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Inertial Range Similarity in Isotropic Turbulence MOGENS MELANDER, BRUCE FABIJONAS, Dept of Mathematics, SMU — We consider equilibrium statistics for high Reynolds number isotropic turbulence in an incompressible flow driven by steady forcing at the largest scale. We show how scaling invariance of one function, together with power laws for the structure functions, can account for the phenomenon of anomalous scaling. Our similarity theory yields expressions for scaling exponents, coefficients, PDF, and cumulants. Also, a turbulence length scale with no Reynolds number dependence emerges. The theory is a sharper version of our 2004 presentation: a better similarity hypothesis, fewer assumptions, and excellent agreement with shell model data.

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