

**Cordially Invites you to the
INSTITUTE COLLOQUIUM
(Divn. Of Mechanical Sciences)**

by

**Professor S. Gopalakrishnan
Chairman, Department of Aerospace Engineering**

**“Propagation of Elastic Waves in Nano Materials
and Structures”**

**Date :Wednesday, 6th April 2016
Venue :Faculty Hall, Main Building
Time : 4-00 p.m.**

**Prof Anurag Kumar, Director
will preside**

Abstract

This talk presents the study of propagation of elastic waves in nano materials such as Carbon Nanotubes and Graphene and the lattice dynamic periodic structures using continuum approximation. The goal of the study is to not only determine the wave propagation characteristics, namely the wavenumber, group speeds, but also to see the band gap behavior in these structures. In particular, the use of various gradient elasticity theories namely, the Peri-Dynamic theory, the Eringen’s Stress gradient theory, the second and fourth order strain gradient theories, all of which brings in atomistic length scale parameters into the continuum governing equations, is used to study the wave propagation characteristics in the nano structures. Using these non-local theories, wave propagation in Single and Multi-wall carbon tubes and monolayer Graphene structures are studied. A number of examples will be presented that brings out the essential wave propagation features such as escape frequency, cut-off frequencies, phase speeds and group speeds in these structures. Next, using Bloch wave approximation, band gap tuning is demonstrated in hexagonal lattices with auxetic cores and also in pentamode materials. These studies will help in designing new materials with enhanced damping properties in structures.

Tea : 5-00 p.m.

ALL ARE WELCOME

