



**S N BOSE NATIONAL CENTRE  
FOR BASIC SCIENCES**

Block JD, Sector III, Salt Lake, Kolkata 700 106



# **DEPARTMENTAL SEMINAR**

## **Chemical, Biological & Macro-Molecular Sciences**

**18<sup>th</sup> January, 2022**

**4.00 PM**

**ONLINE**

### **SPEAKER**



**Dr. Jyotishman Dasgupta,  
Associate Professor, Department of Chemical Sciences, TIFR**

### **TITLE OF THE TALK**

## **Transient Raman Spectroscopy for Probing Charge Transfer States**

### **ABSTRACT**

Charge transfer (CT) states form the basis for multitude of chemical reactions, and has become relevant due to its ubiquity in all light energy conversion paradigms.[1] In order to discover new materials with optimized charge transfer rates at molecular interfaces for energy conversion technologies, it is imperative to diagnose the structure-function correlations “in operando”. Tracking the non-equilibrium nuclear dynamics leading up to the charge transfer states and probing the subsequent separation of charges requires time-resolved spectroscopy with structural sensitivity. In this talk, I will discuss the utility of transient Raman spectroscopy as a tool to structurally probe the formation of CT states [2] in molecular dyes with large Stokes shift,[3] and uncover the hidden lengthscale of the photochemistry inside the active site of metalloproteins.[4] Both frequency domain and time-domain methods will be elaborated with emphasis on challenges of real-time Raman detection during chemical reactions.

### References

1. Sajjad Dadashi-Silab, Sean Doran and Yusuf Yagci; Chem. Rev. 2016, 116, 17, 10212– 10275; Alexey V. Akimov, Amanda J. Neukirch and Oleg V. Prezhdo; Chem. Rev. 2013, 113, 6, 4496–4565.
2. Palas Roy, A. Jha, V. B. Yasarapudi, T. Ram, B. Puttaraju, S. Patil and J. Dasgupta, “Ultrafast bridge planarization in donor- $\pi$ -acceptor copolymers drives intramolecular charge transfer” Nature Comm. 2017, 8, 1716 .
3. Shreetama Karmakar, Abhinandan Ambastha, Ajay Jha, Aditya Dharmadhikari, Jayashree Dharmadhikari, Ravindra Venkatramani, and Jyotishman Dasgupta; J. Phys.Chem. Lett. 2020, 11, 12, 4842–4848.
4. Soumyajit Mitra, ASR Koti, and Jyotishman Dasgupta; under review.

### **HOST FACULTY**

**Prof. Rajib K Mitra and Dr. Suman Chakrabarty**  
CHEMICAL, BIOLOGICAL & MACRO-MOLECULAR SCIENCES

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