

A measurement system for the characterization of the electrostatically levitated lunar dust.

Thursday 6 June 2024 10:00 (15 minutes)

The Moon is covered by a layer of regolith which consists of fractured rock and unconsolidated debris, mainly resulting from micrometeorite bombardment. With no magnetosphere and almost no atmosphere, the regolith is directly exposed to solar wind and the full solar spectrum. As a result, it acquires a charge, and its finest part, the so-called lunar dust, may exhibit unusual behavior, including levitation and transport across the surface due to electrostatic forces. Several observations indicate the occurrence of this electrostatic process, which has attracted increased attention for its important role in the evolution of the physical and spectral properties of the lunar surface. Moreover, the lunar dust is regarded as one of the major technical challenges for future exploration on the Moon, especially for long-term human presence. Dust mobilization due to natural mechanisms and/or human activity, indeed, poses a hazard to operations and hardware and crew safety. The behavior of charged dust needs to be well characterized to define appropriate operations, design, and mitigation strategies.

I will present the research activity that the INAF-OACN planetology group is carrying out as part of the “Earth-Moon-Mars (EMM)” project, founded in the framework of the PNRR. This activity aims to develop a prototype of a system conceived to characterize the dust grains that electrostatically levitate above the lunar surface, measuring their charge and velocity. In addition, the project involves the development of a facility to simulate the lunar dust environment and the conditions that electrically charge the dust grains on the lunar surface.

sessioni congresso

Sole e Sistema solare

Primary author: PORTO, Carmen (Istituto Nazionale di Astrofisica (INAF))

Co-authors: ESPOSITO, Francesca (Istituto Nazionale di Astrofisica (INAF)); FRANZESE, Gabriele (Istituto Nazionale di Astrofisica (INAF)); MONGELLUZZO, Giuseppe (Istituto Nazionale di Astrofisica (INAF)); SILVESTRO, Simone (Istituto Nazionale di Astrofisica (INAF))

Presenter: PORTO, Carmen (Istituto Nazionale di Astrofisica (INAF))

Session Classification: Sole e Sistema Solare