



Dynamic renormalization group analysis of multifractal processes in intermittent turbulent space plasmas

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A modern description of dynamical complexity relevant to the intermittent turbulence of coexisting nonpropagating spatiotemporal fluctuations and propagating modes in space plasmas is provided. The theory is based on the physical concepts of sporadic and localized interactions of coherent structures that emerge naturally from plasma resonances. The technique of the dynamic renormalization group is applied to the study of forced and/or self-organized criticality (FSOC), scale invariance, and symmetry breaking, related to such type of multiscale fluctuations. Numerical examples are presented to illustrate the concepts and methodology.