

Abstract Submitted
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Parabolic Profile Approximation for the Singularity Spectrum in Fully Developed Turbulence: Applications to Enstrophy Cascade in Two Dimensions BHIMSEN SHIVAMOGGI, University of Central Florida — The parabolic-profile approximation (PPA) for the singularity spectrum $f(\alpha)$ of fully-developed turbulence (FDT) is extended to the Kolmogorov microscale regime. The PPA also affords, unlike the multi-fractal model, an analytical calculation of probability distribution function of velocity gradient, and describes intermittency corrections that complement those provided by the homogeneous-fractal model. This formulation is extended to the two-dimensional (2D) enstrophy cascade. Intermittency (externally induced) in the 2D enstrophy cascade is shown to be able to maintain a finite enstrophy along with a vorticity conservation anomaly. Intermittency mechanisms of 3D energy cascade and 2D enstrophy cascade in fully-developed turbulence seem at least theoretically to have some universal features.

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