MODELING OF INTERACTION OF ELECTROMAGNETIC WAVES WITH SMALL NON-SPHERICAL PARTICLES HAVING FRACTAL SURFACE

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This article is devoted to the conceptual idea of calculation of internal electromagnetic field of non-spherical particles being under influence of external field whose surface is Brownian and whose relative dielectric permittivity depends on the coordinate of their radius.

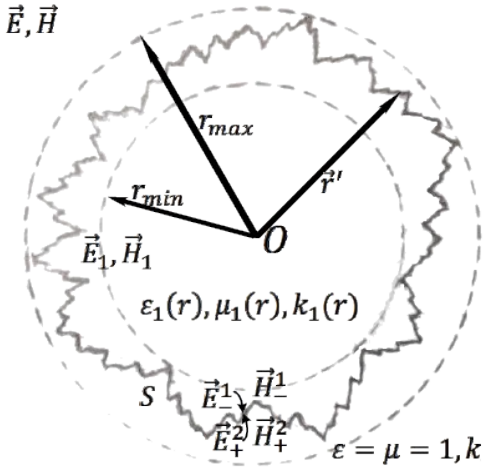

Figure. Geometry for particle having Brownian surface and its electromagnetic characteristics. $\vec{E},\vec{H}$ are the vectors of electric and magnetic field, ε,μ are relative dielectric and magnetic permeability respectively being constant for external medium and equal there 1 and variable for particle, k is a wave number in vacuum and $k=2\pi/\lambda$, where λ is a wavelength of incident field. The same variables for particle have index "1". The wave number in the particle is a function depending on the coordinate of radius, $\hat{n}$ is a vector of normal on S.

The vectors of interior electric and magnetic fields are expressed in the next forms:

$$\vec{E}_1(\vec{r})=\sum_n a_n\vec{\Psi}_n(k_0\vec{r}), \quad (1)$$

$$\vec{H}_1(\vec{r})=\left(ik\mu(\vec{r})\right)^{-1}\nabla\times\vec{E}_1(\vec{r}), r\le r_{min} \quad (2)$$

References

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