152. Relativistic dynamics in a Friedmann Universe

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Abstract

The Friedmann-Lemaître-Robertson-Walker (FLRW) model stands as a cornerstone among cosmological frameworks, effectively describing the formation and evolution of cosmic structures consistent with most empirical observations. The backbone of the FLRW is the cosmological principle according to which the universe is homogeneous and isotropic on large scales. However, current three-dimensional catalogues reveal a contrasting view of the universe as non-homogeneous and non-isotropic up to the furthest observational limits, challenging the accuracy of the FLRW model.

In this paper, we derive new redshift-light intensity and redshift-number density relations using Einstein Field Equations (EFE) based on the number count of galaxies method, detailing the dynamics and evolution of the universe within the FLRW paradigm. Our findings show that these novel relations can precisely characterize galaxy formation and evolution, enhancing our understanding of the cosmos. Specifically, the relations replicate the initial burst of galaxies at the beginning of the universe, consistent with other models, and provide more general and accurate results for structure formation and evolution, aligning with observational data. This makes them a promising tool for future cosmological studies.

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