



ICTS Astrophysics & Relativity Seminar

Title : Probing cosmic expansion with gravitational wave-large scale structure correlations

Speaker : Sayantani Bera (Centre de Physique Théorique (Cosmology), Aix-Marseille University, France)

Date : Thursday, 27 February 2025

Time : 3:30 PM (IST)

Abstract : The most debated crisis in cosmology today is, perhaps, the inconsistency of the estimated value of the current expansion rate of the Universe (known as the Hubble constant, H_0) between different probes using high redshift and low redshift observations. Gravitational wave (GW) emitting sources, which are routinely observed nowadays through the ground-based LIGO-Virgo-KAGRA detector network, could serve as an independent probe shedding light on this crisis. Such sources, also called the “standard sirens”, provide us with a direct measure of the cosmological distances through the observed gravitational wave strain. When accompanied by an electromagnetic counterpart, such as Gamma Ray bursts, the redshift of the source can also be determined, thus offering a new avenue to probe the cosmic expansion. However, the majority of the detected GW events are “dark sirens”, i.e. they do not have an associated electromagnetic signal. For such sources, one can make use of their clustering properties with respect to the observed galaxies and the underlying dark matter distribution, since they are part of the same large-scale structure and are thus correlated with each other through structure formation history. In this talk, I will discuss how the angular correlation between gravitational-wave standard sirens and galaxies allows an unbiased inference of the Hubble constant. With the growing number of such events in future observations, this technique will be imperative for a robust cosmological inference using GWs.

Venue : Feynman Lecture Hall

Zoom Link: <https://icts-res-in.zoom.us/j/93498931685?pwd=8bjMSfOZ8TdTccBPa3nVclHye2l1e6.1>

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