FRACTAL BROWNIAN MOTION OF PARTICLES IN COLLOIDAL PLASMA

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We analyzed experimentally obtained data on the motion of a single colloidal particle in a trap in the near-electrode layer of RF discharge plasma. The experiment was carried out with colloidal particles of three types: uncoated melamine-formaldehyde particles, melamine-formaldehyde particles with a thin copper coating and Janus particles partially coated with iron. The grains were exposed to a flat wide laser beam, allowing them to be visualized and their kinetic energy to change. To analyze the motion of the particles, the functions of their mean first-passage time dynamic entropy were built, the localization area of particles and the fractal dimension of their trajectories were found. The results obtained testify to the significant difference between colloids of different types, as well as to the evolution of their motion with a change in kinetic energy. It is shown that the fractal dimension of trajectories of particles of all types is fractional and decreases with an increase in their kinetic energy.