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**Triad interactions in a four-dimensional fluctuating velocity field** PREBEN BUCHHAVE, Intarsia Optics, CLARA VELTE, Technical University of Denmark — High intensity turbulence should be considered a stochastic function of four independent parameters, three spatial coordinates and time. The interaction between the different velocity structures is caused by the nonlinear term in Navier-Stokes equation and is conventionally analyzed by a three-dimensional spatial Fourier transform in a homogeneous velocity field resulting in the so-called triad interactions caused by the second order convection term. We present some conclusions resulting from an analysis of a four-dimensional Fourier transform of the fluctuating velocity. Moreover, we consider a case corresponding to a realistic experiment, where the velocity is digitally sampled with a finite sample rate and the flow is limited to a finite spatial and temporal range. Our results explain features observed in experiments such as the time development of the power spectrum, deviations from the conventional Richardson cascade and perseverance of initial large-scale spectral features.

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