# Towards a validated multi-scale multi-physics and multi-phase model for lunar dust

Topic 2-Modeling of lunar dust behavior and mitigation techniques

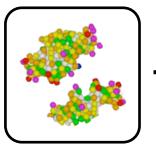
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## Approach

- Microscale: Target smallscale particle roughness and surface charges
- Microscale: Focus on particle-particle interactions

### Microscale



Validation method: Drop tower (settling velocity)

#### **Research Objectives**

**Goal:** Establish a validated multi-scale model to study the transport and interaction of charged irregular lunar dust particles

**Comparisons to SOA:** Models that resolve both the electrostatic interaction between

### Macroscale



Validation method: Shear-flow surface particle transport

irregular particles and the transport of these particles in a large space do not exist. Start TRL 1-2, End TRL 3-4 Add physics that are

Add physics that are pertinent to lunar dust to existing models through new experiments

## **Potential Impact**

The success of future long

- Macroscale: Transport of particles in cabin and vacuum environment
- Innovation: Multiscale validation methods that target each key component

term lunar surface mission requires lunar dust mitigation strategies that can be applied to spacesuits, airlocks, cabin environments, and Gateway, which requires a complete framework to evaluate different mitigation techniques.