

# THE REMOTE SENSING IN LOW ATMOSPHERE COMPLICATED BY THE NANOPARTICLES SYSTEMS

L. Uvarova<sup>\*a</sup> T. Kazarova<sup>a b</sup> I. Krivenko<sup>c</sup> A. Ivannikov<sup>c</sup>

<sup>c</sup> Tver State Technical University, Thermophysics, 22 Afanasii Nikitin embankment, 170026, Tver, Russian Federation

<sup>a</sup> Moscow State University of Technology "STANKIN", Applied Mathematics, 3a Vadkovskii lane, 127994, Moscow, Russian Federation

<sup>b</sup> Moscow State University of Technology "STANKIN", philosophy, 3a Vadkovskii lane, 127994, Moscow, Russian Federation

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## **ABSTRACT:**

It is well known that the problem of a scattering on the aerosols of different diameters and matters arises at the low remote sensing of objects above cities and industrial businesses. Really the effects of dust, smoke and other aerosol particles take a place due to their high concentration. The development of nanotechnologies carries out to the necessity to take the fact of nanoparticles emissions into account at the low remote sensing. The scientific discussions about comparable properties of nanoparticles and large molecules take a place. For example, in work [J.F. Mora. // European Aerosol Conference, 2009] it is shown that many properties of nanoparticles are close to ones of large molecules. Therefore a nanoparticles scattering of electromagnetic waves affects on the remote sensing just as a scattering on large molecules. In this work we considered the scattering and the dispersion of electromagnetic waves by nanoparticles of spherical and cylindrical forms. In general case we considered non- homogenous particles and electromagnetic wave of different frequency. The solutions were carried in bi- spherical and bi- cylindrical coordinate systems that allowed consider the collective of nanoparticles too. The dielectric permittivity of such complex structures may be both positive and negative value. The received results allow determine the temperature profile in nanoparticles and structure of the heat halos near of nanoparticles and their collectives. The structures of the heat halos depend on the dielectric permittivity and wave number substantially. For example, for two non- homogenous cylinders: in case of the positive dielectric permittivity the halo has the form thread near of each cylinder and in case of negative dielectric permittivity it has the form plateau. The percentage of a surviving of information at a few reflections in such systems is investigated too. For this goal we use the modeling with the help the Markovian process.

**TOPIC:** Microwave remote sensing

**ALTERNATIVE TOPIC:** Lidar and laser scanning