

Laboratory study of the reflectance of regolith surfaces: porosity versus grain size behavior

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The surfaces of most atmosphereless solar system objects are referred to as regolith or layers of usually loosely connected fragmentary debris, produced by meteorite impacts. Measurement of light scattered from such surface provide information about the composition and structure of the surface. A suitable way to characterize the scattering properties is to consider how the intensity and polarization of scattering depends on the particle size, composition, porosity, roughness, wavelength of incident light and the different geometry of observation.

Here in Assam University, Silchar, India we have set up a laboratory to simulate the light scattering properties of such surface in intensity as well as in polarization. For the laboratory simulation a goniometer is used with a CCD as a detector and a He-Ne gas laser as a source having wavelength 632.8 nm. For imaging a thick lens [converging] is mounted in front of the CCD camera. For measuring degree of polarization an addition Polaroid has been mounted in front of the thick lens. The Polaroid can be rotated in many discrete steps. The light scattered from the regolith surface is detected by the CCD camera at three different positions of Polaroid. The intensity and polarization are measured by varying phase angle. In the present work, the effect of porosity and grain size on reflectance is studied for a diverse collection of regolith like samples with a wide range of albedo . Results obtained by the above experiment will be discussed.