

Physics Colloquium

Michigan Technological University

Thursday, March 27, 2014

at 4:00 pm

Room 139 Fisher Hall

A Study of Enhancement in Faraday Rotation and Circular Dichroism in Ultra-Thin Magnetic Garnet Films

by Ashim Chakravarty
Advisor: Dr. Miguel Levy

Abstract: In magneto-optic media, linearly polarized light exhibits Faraday rotation (non-reciprocal polarization rotation), for magnetization along the direction of light propagation. Yttrium Iron Garnet (YIG) based films show a strong magneto-optical response as right and left circularly polarized light are differently absorbed (dichroism) at shorter wavelengths than the probe wavelength (Kramers-Kronig). This difference in absorption is due to different charge transfer processes between the electronic states in the YIG. Our study examines dimensional dependent changes in dichroism (and electronic structure) in magnetic garnet thin films and their effect on Faraday rotation.

Investigating Hadronic Interactions with Cosmic Ray Physics

by Tolga Yapici
Advisor: Dr. Brian Fick

Abstract: For particle accelerators to retrieve the hadronic interaction parameters (cross-section, inelasticity and multiplicity) at high energies ($E > 10^{18}$ eV) at the current technology level is impossible. The important information about these parameters can be probed using the Pierre Auger Observatory Extensive Air Shower data. In this presentation, concepts in cosmic ray physics will be explained. In addition, methods for cross-section measurements developed and being developed are going to be introduced briefly.