

Dust moving analyser above surface for Luna missions

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1. Introduction

One of the complicating factors of the future lunar landing missions is the influence of the dust. Meteorites bombardment has accompanied by shock-explosive phenomena, disintegration and mix of the lunar soil in depth and on area simultaneously. As a consequence, the lunar soil has undergone physical and chemical transformations, melting, sintering and seal.

The absence of an atmosphere on the Moon's surface is leading to greater compaction and sintering. Properties of regolith and dust particles (density, temperature, composition, etc.) as well as near-surface lunar exosphere depend on solar activity, lunar local time and position of the Moon relative to the Earth's magneto tail.

Upper layers of regolith are an insulator, which is charging as a result of solar UV radiation and the constant bombardment of charged particles, creates a charge distribution on the surface of the moon: positive on the illuminated side and negative on the night side. Charge distribution depends on the local lunar time, latitude and the electrical properties of the regolith (the presence of water in the regolith can influence the local distribution of charge).

Studying the properties of lunar dust is important both for scientific purposes to investigation the lunar exosphere component and for the technical safety of lunar robotic and manned missions.

Dust Experiment goals for future Luna missions are the investigation the dynamics of the lunar near-surface dust (speed, charge, mass, vectors of fluxes), measure the dynamics of the electric fields of the near-surface plasma and the photoelectric work function for lunar regolith in situ.

Acknowledgements

This work is in progress with the support of RFBR grant 13-02-90441 and 22's program of RAS Presidium.

References

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