



**NITheP cordially invites you to a seminar by:**

**Prof. Jonathan Sievers**

*University of KwaZulu-Natal*

Date: Friday, 8th November 2013

Time: 11h15 – 12h15

Venue: NITheP Seminar room, H-Block, 3<sup>rd</sup> Floor

**Title: The Oldest Light in the Universe**

**Abstract:**

The universe started off as a hot dense place. Free electrons locked photons in place. By about 400,000 years after the Big Bang, the universe had expanded and cooled enough for electrons and protons to combine into hydrogen atoms, and the cosmos became transparent. We can look into the distance, and thereby back in time, and watch the universe become transparent. This light coming from there has been stretched by the expansion of the universe to microwave frequencies, so is called the Cosmic Microwave Background (CMB). The universe was remarkably smooth when the CMB was emitted, with the density uniform to a few parts in  $10^5$ . Experimental advances have made even these tiny fluctuations observable, and in fact they provide our most detailed view of the large-scale properties of the universe, like its age, its density, and what it is made up of. CMB observations even provide the strongest constraint on the mass of the neutrino. This talk will cover the basic physics of the CMB and explain how we learn from it, show constraints from recent experiments (such as the Planck Satellite and the Atacama Cosmology Telescope), and give a taste for what new results should come from currently operating instruments.

**Tea/coffee and biscuits will be served at 11h00**