties of Lévy flights, with the particular emphasis on the first passage time and overshooting, as well as the behavior of Lévy flights in external fields, including escape from a potential well and the "Lévy ratchet". These properties are discussed on the basis of probabilistic approach, analytical and numerical solutions of space-fractional Fokker-Planck equation as well as numerical solutions of the stochastic Langevin equations with white Lévy noise.

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