

UNH Materials Science Seminar

11:10-12:00, Thursday, October 11, 2007

Kingsbury S145

University of New Hampshire

Ultrasonics and Nanoscience

Professor Humphrey Maris

Department of Physics, Brown University

I will describe two projects in which sound waves have been used to study very small structures. The first project, picosecond ultrasonics, uses ultrashort light pulses to generate and detect pulses of sound. The length of these sound pulses can be as small as a few nanometers. This technique makes possible ultrasonic studies of a wide variety of thin films and nanostructures, and has become a widely used metrology tool in the semiconductor device industry. It provides an accurate method for the measurement of the thickness of thin films, can determine the quality of the bonding between a film and a substrate, and gives information about mechanical properties. In the second project, a combination of ultrasonic and optical techniques are used to monitor the position of electrons. A movie showing the motion of a single electron will be shown.

Humphrey Maris received his undergraduate and PhD degrees from Imperial College, London. He was a postdoc at Case Institute of Technology from 1963 to 1965. Since then he has been in the physics department at Brown University. His research interests include ultrasonics, phonon physics, solar neutrinos, liquid helium and ultrafast optics. He recently received the 2007 Prize for contributions to Phonon Physics.