FORMATION AND DYNAMICS OF ACTIVE BROWNIAN PARTICLES IN GAS-DISCHARGE PLASMA

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The ability to convert external energy into directed motion is characteristic for thermodynamically non-equilibrium systems, called active systems [1]. One of the most widely spread active systems in the nature is a dust plasma containing charged micro- and nanoparticles. In a gas-discharge plasma, such systems of active Brownian particles can exchange energy and matter with the surrounding medium. A characteristic property of metal-coated microparticles is their modification in the plasma volume [2]. When in a gas-discharge plasma, such particles can absorb incoming external radiation and get into active motion [3].

Experimentally studied the plasma-dust structure in a gas-discharge tube with a multi-metal composite cathode (copper, nickel and aluminium). The study of dusty plasma in a DC glow discharge found the formation of active dust particles in the cloud layers formed by electrode erosion. Changes in the gas discharge parameters occurring under constant conditions and caused by the appearance (synthesis) of new active particles as a result of electrode erosion were studied both for each cathode material and for the simultaneous combination of three metals. The dependence of the dispersity and the condensation rate of the active particles on the cathode material used was found.

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