Abstract Submitted
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Reaching high resolution for studies of intermittency in energy and scalar dissipation rates[1] K. RAVIKUMAR, P.K YEUNG, Georgia Tech, K.R. SREENIVASAN, New York Univ — Passive scalar fields in high Reynolds number turbulence are often observed to be highly intermittent in both the inertial-convective (via the extreme anomaly of structure function exponents) and viscous-diffusive ranges (via intense fluctuations of the scalar dissipation rate, χ), with the Schmidt number, Sc, acting as an additional parameter. High-resolution direct numerical simulations are clearly crucial, and reliable conclusions on the Sc-effects require that resolution be adequate for all scalars involved. Such calculations are computationally very expensive. However, it is possible (Yeung & Ravikumar, to appear in Phys. Rev. Fluids, 2020) to replace long simulations of stationary isotropic turbulence at high resolution by multiple short segments evolved from lower-resolution data, at much lower cost. It is also useful to perform ensemble averaging over the statistics of scalars with the same Sc but subjected to uniform mean gradients in different directions. Fluctuations of χ for a scalar with $Sc = 1$ are more intermittent than those of the energy dissipation rate (ϵ). Numerical results including moments of local averages of χ and conditional moments of χ given ϵ at resolution up to 6144^3 will be presented.

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