



AIT
Asian Institute of Technology

Center of Excellence in Nanotechnology (CoEN)

Special Lecture on

“Light Scattering with Nano-size dust grains in Astrophysical Environment”

Thursday, 17 March 2011 at 11:00 AM

by

Prof. Ranjan Gupta
IUCAA, Pune India

Venue:

Room 102, Outreach Building, AIT

Abstract:

It is well known that the interstellar dust plays the most important role in which the light seen from stars suffers extinction. Conventional models assume Mie theory of light scattering with solid spheres and other shapes of silicate and graphite particles of different sizes. An extension of this theory was Effective Medium Theory (EMT) which tries to explain some of the observed interstellar properties.

Recent space probes have confirmed that the dust grains are highly porous and fluffy (i.e. aggregates or clusters) rather than having regular shapes (spherical, cylindrical or spheroidal) and homogeneous in composition and structure. Since there is no exact theory for calculation of scattering properties of such irregular, inhomogeneous particles, recently our group has used Discrete Dipole Approximation (DDA) method and the results of this investigation will be discussed. The model uses a composite fluffy dust grain for explaining most of the observed interstellar extinction curves and also polarization. Another parameter which needs to be constrained by the dust models is the interstellar abundances of Carbon and Silicon which is usually overestimated by the solid dust models but our model predicts closer match to the observed ISM abundances. The Silicate dust emission features at 10 and 18 microns is also explained by our composite grain model which helps in understanding the dust characteristics in the circumstellar dust shells around stars.