

THE UNIVERSITY OF HONG KONG
COLLOQUIUM IN PHYSICS DEPARTMENT

**Understanding Gravitational Redshifts in Clusters of
Galaxies and in Cosmology**

Prof. Nick KAISER

Institute for Astronomy, University of Hawaii

Time: Tuesday, March 1, 2016, 4:30 p.m.

Venue: Lecture Theatre P4, LG1/F, Chong Yuet Ming Physics Building, HKU

Abstract:

In 2011 astronomers reported in Nature a measurement of the gravitational redshift in massive clusters of galaxies. The results appeared to agree with Einstein's General Theory of Relativity, and to exclude some alternatives.

It turns out that this effect is rather more complicated than was initially thought and raises a number of interesting fundamental questions about the nature of redshifts in astronomy. For one thing, the result challenges the common notion of redshifts being 'caused by the expansion of space'. Second, there are several special relativistic effects that need to be considered. One of these is the well known transverse Doppler redshift, but two others were unexpected.

I shall describe the observation; show how it provides a playground for exploring some aspects of special relativity and cosmology; and discuss what it tells us about alternative theories of gravity.

About the Speaker:

Prof. Nick Kaiser is an eminent observational cosmologist at the University of Hawaii. He was instrumental in developing the four main observational probes that are used to test modern theories for the formation of the Universe and the structure it contains: the cosmic microwave background; galaxy clustering; cosmic-flows, and gravitational lensing. He also led the development of the Pan-STARRS wide-field survey observatory. Prof. Kaiser has won numerous prizes and is a member of the Royal Society.



Physics colloquium series is organized to introduce cutting edge researches and new development in physics, designed to be suitable to graduate and undergraduate students, and also to scientists working on different fields. Each colloquium will generally start with an extensive introduction of the background of the field, followed by forefront research topics and results. The colloquium will serve as an education forum for students and laymen alike, and also serve as a platform for exchange and update their knowledge of various branches of physics among academic staff members.

Coffee and tea will be served 20 minutes prior to the colloquium

Anyone interested is welcome to attend

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