

ELS-XV-2015 Abstracts

ELS-XV-2015-137-1

Electromagnetic & Light Scattering XV 2015, Leipzig

© Author(s) 2015. CC Attribution 3.0 License.

## Scattering Properties of Composite Grains

D. Vaidya (1) and R. Gupta (2)

(1) Department of Physics, Gujarat College, Ahmedabad 380006, India (dipak.vaidya@gmail.com), (2) Inter University Centre for Astronomy and Astrophysics, IUCAA, Pune 411007, India, (rag@iucaa.ernet.in)

The compositional analysis of comet dust sample return and in-situ measurements obtained by the STARDUST mission, indicated that the cometary dust grains are inhomogeneous ; viz. porous, fluffy and composites of very small silicate and carbonaceous grains. Since, there is no exact theory to study scattering properties for these porous and composite grains, there is a need to formulate models for electromagnetic scattering by these inhomogeneous grains. We use discrete dipole approximation (DDA) to study scattering properties of composite and porous grains. We calculate angular distribution of scattered intensity and linear polarization by composite grains, made up of host silicate spheroidal grains and inclusions of graphite/ or amorphous carbon/and voids for porous grains. We study the variation in the scattering and polarization with the volume fraction of the inclusions. The scattered intensity clearly shows the effect of the volume fraction of the inclusions at the scattering angles greater than 90 degree. It decreases as the volume fraction of the inclusion is increased. The polarization P for these spheroidal composite grains peaks around 90 degree. These results on the polarization also show negative polarization at large scattering angles (>160 degrees). Using Maxwell-Garnet effective medium approximation and T-matrix, also, we have calculated the scattered intensity and polarization for these composite grains and compared the results obtained using DDA. We present the composite and porous grain models and discuss the results.