Fractional diffusion by Levy stochastic motion of charged particles in the presence of a magnetic field[1] SARA MORADI, Fluid and Plasma Dynamics, Université Libre de Bruxelles, 1050-Brussels, Belgium, DIEGO DEL-CASTILLO NEGRETE, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831-8071, USA — The motion of charged particles in the presence of alpha-stable Levy noise in a constant external magnetic field and linear friction is studied via Monte Carlo numerical simulations. The Levy noise is introduced to model the effect of non-local transport due to fractional diffusion in velocity space. The statistical properties of the velocity moments and energy for various values of the Levy index α are investigated. Of particular interest is the study of the resulting non-Maxwellian particle distribution functions and their dependence on alpha, the magnetic field amplitude, and the friction. We also explore the role of asymmetric Levy noise, the interplay of regular and fractional diffusion, and compute the statistical moments of displacements.

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