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Cosmological Renormalization Group Equation and the Scale Dependence of Cosmic Voids ERIC STEINFELDS, KEITH ANDREW, THAD ROBERTS, CURTIS POLAND, Western Kentucky University — The large scale structure of the galaxy distribution in the cosmic web is often characterized by the two point correlation function. Recently general two point correlation analysis has been extended from galaxies to quasars, clusters, halos and voids. However, the two point function is just the first in an infinite series of the full n-point correlators needed to understand the details of large scale cosmological structure. It has been found that for a certain range of scales the distribution of matter and of voids exhibits a self-similar pattern. As noted by Peebles, the Renormalization Group Equation (RGE) can be used to study large scale structure from a different perspective involving self-similar patterns. The RGE can be effective for identifying patterns that appear at multiple length scales such as those in a multifractal structure. Here we apply the multifractal method to SDSS, CfA, 6dFGRS, WiggleZ and n body hierarchical numerical simulations from Gadget II. We find the singularity spectrum for a dual mulitfractal void structure that has an asymptotic RGE homogeneity scale on the order of $390h^{-1}$ indicating there can be a very large nearly uniform matter distribution similar to the Cosmological Principle used in FRLW cosmological models.

Keith Andrew
Western Kentucky University

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