

# **ABNORMAL KINETIC TEMPERATURE OF CHARGED DUST PARTICLES IN PLASMAS**

Norman G.E., Stegailov V.V., Timofeev A.V.

*Joint Institute for High Temperatures RAS, 13 bld. 2, Izhorskaya st., Moscow, 125412 Russia*

A mechanism of the increase of the average kinetic energy of charged dust particles in gas discharge plasmas is suggested. Particle charge fluctuation is the reason for the appearance of forced resonance, which heats vertical oscillations. The energy transfer from vertical oscillations to the horizontal ones is based on the parametric resonance. It arises because of the overlapping of the eigenfrequency range of the horizontal oscillations in a dust particle cluster with the eigenfrequency range of particle vertical oscillations in near-electrode plasmas. The combination of the parametric resonance and the forced resonance explains the high kinetic temperature of dust particles. The theoretical assumptions are confirmed by simulation of dust particles motion in the near-electrode layer plasma of gas discharge. The estimated frequency, amplitude and kinetic energy are close to the experimental values.