# Formation of active Brownian particle systems in DC glow discharge plasma

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Open dissipative systems far from equilibrium are the object of study of various processes, including self-organisation and evolution [1]. One of the examples of such systems is the system of active Brownian particles in gas-discharge plasma, which can transfer energy and matter to the medium [2, 3].
The formation of active Brownian particles in the plasma of a glow DC discharge has been studied experimentally. The possibility of synthesis of particles from different materials (copper, nickel and aluminium) of the sputtering cathode was shown. The dependence of particle characteristics on the parameters of their formation in the gas-discharge tube has been found. The mechanisms of particle synthesis varied in the volume of the setup. Samples of synthesised particles were found in different parts of the experimental system, which is characteristic in the case of metal ion transport and agglomeration mechanism. Based on SEM microscopy and EDS analysis techniques, the properties of the synthesised particles were studied. The synthesised metal particles, able to convert the laser energy into their own motion, were active Brownian and formed extended dust structures in the positive column of a glow DC discharge.

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