

## **ICTS Astrophysics & Relativity Seminar**

- Title** : Multi-messenger cosmology with next generation Gravitational Waves detectors and Electromagnetic surveys
- Speaker** : Sumit Kumar (Max Planck Institute, Germany)
- Date** : Monday, 3rd June 2024
- Time** : 3:30 PM (IST)
- Abstract** : Cosmology has traditionally relied on electromagnetic (EM) spectrum experiments, like CMB observation and galaxy surveys, to advance. The growing catalogue of Gravitational Waves (GW) mergers offers an independent cosmological probe. Upcoming GW detectors such as the Einstein telescope (ET) and Cosmic Explorer (CE), in conjunction with contemporary EM surveys like the Vera C Rubin Observatory and Square Kilometer Array, will enable us to explore the Universe up to high redshift. In this talk, I will review different methods to probe background cosmology and large-scale structures (LSS) using EM and GW observations. I will show that with 5-10 years of observations, we can detect LSS features, such as Baryon Acoustic Oscillations and clustering bias, using solely GW observations, with a Bayes factor greater than 10. I will also discuss the most effective strategies for integrating data from galaxy surveys and GW merger catalogues to constrain parameters for diverse cosmological models. Furthermore, analyzing the redshift-dependent evolution of LSS features could help us understand the connection between compact binary formation and structure formation.
- Venue** : Emmy Noether Seminar Room
- Zoom Link: <https://icts-res-in.zoom.us/j/93150422207?pwd=WXBmNE0vMUFOa1VCRWpHZlJFR0FmQT09>  
Meeting ID: 931 5042 2207  
Passcode: 030304