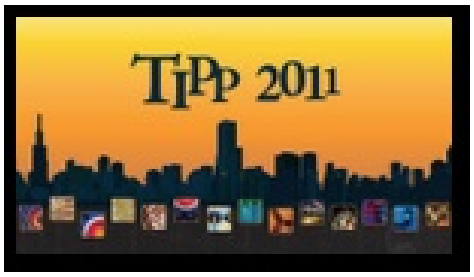

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IceCube-DeepCore and beyond: towards precision neutrino physics at the South Pole

Saturday 11 June 2011 11:00 (30 minutes)

The IceCube Neutrino Observatory is the world's largest high-energy neutrino telescope, utilizing the deep Antarctic ice as the Cherenkov detector medium. In December 2010 the last of the observatory's 86 strings of optical detectors was deployed, completing the approximate cubic-kilometer array. The DeepCore detector, the low-energy extension to the IceCube, uses high-quantum efficiency optical modules in the clearest ice to instrument a fiducial volume of up to 30MT. With DeepCore, IceCube has very high neutrino detection efficiency for energies ranging from ˜10 GeV to a few EeV, providing extended reach to, among other neutrino physics, indirect Dark Matter searches and atmospheric neutrino oscillations. Much of the success in achieving a pure neutrino sample in the detector is the use of the IceCube array as the world's largest active veto for cosmic ray muons. The possibility exists to further infill the DeepCore array to achieve lower detector energy thresholds and higher precision measurements in the deep ice and we consider a two phase approach to such an infill array.

The first phase detector, similar in design to DeepCore, has goals of 10MT with sub-GeV energy sensitivity, augmenting the DeepCore physics program. The potential second phase would seek to achieve a few MT fiducial volume with an approximate 10 MeV energy threshold, for burst of events, for a large-scale physics program that includes proton decay, supernova neutrinos and potential future long baseline efforts.

Presented will be a status of the IceCube detector, with initial data from the first full year of the complete DeepCore detector, and the ongoing physics feasibility studies for these potential new arrays buried in the ice.

Author: Prof. GRANT, Darren (University of Alberta)

Presenter: Prof. GRANT, Darren (University of Alberta)

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