

# Dust Charging and Transport on Airless Planetary Bodies

New experimental and modelling research has demonstrated that dust grains on airless bodies (e.g., the Moon and asteroids) can be charged by solar wind and solar ultraviolet (UV) radiation, and mobilized or even lofted by surface electrostatic forces.

- Electrostatic dust transport has been suggested to explain a number of observations, including the first evidence “Lunar Horizon Glow”. However, the fundamental physics of dust charging and launch mechanics has not been fully understood.
- Recently, dust lofting was successfully demonstrated under exposure to UV or plasmas in the laboratory; a new “Patched Charge Model” was developed that models emission and absorption of photoelectrons or secondary electrons inside microcavities between dust grains to create large negative charges on surrounding grains that repel each other to become lofted.

Wang et al., (2018) Journal of Visualized Experiments

Lunar Horizon Glow

Surveyor 7: 1968-023T06:21:37

Lab Experiment

0.25 cm

**Top:** Lunar horizon glow was suggested to be caused by levitated dust grains scattering off the sunlight; **Bottom:** Dust grains are lofted due to UV exposure in the laboratory.

