



PONDICHERRY UNIVERSITY
School of Physical, Chemical & Applied Sciences
Department of Physics

Invited Lecture

On

Novel Approaches in Dual Frequency 2D IR Spectroscopy

By

Dr. Sri Ram Gopal Naraharisetty

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School of Physics

University of Hyderabad

Gachi Bowli, Hyderabad.

Date : 09.02.2015
Time : 3.30 p.m.
Venue : Raman Seminar Hall, Department of Physics
Pondicherry University
Puducherry – 605014

ALL ARE WELCOME

Handwritten signature of Dr. K.V.P. Lata in blue ink.

Dr. K.V.P. Lata
(Guest lecture Co-ordinator)

Handwritten signature of Dr. G. Chandrasekaran in blue ink, dated 09/02/2015.

Dr. G. Chandrasekaran
(H.O.D Physics)

Dr. G. CHANDRASEKARAN
PROFESSOR & HEAD
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"Novel Approaches in Dual Frequency 2DIR Spectroscopy"

Abstract

Ultrafast two-dimensional infrared spectroscopy (2DIR) is a rapidly evolving branch of spectroscopy in determining the three dimensional structures with ultimate time resolution of few tens of picoseconds. Recently developed dual-frequency 2DIR (DF 2DIR) spectroscopy allows determining couplings between vibrational modes of different frequencies, which is analogous to heteronuclear 2D NMR. Several new weak IR labels were introduced first time in our laboratory to obtain atom sensitive structural constraints via DF 2DIR, examples of such mode are CD, C≡N, C=C, SH, SO, CH, and modes in the finger print region. An overview and applications of novel technique relaxation-assisted 2DIR (RA 2DIR), developed and tested in our laboratory, will be presented. The method relies on vibrational energy transport and permits amplification of the observed cross-peak amplitudes, permitting therefore substantially increase of the range of distances accessible by 2DIR and has ability to detect bond connectivity patterns. We demonstrated that the CD transitions of leucine-d₁₀ amino acid can serve as convenient structural reporters. We believe that the side chain perdeuteration approach in amino acids reinforced with RA 2DIR will prove to be useful tool for studying protein structure and dynamics.