



INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE

2A & 2B, Raja S. C. Mullick Road, Jadavpur, Kolkata-700 032

School of Physical Sciences

SEMINAR NOTICE

Title : Observing nulls in primordial correlations via the 21 cm signal

Speaker : Dr. H. V. Ragavendra, IISER, Kolkata

Date : September 01, 2022 (Thursday)

Time : 15:00 hours (IST)

Venue : Physics Seminar Room (C-406), 3rd Floor, Centenary Building, IACS

Join Zoom Meeting

<https://zoom.us/j/93343455180>

Meeting ID: 933 4345 5180

Passcode: 157066

Abstract:

The 21 cm line emitted by neutral hydrogen during the Dark Ages carries imprints of pristine primordial correlations. In a recent work, we have shown that, in models of inflation driven by a single, canonical scalar field, a phase of ultra-slow-roll inflation can lead to a null in all the primordial correlations at a specific wavelength. We have explicitly illustrated this effect in scenarios wherein the nulls in correlations occur over the wavelengths of 0.01 to 1 Mpc. In this talk, I shall first discuss the inflationary dynamics responsible for this nulling in correlations. I shall illustrate the behavior of primordial scalar power and bi-spectra focussing on the range of wavelengths around this null. Further, I shall present the feature of dip in the power and bi-spectra of HI signal caused by such a null, which can be detected by observational missions. While the dip in the signal from the redshift of $z = 25$ is within the range of sensitivity corresponding to SKA-Low, we find that the predicted signal is much more discernible from the redshift of $z = 50$, with the sensitivities that can be achieved by future missions such as SKA-II or a lunar array. Lastly, I shall conclude with the key result that the detection of such a unique dip in the 21 cm spectra will serve as a confirmation of an ultra-slow-roll phase during inflation.

All are cordially invited to attend the seminar.