



School of Interdisciplinary Research (SIRe)

Indian Institute of Technology Delhi, New Delhi

Invites you all to a lecture on

The ubiquity of synchrony in nature



Ramakrishna Ramaswamy
Visiting Professor
Department of Chemistry
IIT-Delhi, New Delhi 110 016.
E: ramaswamy@iitd.ac.in,
T: +91-11-2659 7969

Date: **January 30, 2020 (Thursday),**
Time: **3:00 pm**

Venue: **Committee Room, Dept. of Physics**
IIT Delhi

Ram Ramaswamy was educated at Madras University, IIT Kanpur and Princeton University. Presently Visiting Professor at IITD, he earlier taught at the Jawaharlal Nehru University from 1986 till his retirement in 2018, in the Schools of Physical Sciences and Computational and Integrative Sciences.

Ramaswamy's research interests have, over the years, meandered between chemistry, physics and computational biology. The study of nonlinear dynamical systems, with particular emphasis on collective behaviour, has been a long-standing preoccupation.

Abstract:

The phenomenon of synchronization has been described and studied since the 1660's. However, its full generality has only been realized in the past few decades following developments in the study of nonlinear dynamical systems. In particular, a variety of forms of synchrony are recognized, and in this talk I will briefly describe some of these different variants.

In addition to complete or identical synchrony, there can be phase synchronization, lag synchrony, projective synchrony, and so on, all of which can be subsumed in the notion of a generalized synchrony. This is probably the most widespread form of temporal correlations that occur in nature and it offers a unified framework within which such collective behavior can be described.

A defining characteristic of synchronization in coupled systems is that the resulting dynamics occurs on a lower dimensional sub manifold of the phase space. Coupling functions can also be designed in order to lead the dynamics to a target sub manifold. Examples from a variety of natural and engineered systems will be discussed to illustrate these ideas