

Physics Colloquium

Michigan Technological University

Thursday, March 24, 2011, 4:00 pm

Room 139, Fisher Hall

Stopband Reconfiguration in Gyrotropic Birefringent Bragg Filters

Ashim Chakravarty

Advisor: Dr. Miguel Levy

Abstract: We report on photonic stop band reconfiguration upon magnetization reversal in gyrotropy-activated magneto-optic birefringent waveguide media. It is shown that normal modes in these media are elliptically polarized and that magnetization reversals strongly affect the character of these modes. Helicity switching between the normal modes upon magnetization reversal induces stop band reconfiguration in photonic crystal structures fabricated in gyrotropic films. It is also shown that reflected mode ellipticity decreases continuously with increasing stop band order.

A Cosmological Discriminator Designed to Avoid Selection Bias

Amir Shahmoradi

Advisor: Dr. Robert Nemiroff

Abstract: We define a new cosmological discriminator -- a "one-sided Amati relation" -- which is defined by only the bright/soft side of the E_{iso} versus E_{peak} (Amati) relation, since this does not suffer from significant selection bias. An advantage of this approach is that changing a GRB redshift would only slide it along the one-sided Amati relation, making actual GRB redshifts less important than how GRB brightness and hardness change with cosmological distance. Therefore, it is the slope of this one-sided Amati relation that makes it a cosmological model discriminator. We investigate the limits of the power of this method to discern between cosmological models where dark energy changes with redshift.