Physics Colloquium

Michigan Technological University

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4:00 pm
Room 139 Fisher Hall

The Search for Astrophysical Neutrinos with the IceCube Experiment

Segev Benzvi

University of Wisconsin
Madison

Abstracts: The IceCube Neutrino Observatory, currently nearing completion at the South Pole, is designed to detect high-energy neutrinos from astrophysical sources. When it is fully deployed in 2011, the detector will comprise 4800 optical modules embedded inside a cubic kilometer of clear ice, located one mile below the surface of the Antarctic ice sheet. By recording the particle cascades created by neutrino interactions inside the ice, the detector is sensitive to charged cosmic rays and neutrinos with energies between 100 GeV and 100 PeV. This energy range includes the neutrinos we expect to see from extragalactic particle accelerators, such as Gamma Ray Bursts and Active Galactic Nuclei, as well as the by-products of charged particle interactions with the cosmic microwave background (GZK neutrinos). In this talk, we will describe the configuration, deployment status, and sensitivity of the IceCube detector. We will also review preliminary results from IceCube, including a search for neutrino point sources, a measurement of the energy spectrum of atmospheric neutrinos, and a surprising (and unexplained) observation of a large-scale anisotropy in TeV cosmic rays.

Bio: Segev BenZvi is a member of the Pierre Auger Collaboration, where he has specialized in atmospheric monitoring and the influence of atmospheric conditions on the measurement of the energy and mass composition of EeV cosmic rays. Since joining IceCube in 2008, he has studied the anisotropy of TeV cosmic rays observed at the South Pole, which mirror a similar anisotropy recorded in the northern hemisphere (but whose origins are not understood). He has also recently joined the HAWC experiment, a TeV gamma ray observatory under construction in Mexico.

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