

Good afternoon,
You are invited to attend our weekly ECE Graduate Seminar.

Old Dominion University
College of Engineering and Technology
Department of Electrical and Computer Engineering

All lectures to be held at 3:00pm on Fridays online at

[ODU DL: ECE 731 831 Grad Seminar](#)

For more information, contact Dr. Chung Hao Chen at (757) 683-3475 or email cxchen@odu.edu.

Friday, September 17, 2021 Seminar Topic:

ULTRAFAST THERMOREFLECTANCE STUDIES OF NIOBIUM THIN FILM by Md. Obidul Islam, Ph.D. Candidate in the Department of Electrical & Computer Engineering at Old Dominion University

Abstract:

Thermal properties of thin films play crucial roles in developing novel devices in the field of microelectronics, energy harvesting and photonic system. As the geometry and structural growth of thin films are different than their bulk counterpart, the mechanical, optical, electrical, and thermal properties are varied and dependent on thickness largely. Energy transport in a thin film requires a technique with picosecond temporal resolution. The advent of femtosecond laser pulse made it possible to study the non-equilibrium electron-phonon interaction, coherent phonon transport, picosecond acoustics, thermal expansion coefficient and properties of thin films and interfaces. Pump-probe thermo-modulation technique using short-pulsed laser has been extensively used for measuring thermophysical properties such as thermal conductivity, volumetric heat capacity, interface thermal conductance, thin film thickness, sound velocity, thin-film damage and many more. The basic principle used in thermoreflectance/thermo-transmittance technique is the change in reflectivity/transmittivity of a material due to the change in temperature. This seminar talk will illustrate the basic ideas of femtosecond optical pump-probe spectroscopy, experimental technique in measuring thermoreflectance data and Fourier heat diffusion model to determine thermo-physical parameters like electron-phonon coupling, thermal conductivity, thermal boundary conductance etc. The experimental results shown here are obtained from niobium thin films taken at TDTR pump-probe experiment at Applied Research Center, Old Dominion University.



Bio:

Md Obidul Islam is a 3rd year Ph. D. student in Electrical and Computer Engineering under Prof. Hani Elsayed Ali in the Old Dominion University, Norfolk, Virginia. He did his Bachelor and Masters, in Applied Physics, Electronics and Communication Engineering from the University of Dhaka, Bangladesh. His research focus is primarily on nanoscale heat transfer in metal and superconducting materials.