Karnataka University, Dharwad

Department of Physics & Electronics (ε-Club)

and

Dr. M R Gorbal Foundation, Bangalore

Invites you to Inaugural Dr. M R Gorbal Foundation Lecture

on

Raman Spectroscopy: from Physics to Medicine

Guest Speaker:

Prof. S Umapathy

Director, IISER, Bhopal,

Professor, IISc, Bangalore,

Special Professor, University of Nottingham, UK.

Date: 15-02-2023 **Time: 10.00 AM**

Venue: Sir. C. V. Raman Hall, Dept. of Physics, K.U. Dharwad

You are cordially invited

Shri. Ramesh Gorbal
President
Dr. M R Gorbal Foundation

Prof. R. F. Bhajantri
Chairman
Dept of Physics & Electronics

Prof. S Umapathy
Director, IISER, Bhopal,
Professor, IISc, Bangalore,
Special Professor, University of Nottingham, UK

Date: 15th February 2023, 10am @ Sir. C. V. Raman Hall, Department of Physics, KUD

Title: Raman Spectroscopy: from Physics to Medicine

Abstract: Lasers have become an essential light source in spectroscopic applications due to their inherent coherence and intensity. These properties enable both time (fs) and spatial (nm) resolutions required to study structure of materials at the nanoscopic to microscopic level and also their dynamics in femtosecond to seconds time scale. In this talk we will present applications of laser Raman spectroscopy both in time domain to learn about dynamics and in spatial domain to learn about structure.

Understanding bond specific vibrational energy redistribution and relaxation of excited molecular states and also their bond specific structural dynamics were not accessible at femtosecond time resolutions due to the inherent band width restrictions present in femtosecond laser pulses. However, in recent times, study of the third order non-linear susceptibility response of a system using stimulated Raman scattering processes leads to observation of evolution of vibrational structures in femtosecond time scales. We would show examples of energy migration and coherent oscillation of coupled vibrational modes which provide information on early time response of a molecular system on excitation.

In the case of biology and medicine, we would present results of Raman microscopic approaches to studying tissues, cell-drug interactions, and lab-on-chip applications. Further, very recently we have demonstrated Raman imaging methodology to identify materials, which are hidden inside another material. Identifying these hidden chemicals based on their molecular structure would also be presented.

Acknowledgement: Thanks to all my group members for their contribution presented in this talk and we thank funding from DST, DRDO, CSIR and UGC.