

3D-DYNAMICS OF ACTIVE PARTICLES IN A CCP DISCHARGE

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This work is devoted to the dynamics of active particles and its diagnostics in a low-pressure RF discharge plasma. The work consisted in mastering the methods of three-dimensional diagnostics, obtaining Janus particles and analyzing their motion and active properties. The active properties of both a single particle levitating in the near-electrode region of the discharge and a quasi-two-dimensional particle structure were studied. The particles were observed using two calibrated cameras (stereopair). Reconstruction of three-dimensional coordinates of particles was carried out by the method of "reference" points. On the basis of the obtained particle trajectories, the dependencies of kinetic energy on laser power, root-mean-square displacement on time, and patterns of three-dimensional motion were analyzed. In addition, the relationship of vertical particle oscillations with pressure fluctuations in the gas discharge chamber was revealed.