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Dynamics of non-local interactions in isotropic turbulence AGUSTIN MAQUI, DIEGO DONZIS, Texas A&M University — A large database of isotropic turbulence with R_{λ} ranging from 38 to 1100 and resolutions up to 4096³ is used to study aspects of the dynamic response of the small scales to forcing at the largest scales. Time correlations of spectra and transfer show that changes in the large scales have an immediate effect on the smallest dissipative scales. Furthermore, these non-local interactions are strongly anti-correlated for wavenumbers beyond the so-called bottleneck. While the applied large-scale forcing is Gaussian, the probability density function of individual modes of the energy spectrum is skewed for all wavenumbers. On the other hand, transfer spectra shows departures from Gaussianity only at high wavenumbers. Short-term behavior is studied through the evolution of the ratio of spectral levels at different wavenumbers as forcing is abruptly introduced or discontinued. All results demonstrate the direct connection between distant scales. More importantly, the observed trends do not appear to decrease as the Reynolds numbers increases. Different models for the spectral transfer are shown to capture some of the observed behavior. Further consequences of the results will be discussed.

> Agustin Maqui Texas A&M University

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