Laboratoire PPSM – UMR CNRS 8531

Photochimie et Photophysique Supramoléculaires et Macromoléculaires

Séminaire PPSM

Lundi 9 décembre 2019, 11h00

Auditorium D. Chemla - Bâtiment IDA

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Invité par : Guillaume Laurent

«Excitons and plasmons: A tale of two elementary excitations and their interaction»

Coupling of elementary excitations in the presence of light results in several newer optical phenomena.[1] The coupling can be categorized as strong, weak and very weak, depending on the magnitude of the interaction. We have earlier demonstrated several examples of these interactions and its consequence on their optical properties.[1] Our group has recently demonstrated examples of exciton-exciton coupling in molecules, and plasmon-plasmon coupling in plasmonic systems by organizing them in asymmetric fashion.[2-4] As a consequence of such interactions, several fascinating chiroptical properties emerge.[2-4] These aspects, along with our recent results on the generation of plexcitonic states[5] will be presented in the first part of the talk. Precise assembly of plasmonic materials of desired size and shape allows further modulation of their optical and field effects, opening up several plasmonically powered processes such as surface enhanced spectroscopy.[6-9] We have translated the principles of surface-enhanced spectroscopy for the design of plasmonic platforms, which can identify molecules of importance in health, environment and safety.[9] These aspects will be discussed.

References

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George Thomas is a senior professor and J C Bose National Fellow at the School of Chemistry of the Indian Institute of Science Education and Research Thiruvananthapuram. He has made significant contributions in several areas of photosciences and nanomaterials and his group is currently focusing on the studies related to light-matter interaction at the nanoscale. Some of his recent efforts include (i) understanding the interfacial electron transfer properties of hybrid semiconductor nanostructures, (ii) design of plasmonic nanomaterials for surface enhanced spectroscopy (iii) chiroptical properties of supramolecular nanostructures.
He received his PhD degree in Chemistry from the University of Kerala and afterwards worked as senior scientist in the Photosciences & Photonics Section of the CSIR-National Institute for Interdisciplinary Science & Technology from July 1994 to April 2010.
In May 2010, he accepted an invitation from the newly established Indian Institute of Science Education and Research Thiruvananthapuram and joined as a Professor. He has published around hundred and twenty peer-reviewed original research articles, having an average citation of ~70. Twenty students completed their doctoral degree under his supervision.
He served as the founding Dean of IISER Thiruvananthapuram (2010-2015) and is instrumental in building IISER Thiruvananthapuram in various capacities.
He is currently the President of the Asian and Oceanian Photochemistry Association (APA). He was the member of editorial advisory committee of the Journal of Physical Chemistry of the American Chemical Society during the period 2012-2015.
George Thomas is a recipient of several awards and distinctions: most significant ones are the J C Bose National Fellowship (2014-2019 and 2019-2024) and the prestigious Shanti Swarup Bhatnagar Prize in Chemical Sciences (2006).

He is an elected fellow of Indian National Science Academy, New Delhi (2015) and Indian Academy of Sciences, Bangalore (2007) and Honorary Professor of the Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore.

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