

Light Scattering by Regolith Dust Particles on Icy Body

T. MUKAI, Y. OKADA, I. MANN and A.M. NAKAMURA

Graduate School of Science, Kobe University, Japan mukai@kobe-u.ac.jp

Light scattering by dust particle plays an important role to derive the physical properties of dust in space from astronomical data. It is well known that the light scattering by a single particle depends on its size, its shape, and its component. Recently, we need knowledge of light scattering by the particles existing on the surface of airless bodies in the interplanetary space to examine, e.g. the backscattering light pattern detected in asteroid Itokawa, and a classification of color observed among the Trans-Neptunian objects.

It is expected that the regolith particles, with size of comparable with the wavelength of interest, existing on the bulk surface of icy body yield significant influence on the intensity of the reflected light by icy body, as functions of a wavelength and a phase angle.

We present our simulation results about the light scattering by the regolith layer on the icy body. The signs of physical properties of regolith particle, i.e. its size, shape and structure appeared in the reflected light are investigated by using the numerical simulation, based on the computer codes recently developed[1,2] for light scattering by irregularly shaped particles on the smooth bulk surface

One of the results suggests that the intensity of reflected light by a regolith surface decreasing more slowly with increasing the incident angle, compared with the case of the surface with no regolith particles, which is consistent with our laboratory data[3]. We will address other results, i.e. incident angle/wavelength dependence of reflected light intensity, on the physical properties of regolith particle.

References

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