

ABSTRACT ONLY

A COMPARISON OF MULTIFRACTAL BEHAVIOR IN GALAXY SAMPLES FROM SDSS

J. E. García-Farieta¹ and R. A. Casas-Miranda¹

In this paper we study the spatial distribution of galaxies at large-scale in the Universe with samples from the Sloan Digital Sky Survey of Galactic redshift (SDSS) including observational holes in the masks, particularly with SDSS Data Release 7 (DR7), Data Release 10 (DR10) and Data Release 11 (DR11). From a multifractal formalism and using the sliding window technique for each sample limited to the redshift range $0.002 < z < 0.2$, we have determined the fractal dimension $D_q(r)$ in the range $-6 \geq q \geq 6$ and the lacunarity spectrum to characterize the hierarchical clustering as well as its dependence with the radial distance. Additionally the scale of homogeneity was determined for each structure parameter q in the samples. Our results show that the galaxy clustering exhibits a behavior that depends on the radial distance, revealing that the hierarchical clustering is not a fractal at large-scales, with a transition to homogeneity on large scales below $130 Mpc/h$, finding a strong consistency with Standard Model of Cosmology (Λ CDM). Finally we report a effect due to observational holes in the geometry of the catalogues that cause a shift in the homogeneity scale r_H for some samples, this effect induces a weak fractal behavior even for large-scales.

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¹ Universidad Nacional de Colombia - Sede Bogotá, Departamento de Física, Av. Cra 30 No 45-03, Bogotá, Colombia (joegarciafa@unal.edu.co).