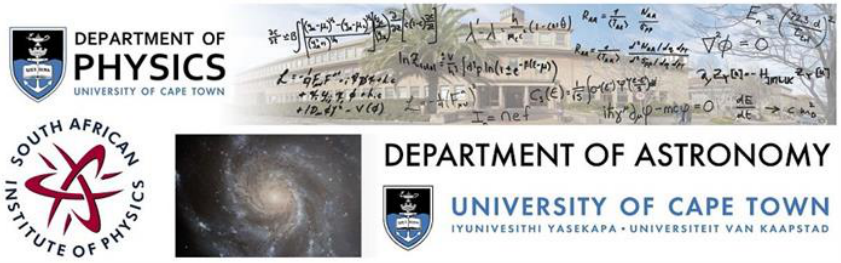

Contribution ID: **581** Type: **Oral Presentation**

PLENARY: Probing the Mystery of Dark Energy With Billions of Galaxies

Thursday, 7 July 2016 08:40 (1 hour)

Abstract content
   (Max 300 words)
Formatting &
Special chars

The discovery in the late 90's that the universal expansion is accelerating, rather than decelerating, has had a profound effect on modern physics. One possible explanation for that phenomenon is that the entire vacuum of space is filled with a mysterious energy field with negative pressure, the so-called 'dark energy'. However, the value of the implied energy density is nearly 120 orders of magnitude smaller than what would be naively expected from quantum field theories. So this remains one of the most pressing problems in physics.

The only clear means we have of probing this problem experimentally is to make increasingly precise measurements of the expansion history of the universe itself. In recent years, a variety of distinct methods have been developed for that purpose, all of which involve measuring subtle statistical properties of the distribution and characteristics of large numbers of galaxies. I will describe these techniques, and introduce the Large Synoptic Survey Telescope (LSST), which is currently under construction. LSST is a large-aperture, wide-field ground-based telescope designed to make an imaging survey of the entire southern hemisphere every few nights. Over ten years of operations, LSST will acquire roughly 1,000 distinct images of every part of the southern sky. Nearly 20 billion galaxies will be detected, yielding a very rich sample for cosmological investigations that will provide extremely tight constraints on the nature of dark energy.

Primary author: Prof. KAHN, Steven M. (Stanford University, California)

Presenter: Prof. KAHN, Steven M. (Stanford University, California)

Session Classification: PLENARY

Track Classification: Track H - Plenaries