EXPLORING THE COSMOS WITH FUTURE CMB POLARISATION DATA

SEMINAR

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Abstract

The study of the cosmos has advanced significantly over the past three decades through measurements of the Cosmic Microwave Background (CMB) temperature anisotropies with unprecedented precision, as well as polarisation anisotropies with moderate sensitivity. In the coming decades, CMB polarisation will be measured with substantially higher sensitivity by experiments such as **LiteBIRD**, the **Simons Observatory**, and other forthcoming missions. The primary scientific objective of these experiments is the detection of **primordial B-mode polarisation** in the CMB. The same data will also enable the exploration of new physics, including **cosmic birefringence** (parity-violating effects in CMB photons) and extensions to the standard cosmological model, particularly those aimed at alleviating the **Hubble tension**. In this talk, I will present the prospects for detecting primordial B-mode signals with **LiteBIRD** and other proposed experiments in the presence of various foreground complexities. I will also discuss two novel science cases—**cosmic birefringence** and **Rayleigh scattering**—which are being targeted as potential extensions of the standard model of cosmology.

Everyone is invited to attend