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Linear waves in the near-surface plasma layer of the illuminated part of the Moon[1] TATIANA MOROZOVA, SERGEY POPEL, Moscow Institute of Physics and Technology, MOSCOW INSTITUTE OF PHYSICS AND TECHNOLOGY COLLABORATION, SPACE RESEARCH INSTITUTE, RUSSIAN ACADEMY OF SCIENCES COLLABORATION — A dusty plasma system in the near-surface layer of the illuminated part of the Moon is described. The system involves photoelectrons, solar-wind electrons and ions, neutrals, and charged dust grains. Linear waves in the plasma near the Moon's surface are discussed. It is noticed that the velocity distribution of photoelectrons can be represented as a superposition of two distribution functions characterized by different electron temperatures: lower energy electrons are knocked out of lunar regolith by photons with energies close to the work function of regolith, whereas higher energy electrons are knocked out by photons corresponding to the peak at 10.2 eV in the solar radiation spectrum. The anisotropy of the electron velocity distribution function is distorted due to the solar wind motion with respect to photoelectrons and dust grains, which leads to the development of instability and excitation of high-frequency oscillations with frequencies in the range of Langmuir and electromagnetic waves. In addition, dust acoustic waves can be excited. A possibility of the dust-acoustic instability development due to the interaction of Earth's magnetosphere tail plasma and the dusty plasma in the near-surface layer of the illuminated part of the Moon is discussed. This work was supported in part by the Presidium of the Russian Academy of Sciences (under Fundamental Research Program no. 9, "Experimental and Theoretical Study of the Solar System and Stellar Planet Systems") and the Russian Foundation for Basic Research (project no. 15-02-05627-a).

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