Dear All,

INDIAN INSTITUTE OF SCIENCE

INSTITUTE COLLOQUIUM
(Physical & Mathematical Sciences)

Prof. Rahul Pandit
Department of Physics

will deliver a lecture

on

Cardiac Arrhythmias: What can we learn from numerical simulations?

on Friday, January 11, 2008
at 4.00 pm in the Faculty Hall

THE DIRECTOR
will preside

All are cordially invited

Coffee/Tea: 5.00 pm
Venue: Reception Hall

Abstract

Cardiac arrhythmias such as ventricular tachycardia (VT) or ventricular fibrillation (VF) are the leading cause of death in the industrialised world. There is a growing consensus that these arrhythmias arise because of the formation of spiral waves of electrical activation in cardiac tissue; unbroken spiral waves are associated with VT and broken ones with VF.

Several experimental studies have been carried out to determine the effects of inhomogeneities in cardiac tissue on such arrhythmias. We give a brief overview of such experiments. We then provide an introduction to partial-differential-equation models for ventricular tissue, show how different types of inhomogeneities can be included in such models, and discuss various numerical studies, including our own, of the effects of these inhomogeneities on spiral-wave dynamics. The most remarkable qualitative conclusion of our studies is that the spiral-wave dynamics in such systems depends very sensitively on the positions of these inhomogeneities.

This work has been done with my student TK Shajahan and Dr. Sitabhra Sinha (at IMSc, India); some very recent work has been done with another student, Alok Ranjan Nayak.