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Brownian motion of particle in a gas with non-equilibrium distribution function SERGEY MAIOROV, ALEXANDER IGNATOV, A.M. Prokhorov General Physics Institute, Russian Academy of Sciences, Moscow, SERGEY TRIGGER, Joint Institute for High Temperatures, Russian Academy of Sciences, Moscow, PITER SCHRAM, Eindhoven University of Technology, Eindhoven — In dusty plasma usually one supposes, that the macroparticle is in equilibrium with atoms of the surrounding gas. In the present work the kinetic characteristics of Brownian particle are found by the molecular dynamic simulations. We consider the three-dimensional diffusion with the specific behavior of the distribution function of the "bath." We use for calculations the non-equlibrium distribution function of atom on velocities:

$$f_{atom}(V) = (1-\alpha)V^2 \exp(-V^2/2) + \alpha V^2/(1+V^{2+n}),$$

Here V – atom velocity, α - part of non-equilibrium "long tail" Earlier the case of Brownian motion of macroparticle in perfect gas has been considered. The influence of the "long tail" of atomic distribution function has been neglected. The results of numerical simulation of Brownian motion of charged macroparticle in constant electric field are considered.

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