Center of Excellence in Nanotechnology (CoEN)

Special Lecture on

"A dust model to explain cometary polarization"

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by

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Venue:
Room 102, Outreach Building, AIT

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Abstract:

The observed optical polarization for comets have been explained in past assuming cometary grains to be compact spheres, such that Mie Theory could be applied to simulate the observed polarization. However, from a realistic point of view, recently, other shapes like spheroids and aggregates of monomers have been considered to explain the observed polarizations for cometary grains. For this purpose T- matrix or DDA based light scattering technique was mostly used to simulate the observed polarizations. A number of authors have used T-matrix, DDA and various other techniques, along with aggregate grain model to explain the polarizations of comets like Halley, Hale-Bopp, Levy and Hyakutake etc. Recent STARDUST mission had suggested cometary grains to be mixtures of compact and porous aggregates. Accordingly, recently attempts have been made to reproduce cometary polarization with mixture of various compositions, shapes and porosity.

The work that will presented contains a model for cometary grains which contains (1) solid grains of pyroxine (silicate) with various sizes and shapes of sphere, prolates and oblates and (2) aggregates of monomers with various sizes, with composition of carbon and having structures defined by BCCA and BAM2 codes. It is found that the present model can explain the observed polarization data, especially the negative branch, for comet Halley at 485 μm, more effectively as compared to other work done in past. Among the aggregates the BAM2 structure was found to play a major role, in deciding the cross-over angle and depth of negative polarization branch.