Modelling of Laboratory Data of Bi-directional Reflectance of Regolith Surface Containing Alumina

C BHATTACHARJEE[1,2], D DEB,[1] H.S. DAS[1] and A.K.SEN[1], R.GUPTA[3]

1 Department of Physics, Assam University, Silchar.

2 Department of Physics, Kokrajhar Govt. College, Kokrajhar

3. IUCAA, Pune.

Bidirectional reflectance of a surface is defined as the ratio of the scattered radiation at the detector to the incident irradiance as a function of geometry. The accurate knowledge of the bidirectional reflection function (BRF) of layers composed of discrete, randomly positioned scattering particles is very essential for many remote sensing, engineering, biophysical applications and in different areas of Astrophysics. The computations of BRF's for plane parallel particulate layers are usually reduced to solve the radiative transfer equation (RTE) by the existing techniques. It has been observed that the brightness of all planets or satellites which have no atmosphere, increases very rapidly as the solar phase angle approaches zero. This is known as *opposition effect*. But, this opposition effect is absent in case of those planets which has atmosphere around them. The bodies which have no atmosphere are covered by layers of finely grained dust particles which are known as *regolith* layers. In planetary remote sensing, the chief aim is to retrieve the information about the nature of the regolith layers by studying the phase curves. In this work we present our laboratory data on bidirectional reflectance versus phase angle for two sample sizes of 0.3and1μm of Alumina for the He-Ne laser at 632.8nm (red) and 543.5nm(green) wavelength. The nature of the phase curves of the asteroids depends on the parameters like- particle size, composition, porosity, roughness etc. In our present work we analyse the data which are being generated using single scattering phase function i.e. Mie theory considering particles to be compact sphere. The well known Hapke formula will be considered along with different particle phase function such as Mie and Henyey Greenstein etc to model the laboratory data obtained at the asteroid laboratory of Assam Univesity.

Key words:- BRF, Scattering, Regolith, Phase function.

1. Corresponding author's Email:-bhattchinmoy@gmail.com