

DUST PARTICLE REMOVAL BY ELECTROSTATIC AND DIELECTROPHORETIC FORCES FOR LUNAR EXPLORATION

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Prevention of dust accumulation on spacesuits, instrumentation, optical and thermal systems, and mechanical joints is of prime importance for the success of human exploration missions to the moon. Dust adhesion on these systems is well documented on the written record of the Apollo missions to the moon. The absence of an atmosphere on the moon leaves electrostatic forces and Van der Waals forces as the main causes of dust adhesion to surfaces. In this paper, we report on our continued efforts to use electrostatic and dielectrophoretic forces to develop a dust removal technology to prevent the accumulation of dust on surfaces and to remove dust already adhering to those surfaces. We also include results of computer simulations of charged particles interacting with three out-of-phase, non uniform, alternating electric fields and of the motion of uncharged, dielectric particles under dielectrophoretic forces in non uniform electric fields.