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SPACE EXPLORATION SYMPOSIUM (A3)  
Moon Exploration – Part 1 (2A)Author: Mr. Lior Rubanenko  
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Weizmann Institute of Science, Israel, Oded.Aharonson@weizmann.ac.ilTHE EFFECT OF SLOPE DISTRIBUTION ON THE SURFACE TEMPERATURE OF THE MOON  
AND OTHER AIRLESS BODIES**Abstract**

The surface temperature of an airless planetary body such as the Moon depends on the amount of insolation it receives from the sun and the emitted and reflected radiation from nearby slopes. Motivated by the close relationship between temperature and volatile stability, we seek to consider the effect of the slope distribution at various scales on the temperature distribution. We numerically calculate the surface temperature distribution accounting for four effects: insolation reaching the surface, reflected solar radiation from other facets, emitted heat flux from other areas in proximity to the facet in question and its subsequent reflections, and conduction of heat into the ground. We use a ray casting technique in order to track the rays incident on a surface and its subsequent reflections. We have implemented heat diffusion into the subsurface in 1D using a highly efficient algorithm. We have validated our model and found good agreement with measurements acquired by the LRO DIVINER and LROC instruments, and by comparing it to previous works in the field. The model enables investigation of the effect of slopes and surface roughness on the temperature distribution both at the measured scale and at smaller scales.