# Microparticle heating in cryogenic gas-discharge plasma

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The electric discharge with microparticles is an effective tool for creating the necessary concentration of cold ions [1]. Therefore, information about microparticle surface temperature is necessary for the organization of effective ion-plasma reactions involving microparticles at cryogenic temperatures. In this paper, a numerical analysis of the heating of microparticles in neon glow discharge at a temperature of 77 K is carried out [2]. The temperature of microparticles is determined by the balance of heating of its surface by the flow of kinetic energy of ions and electrons, the energy of electron-ion pair recombination, the release of energy during quenching of metastable atoms, and the cooling flow of heat carried away by neutral gas atoms [3, 4]. It was found that the temperature of the microparticles exceeds the temperature of the surrounding gas. The relationship between the surface temperature of a microparticle and its coordination inside the cloud and the concentration of microparticles is revealed. It is shown that the heating of microparticles at the periphery of the cloud can be higher than in the center of the cloud, decreases with increasing concentration of microparticles, and in denser clouds the temperature profile of microparticles evens out.

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