University of Mumbai & Department of Atomic Energy
CENTRE FOR EXCELLENCE IN BASIC SCIENCES
Health Centre, University of Mumbai, Kalina Campus, Mumbai 400098

COLLOQUIUM

"Light-induced Chemistry: Story of Reactive Motions and Intermediates"

Abstract: Development of novel materials for energy generation and storage is critically dictated by our understanding of fundamental chemistry underlying the energy conversion process. In last few years, the potential of solar energy technologies has emerged and has led to an increased attention on molecular photomaterials. Optimizing the basic processes of light trapping and light-to-charge conversion is therefore at the heart of making efficient molecule-based solar cells or photocatalytic convertors. In order to maximize the benefits from light-induced chemistry, it is necessary to temporally track all the photo-intermediates in molecular systems of functional importance. In this talk, I would present our ideas on how we are using ultrafast time-resolved spectroscopies to unravel the rich chemistry of excited states in potent photomaterials. Our effort focuses on understanding the reaction coordinate of the photochemical process, thereby generating a rational methodology to create large supercomplexes with efficient photochemistry. I will highlight this idea by presenting an example where we show that "low-frequency" vibrational modes can play an important role in directing light-induced chemistry. I will end the talk by discussing the significance of characterizing the charge transfer states in solution for optimizing table morphologies in solar cells.

By
Dr. Jyotishman Dasgupta
Tata Institute of Fundamental Research, Mumbai.

Dr. Jyotishman Dasgupta received his undergraduate degree in chemistry from Indian Institute of Technology, Kharagpur in 2000. He carried out his Masters thesis under the guidance of Prof. Amit Basak in chemistry department. Subsequently he moved to Princeton university as a Hughes Stott Taylor graduate fellow where he carried out his Ph.D. work in the field of oxygenic photosynthesis at Princeton University, under the supervision of Prof. Charles Dismukes. His PhD thesis focused on unraveling the mechanistic details of the photoassembly of the water-oxidizing Mn4Ca cluster in photosystem II. In 2006, he moved to UC Berkeley where he did his postdoctoral work with Prof. Richard A. Mathies. During his stay at Berkeley, he used femtosecond stimulated Raman spectroscopy (FSRS) to study light-triggered conformation changes in photoactive proteins. Since March 2010, he is an Assistant Professor at the Tata Institute of Fundamental Research, Mumbai. The central theme of his Ultrafast Biophysics and Photomaterials lab is to probe biological/molecular electron, proton and atom transfer in order to fabricate bio-inspired molecule-based devices for fuel and electricity generation.

Day & Date : Tuesday, April 1, 2014
Time : 15:45 hrs
Venue : Seminar Room, PF-AG-14, Prefabs, Near Annabhau Sathe Bhavan, University of Mumbai, Vidyanagari, Kalina Campus, Mumbai - 400 098.

All are Welcome