

The multipolar structure of the local universe

Sunday 10 September 2023 12:30 (30 minutes)

The three-dimensional expansion rate fluctuation field is an unbiased Gaussian observable that measures deviations from the linearity and isotropy of the redshift-distance relationship in an optimal, robust, and model-independent way (Kalbouneh, Marinoni, Bel 2023). We show how to perform a spherical harmonic analysis of this observable and determine the multipole structure of the Hubble expansion rate in the local universe, as traced by samples of galaxies Cosmicflows-4 and, independently, of SNIa (Pantheon+). With this analysis, we update and extend the scope of the conclusions we have previously drawn from the analysis of smaller samples (Cosmicflows-3 and Pantheon). We also show how to subtract multipole fluctuations from the data and extract an optimal value of the Hubble constant. We then compare this value with that found by traditional analyses and discuss the implications for cosmology.

Presenter: Dr KALBOUNEH, Basheer (Aix-Marseille university/ CPT)