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### **Dusty plasma energy conversion processes in Earth's atmosphere and lunar exosphere**

Energy conversion processes are considered in dusty plasmas of Earth's atmosphere and lunar exosphere. Emphasis is given to the problem of formation of dusty plasmas in the Earth's ionosphere at 80–120 km altitudes during high-speed meteor showers and that of dusty plasmas over the illuminated part of the lunar surface. Conversion of mechanical, gravitational, electrostatic, and chemical energy is considered for the situations of generation of low-frequency (~50 Hz) ionospheric radio noise, of infrasonic waves, of amplification of the intensity of green radiation at 557.7 nm from a layer at 110 to 120 km altitude in the lower ionosphere, for charged dust particle rise from the lunar surface, etc. Models of the dusty plasmas are presented. In particular, the model of dusty plasmas over the illuminated part of the moon takes account of the observation point location and the effects of production of photoelectrons at the surface of the moon and dust particles, the dynamics of dust particles in the electric and gravitational fields, and the charging of dust particles through their interaction with the solar radiation photons, the solar wind electrons and ions, photoelectrons, etc. The properties of the dusty plasmas are discussed from the viewpoint of ionospheric research and future lunar spacecraft missions.

### **Biography**

Dr. Sergey I. Kopnin graduated with honours from the Moscow Institute of Physics and Technology in 2005 and defended his PhD thesis at the same Institute in 2008. At present, he is a senior research scientist at the Space Research Institute of the Russian Academy of Sciences, deputy dean and associate professor at the Moscow Institute of Physics and Technology. He is an expert in the fields of dusty plasma physics and physics of atmosphere. He was awarded with fellowships of the Dynasty Foundation, grant of the President of the Russian Federation for young scientists, as well as Prize of International Academic Publishing Company "Nauka/Interperiodica" for the best publication in the journals published by the Company

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Prof. Dr. Sergey I. Popel graduated with honours from the Moscow Institute of Physics and Technology (MIPT) in 1988. He defended his PhD thesis at MIPT in 1991 and DSc thesis at the General Physics Institute of the Russian Academy of Sciences in 1998. At present, he is a head of laboratory at the Space Research Institute of the Russian Academy of Sciences and full professor at the Moscow Institute of Physics and Technology. He is an expert in the fields of plasma physics and chemistry, planetary sciences, nano- and microscale objects in nature, self-organization, etc. He was awarded with Humboldt fellowship (Germany), awards of the Moscow Government and the Dynasty Foundation, Prize of International Academic Publishing Company "Nauka/Interperiodica" for the best publication in the journals published by the Company, Yu. A. Gagarin Medal of the Federation of Cosmonautics of Russia for services to cosmonautics, etc.

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