

Physics Colloquium
Michigan Technological University
April 20 (Thursday), 2006, 3:00-5:00 p.m.
Room 139, Fisher Hall

Feasibility Study of Detecting Gravitational Waves with GPS

Matthew Mosher

(Advisor: Dr. Robert Nemiroff)

Gravitational waves are predicted by general Relativity as waves of space time. There are several initiatives focused on detecting Gravitational waves. This research was determining the feasibility of using the Global Positioning System to detect Gravitational waves.

The Refurbishment of the Radio Telescopes at Amjoch Observatory

Matt Merlo

(Advisor: Dr. Bryan Suits)

For my senior research, I refurbished the two radio telescopes dishes at are located at the Amjoch Observatory in Atlantic Mine. This project is part of the ongoing effort to restore the observatory to prime condition, so it can be used for educational purposes be MTU and the surrounding community. My presentation will cover the basic background and technical details that were necessary to refurbish these telescopes.

The Ion Distribution of a Hall Effect Ion Thruster

Dan Cordell

(Advisor: Dr. Brad King)

Though ion distribution for traditional Hall effect ion thrusters is well characterized, different designs produce different results. We characterize both the population and energy distributions from a new thruster, designed at MTU, using an ExB probe and a retarding potential analyzer.

Characterization of Electrical Properties of ZnO Nanowire Films

Matt Davenport

(Advisor: Dr. Yoke Khin Yap)

This senior research report discusses the fabrication of zinc oxide nanowire film devices and the examination of their I-V curves in several different environments. This investigation was conducted primarily to explore the potential application of ZnO nanowire film devices to biological and chemical sensing.

Estimating the Surface Area of Ice Particles Using Cauchy's Formula

Adam Kaczynski

(Advisor: Dr. Alex Kostinski)

Information about cloud properties can be gained by knowing the size of the particles in a cloud. By simulating images of ice particles in a cloud and applying Cauchy's Formula for Convex Polyhedrons, which relates the average projected area of an object to its surface area, the number of images necessary for an accurate calculation of the surface area can be determined.

Simple Statistical Analysis of Ultra-High Energy Cosmic Ray Showers

Patrick Phelps

(Advisor: Dr. David Nitz)

A simple analysis of simulated cosmic ray shower data from the ARES (AIRshower Extended Simulations) program. The current project is to analyze the output of the program using simple statistical methods to see if any trends emerge. Comparing this data to the real world data from the Pierre Auger observatory we hope to discern at what level simple statistical analysis can be used to evaluate the simulations.

Important Electron Correlation Effects of $4f7\ j=7/2$ Transitions in GdIV

Eric Domeier

(Advisor: Dr. Donald Beck)

In this talk I will go over how we calculated the transition energies of GdIV, including both the a priori calculation and improving our calculation with electron correlation effects and the results that we have obtained. In addition I will cover some of the potential uses of our research and how we hope to further refine our results.

Aligning Carbon Nanotubes on a Substrate

Eric Carlson

(Advisor: Dr. Yoke Khin Yap)

I present a method for aligning carbon nanotubes on a substrate. Dispersing nanotubes in solutions of ethanol with varying concentrations of $\text{MgCl}_2 + 6\text{H}_2\text{O}$ provides a medium and a mechanism for electrophoresis. Observing which concentrations provide the best alignment will be usefully for making devices that utilize carbon nanotubes' good field emission properties.