

## ICTS Astrophysics & Relativity Seminar

**Title** : Morphological Characterization of Galactic Foreground Emissions

**Speaker** : Fazlu Rahman (Raman Research Institute, Bengaluru)

**Date** : Thursday, 06th June 2024

**Time** : 03:30 PM (IST)

**Abstract** : Accurate component separation of full-sky maps in the radio and microwave frequencies, such as the cosmic microwave background (CMB), relies on a thorough understanding of the statistical properties of the Galactic foreground emissions. These emissions include synchrotron, free-free, thermal dust emissions etc. With this objective, we studied the statistical properties, namely the non-Gaussianity and statistical isotropy of various Galactic all-sky maps using morphological statistics, such as Minkowski functionals (MFs) and tensors (MTs). We find that all the foreground maps examined are highly non-Gaussian. However, towards small angular scales, the amplitude of non-Gaussianity falls, with the nature of non-Gaussianity being kurtosis-type. This holds irrespective of the difference in the astrophysical sources of these emissions. Further, we use morphological tools to probe the residual contamination in the astrophysical maps given by WMAP and Planck experiments. In this talk, I will summarise these results and discuss their potential in enhancing foreground subtraction in CMB experiments.

**Venue** : Emmy Noether Seminar Room

Zoom Link: <https://icts-res-in.zoom.us/j/94846542089?pwd=d3V1OG0yVHZSLzQrb3ZzRmpERFNLQT09>

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