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NITheCS Colloquium
Monday, 21 June 2021, 16h00

Prof Kavilan Moodley | University of KwaZulu-Natal

"Dark energy and cosmological cross-correlations with HIRAX 21cm intensity mapping"

ABSTRACT

Observations of redshifted 21-cm emission of neutral hydrogen over a wide range of radio frequencies allow us to access redshifts that encompass a vast comoving volume, including the era of dark energy. In this talk, I will present the Hydrogen Intensity Mapping and Real-time Analysis eXperiment (HIRAX) project, which is a proposed 21cm intensity mapping experiment operating at 400-800 MHz that will measure the evolution of dark energy over the redshift range z=0.8-2.5 by using the characteristic baryonic acoustic oscillation scale as a standard ruler. The HIRAX radio telescope array will be sited in the radio-quiet Karoo astronomy reserve in South Africa and will ultimately comprise 1024 dishes, each six metres in diameter, placed in a compact configuration. I will discuss the design and project status of HIRAX and its scientific prospects. This includes dark energy forecasts as well as prospects for interesting cosmological constraints from cross-correlations of HIRAX data with other large-area, southern-sky cosmological surveys.

BIOGRAPHY

Kavilan Moodley is Professor of Applied Mathematics at the University of KwaZulu-Natal in Durban, South Africa. Moodley's research deals with theoretical and observational cosmology. Moodley has made important contributions to the Atacama Cosmology Telescope project and is presently the PI of the HIRAX experiment, an upcoming 1024 element interferometric array to be based in the Karoo Desert in South Africa. HIRAX will map out the acceleration of the Universe, discover numerous new pulsars, and help characterize and localize fast radio bursts.

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