COMPUTATION OF ELECTROMAGNETIC FIELD IN DISPERSE NONSPHERICAL PARTICLES WITH OPTICAL INHOMOGENEOUS

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In this work we consider the systems of nonspherical particles with optical inhomogeneity being in the external electromagnetic field. We consider a single particle, two-layered particle, multiple-layered particle, a system of two particles and system of N particles where N can take on any natural number. Our purpose is to receive the formulas of vectors of electric and magnetic fields distributed inside particles.

For solving of the problem of electromagnetic field interaction with particles we use the Huygens-Poincare principle. Each particle we consider must satisfy follows smoothness conditions on their surface:

1. There must exist a point inside *S* such that if this point is chosen as the origin of a spherical coordinate system, the radius *r* to a point on *S* is continuous function $r(\theta,\varphi)$ of the spherical angles θ and φ.
2. *S* must be "peace smooth" to satisfy the requirements for Gauss's theorem.

From analisis of derived solutions we have also that some kind of function of the relative dielectic permeability of coordinate of the particle $\varepsilon(r)$ can lead to more homogenious distribution of field inside the particle or in some part of it. Such homogenious can also exist in some part of particle in case when the complex part of $\varepsilon(r)$ is less than zero. Changing fundamental functions which are the terms of series in which filds are expanded leads also to changing the resonances positions in comparison with case for homogenious particle.

This developed approach in some cases can be generilized to particles with relative dielectic permeability depending on values of the field (non-linear system case). It can be achieved using asimptotical methods in case of weak non-linearity and also in cases when we can obtain an exact solutions for corresponding spherical particle. Such solutions can be obtained, for example, when inside the particle we put $\varepsilon=0$. This condition lets us obtain the solution for non-linear Helmholtz's equation and it is an additional condition for components of electric field vector.