CHARGING OF DUST PARTICLES SUBJECTED TO THE ACTION OF AN ELECTRON BEAM

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Atheoryisdevelopedwhichdescribestheprocessesofdustparticlechargininthesituation when dust particles are subjected to the action of a beam of electrons. It is shown that in this situation it is necessary to take into account the electron field emission in addition to the influence of the electron beam on the dust particle. We calculate the current of the electron field emission modified by theSchottky effect and find the steady-state dust particle charge. We show that in the situation considered the electrostatic energy of the dust particle is much smaller than the electron energy in the beam. We apply our results to the description of the experimental data [1] on anomalously high values of dust particle charges under the action on the dusts of a beam of electrons with characteristic energy of 25 keV.

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References

[1] M. N. Vasil’ev, N. A. Vorona, A. V. Gavrikov, O. F. Petrov, V. S. Sidorov, V. E. Fortov, Techn. Phys. Lett., 2010, **36**, 1143.