

Effect of Joule Heating on Orientation of Spheroidal Particle in Alternating Electric Field

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We study the change of orientation of a spheroidal particle immersed into a host medium under the action of an alternating external electric field. It is assumed that the particle and the host medium have different electric conductivities. We show that the rate of Joule heating of the particle depends upon the orientation of its axis of symmetry with respect to the direction of the electric field. If electric conductivity of particle strongly varies with temperature, the Joule heating of the particle affects orientation dynamics and results in the appearance of the new equilibrium orientations. We investigate the dependence of the dynamics of particle rotation and the direction of the equilibrium orientation on the frequency of the electric field.