Physics Colloquium

Michigan Technological University

Thursday, April 1, 2010 at 4:00 pm

Room 139 Fisher Hall

Record-breaking Statistics and Reversibility: Applications in Global Temperature Variability

Amalia Anderson

Advisor: Dr. Alex Kostinski

Abstract: Record-breaking statistics provide a simple, distribution-independent test of stationarity. In Anderson and Kostinksi, Journal of Applied Meteorology and Climatology, in press, we use this result to develop a new test – of variability. Then we use this test to consider the problem of detecting global temperature variance trends. Detection of a global temperature variance trend is an important problem, since variance trends often have more impact than mean trends on extreme events. Also, this is an open problem as the literature is surprisingly sparse and the conclusions vary widely. By using our new test of variability we detect a decreasing variance trend in global temperatures.

Biography: Amalia got her undergraduate degree from Luther College, in Iowa. She is in her fourth year at Michigan Tech and is working toward a PhD in Physics.

Quantum Behavior of Multi-Quantum Island Single Electron Transistor (SET) Devices

Madhusudan Savaikar

Advisor: Dr. Paul Bergstrom
Co-Advisor: Dr. John Jaszczak

Abstract: Devices in which the storage and transport of single electrons are systematically controlled could lead to a new generation of nanoscale devices. Researchers have taken keen interest in the fabrication and modeling of charging effect based Single Electron Devices (SEDs) ever since the charging effects were experimentally observed. Tunnel junctions provide pathways for charge transport between the nodes in such devices. Therefore an individual tunnel junction characterization is an important and an essential step towards the modeling of multi-junction 1-D and multidimensional SEDs. $J-V$ characterization study done for an experimentally fabricated tunnel junction would be presented and the results would be compared. Effects of the change in the junction width on these characteristics would be discussed. Finally the $I-V$ characterization of a two-island system displaying the coulomb blockade that can be used for a switching action would be presented.