Physics Colloquium
Michigan Technological University

January 26 (Thursday) 4:00 to 5:00 pm
Room 139, Fisher Hall

Thin film photonic crystals device based on ferroelectric material

Ziyou Zhou

Advisor: Dr. Miguel Levy

Principles and fabrication process of a tunable one dimensional photonic crystal device in $LiNbO_3$ (Lithium niobate) is presented. Electric filed induced strain in the piezoelectric crystal is achieved through an interdigitated electrode configuration. Crystal ion slicing and wafer bonding techniques are applied to fabricate thin films in order to miniaturize the devices and will be discussed.

Ice Nucleation by Organics at the Molecular Level

Eli Ochshorn

Advisor: Dr. Will Cantrell

We are investigating the process in which some organic material resting at the surface of a supercooled water sample, initiates the freezing of the water. Specifically, we are studying the intermolecular interactions that occur near the water/organic interface. We think that this will allow some insight into the way in which the molecules rearrange as freezing is initiated. We will report results of infrared spectroscopy applied to water samples undergoing catalyzed freezing by some organics. The results suggest a freezing mechanism where structural changes occurring in both the organic and the adjacent layer of water play a role in the freezing. Historically, this line of research has been established by physicists, chemists, and atmospheric scientists. The motivation of the latter group being to understand and predict the freezing of cloud drops, something which still today is done primarily with empirical methods.