



Indian Institute of Technology Kanpur

Department of Physics

Prof. Jagadishwar Mahanty Distinguished Lecture Series in Physics

The Seventh Lecture in the series will be delivered
By

Professor Madan Rao

Raman Research Institute

&

National Centre for Biological Sciences (TIFR), Bangalore

on

"Active Cell Mechanics and Information Processing"

Date: **30.03.2012 (Friday)**

Venue: **L-17**

Time: **05:30 PM** (Tea will be served at 05:00 PM at L17 foyer)

ABSTRACT

The cell is an organized collection of molecules that interact with each other: a chemical engine subject to physical laws. Essential to the physics of the living cell is that molecules that move around in the cellular environment are subject to forces that arise from energy-consuming active processes. The collective behavior, fluctuations and mechanical response of active matter are fundamentally different from ordinary matter. In addition, molecules in the living cell are carriers of information. The living cell manages the organization and flow of information by means of active mechanical stresses generated within it. This has dramatic consequences for the spatiotemporal regulation of chemical reactions in the cell. We will also discuss some recent ideas on how this allows the cell to solve an optimization problem in information processing. This will bring together two apparently unconnected seminal papers of A. Turing.

About the speaker

Prof. Madan Rao is a well-known name in the fields of theoretical Condensed Matter Physics, Non-equilibrium Statistical Physics and Biological Physics. He obtained his Ph. D from IISc, Bangalore. Following a postdoctoral position in Simon Fraser University, Vancouver, Canada, and several visiting faculty positions (e.g., in Kansas state University, Kansas, USA, University of Toronto, Canada, and ICTP, Trieste, Italy), and faculty positions (at IIT, Delhi, and IMSc, Chennai), he joined RRI, Bangalore, in 1994; he is currently a professor there. He is also an adjunct professor at NCBS (TIFR), Bangalore. Prof. Rao has published numerous research papers during his illustrious research career. In recognition of his pioneering contribution to the fields of theoretical condensed matter physics and biological physics, he was awarded the prestigious Swarnajayanti grant, B. M. Birla science award in Physics and also the Shanti Swarup Bhatnagar Award. He is an elected fellow of Indian Academy of Sciences, Bangalore.

Prof. Jagadishwar Mahanty Lecture Series in Physics

Prof. Jagadishwar Mahanty Lecture Series in Physics has been instituted by Dr. Siddharth Mahanty in memory of his father, Prof. Jagdishwar Mahanty, who was a faculty member of the Physics Department at IIT Kanpur from 1961-1972. He made important contributions to Condensed Matter Physics, particularly, to the study of many body physics, lattice dynamics, van-der-Waals interactions and electronic structure of solids.

Prof. Mahanty was born on 20th July 1932 in Puri, Orissa. After his M. Sc. in Physics from Calcutta University, he worked for several years at the National Physical Laboratory. In 1956, he went to the University of Maryland, USA for his doctoral degree. After completing his Ph.D. in 1960 he joined Panjab University, Chandigarh and subsequently joined the Physics department of IIT Kanpur in 1961. He was instrumental in shaping the Physics department during its infancy. He was the Head of the Physics department from 1967 to 1972. In 1971, Prof. Mahanty decided to concentrate on his own research and gave up the administrative responsibility. In 1972, he joined the prestigious Australian National University and superannuated from there in July 1995 due to ill health.

Prof. Mahanty was an excellent physicist with a very modest and kind personality. His helpful nature to both students and colleagues was a great asset of his character. He was a warm and caring person who is greatly missed by his family and friends.

