

Interaction of Stationary Nonspherical Interplanetary Dust Particle with Solar Electromagnetic Radiation

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Interplanetary dust particles are different in size, chemical composition, shape and physical-optical properties. The light scattering by such particles predetermines changes of their motion in the space. This fact is expressed by well-known radiation pressure, which was notoriously based on spherical target assumption. The only forward and backward scattering efficiencies are important in this case. However, any irregularity of the particle shape will produce certain momentum in perpendicular projections to the direction of light propagation. This may be caused also by inhomogeneity of particle chemical composition (or particle density). Particle shape specificity (unconcavities, cavities,...) plays dominant role in formation of light scattering diagram.

Numerical results of the interaction of solar electromagnetic radiation with stationary nonspherical small interplanetary dust particle are presented. Rapid rotation of the particle about defined axis of rotation is considered. The interaction significantly differs from the interaction between spherical particle and electromagnetic radiation. The importance of the results in application to Solar System is presented in our second contribution.