CBC SEMINAR ANNOUNCEMENT

Professor K. George Thomas
Indian Institute of Science Education and Research

Coupling of elementary excitations: A case study with plasmons and excitons

Coupling of elementary excitations in the presence of light results in newer optical phenomena such as plasmon hybridization and exciton coupling. Interaction between molecules and surface plasmons results in weak and strong coupling. It is well established that the surface plasmon modes and molecular wave functions remain unperturbed in the weak coupling regime. The first part of the presentation will illustrate the coupling of various types of elementary excitations and highlight the role of plasmon coupling and SERS by varying the distance and geometry of metal nanostructures.3 Raman signal enhancement of different analyte molecules, when placed at various locations of these assemblies will be presented. In the second part of the talk, a novel strategy for inducing chirality to metal nanoparticle assembly by growing them on chiral surfaces will be discussed.4 The third part of the talk will summarize our recent efforts to understand various modes of coupling in chromophore functionalized metal/semiconductors systems. The strong coupling between the molecular absorption of chromophoric dyes and surface plasmon of metal nanoparticles will be discussed. Rabi splitting resulted in the formation of two new peaks corresponding to the higher and lower energy eigen states. Anticrossing of the dispersion curve confirms the presence of strong coupling in the hybrid systems. Very weak coupling interactions between quantum dots and chromophoric dyes will also be discussed.

5. (a) Anoop Thomas and K. George Thomas (unpublished results); (b) Anoop Thomas, P. V. Nair and K. George Thomas, J. Phys. Chem. C 2014, 118 3838.

Date: 24th November 2014 (Monday)
Time: 4:45pm–6:15pm
Venue: NTU SPMS CBC Building Level 2, Conference Room
Host: Asst Professor Ling Xing Yi