Dynamics of single Janus particles in a dc glow discharge under the action of laser radiation

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Active Brownian motion is of great interest to both biologists and physicists. While Brownian particles are in thermal equilibrium with the environment, active Brownian particles are capable of absorbing energy and transforming it into directed motion, which in turn takes them out of equilibrium [1]. The results of an experimental study of the nature of the motion of a single Janus particle under the action of laser radiation of various powers in a dc glow discharge are presented. Janus particles are polymer particles with a partial metal coating. A solitary macroparticle was injected into a stratified direct current glow discharge where, as a result of the balance of electric force and gravity, its levitation was observed. As a result of the analysis of the graphs of the rms displacement of the particle and the dependence of the kinetic energy on the power density of the laser radiation, it was concluded that a change in the power of the acting laser beam leads to a change in the nature of the motion of a single Janus particle in a dc glow discharge. We have experimentally observed active Brownian motion of a single Janus particle [2], caused by the action of a thermophoretic force, at various intensities of laser radiation.

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[1] Ebbens S J and Howse J R 2010 *Soft Matter* **6** 726–738
[2] Bechinger C, Leonardo R D, Löwen H, Reichhardt C, Volpe G and Volpe G 2016 *Rev Mod Phys* **88**