Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Determining Electrostatic Field of Microcavities in Lunar Dust Grains ALEXANDRIA MENDOZA, LORIN MATTHEWS, TRUELL HYDE, AUGUSTO CARBALLIDO, Baylor University — The lunar regolith covering the surface of the moon has a component of very fine, jagged dust particles. The Apollo astronauts found that lunar dust obscured visors and instrument readouts, degraded seals, and abraded materials. The dust is difficult to remove from spacesuit material, and dust in the lunar habitat poses a hazard to astronaut's health. Thus an understanding of the transport of lunar dust is important for future lunar missions. Dust grains in the regolith become charged through exposure to the solar wind, photoemission and secondary electron emission. Differential charging due to the stochastic charging processes and recollection of photoelectrons in micro cavities can lead to to electrostatic fields large enough to loft grains from the surface, allowing their transport. Here we implement a numerical model to resolve the charging of grains on the lunar surface and determine local variation in the electrostatic field. Grains are lofted when the electrostatic force exceeds gravity and cohesive forces between grains. The resultant predicted frequency of lofting events and size distribution of lofted grains will be calibrated and verified by experiments conducted with various shapes and sizes of dust grains, material properties, and charging conditions.

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Date submitted: 29 Jun 2020 Electronic form version 1.4