

Princeton University
Department of Astrophysical Sciences

Announces the

2006 Lyman Spitzer, Jr. Lecture Series

Extreme Astrophysics

Presented by

Francis Halzen
Department of Physics, University of Wisconsin, Madison

General Astronomy Colloquium*

Tuesday, May 2

4:15pm

Peyton Hall Auditorium

High-Energy Neutrino Astronomy: Towards Kilometer-Scale Neutrino Observatories

Kilometer-scale neutrino detectors such as IceCube are discovery instruments covering nuclear and particle physics, cosmology and astronomy. Examples of their multidisciplinary missions include the search for the particle nature of dark matter and for additional small dimensions of space. In the end, their conceptual design is very much anchored to the observational fact that Nature produces protons and photons with energies in excess of 10^{20} and 10^{13} electronvolts, respectively. The cosmic ray connection sets the scale of cosmic neutrino fluxes. The problem has been to develop a robust and affordable technology to build the kilometer-scale neutrino detectors required to do the science. The AMANDA telescope using clear deep Antarctic ice as a Cherenkov detector of muons and showers initiated by neutrinos of all 3 flavors, has met this challenge. We review the results obtained with more than 5000 well-reconstructed neutrinos in the 50 GeV~500 TeV energy range collected during its first 4 years of operation. More importantly, we will show that AMANDA represents a proof of concept for the ultimate kilometer-scale neutrino observatory, IceCube, now under construction.

Lectures

Peyton Hall Auditorium

Lecture 1	Monday, May 1	3:30	Extreme Astrophysics: Cosmic Rays, Gamma Rays and Neutrinos
Lecture 2	Friday, May 5	3:30	The Highest Energy Neutrinos: Particle Physics and Astronomy
Lecture 3	Thursday, May 11	3:30	Neutrino Telescopes

* Refreshments will be served immediately following the Colloquium in the Peyton Hall Reception Area