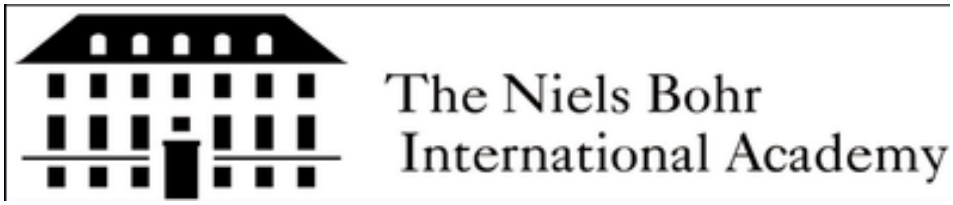

Contribution ID: **0** Type: **not specified**

A Search for Astrophysical Neutrino Sources in the Southern Hemisphere using the IceCube Neutrino Observatory

Tuesday 24 June 2014 16:40 (20 minutes)

One of the most intriguing topics in physics today is to find the answers to where cosmic-rays are produced and how they are accelerated. Hadronic acceleration models suggests that cosmic-ray protons and nuclei are accelerated and they subsequently interact with ambient radiation or matter producing high-energy neutrinos through the decay of light mesons. Unlike charged particles that are bent in magnetic fields and gamma-rays that can be absorbed through interactions with the interstellar medium, neutrinos are of particular importance since they interact only weakly and hence point back to the source of emission. An observation of neutrinos from areas associated with emission of high energy gamma-rays would not only be a key to better understanding of the acceleration mechanism but would also give unique insights of the most dense and violent regions in the Universe.

IceCube is a cubic-kilometer-scale neutrino detector located in the ultra-clear ice at the South Pole. One of the main goals is to search for localized neutrino sources. Recent development has lowered the energy threshold for southern hemisphere point-source searches by utilizing part of the detector as a veto for incoming atmospheric muons that constitutes the background. No point source has yet been found, but IceCube's limits on point sources are approaching the predictions for galactic sources. We expect results in the near future were we for the first time could get a detailed glimps of the Universe through the neutrino window. I will present recent results on a low-energy (100 GeV- 50 TeV) point source search with focus on the sources in the Southern Hemisphere.

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Session Classification: Problems Class/Student Talks

Track Classification: Tuesday