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Coherent events in the phase of the Fourier spectrum of isotropic 2D turbulence[1] JOSE-MIGUEL REYNOLDS-BARREDO, Universidad Carlos III de Madrid, DAVID E. NEWMAN, University of Alaska Fairbanks, PAUL W. TERRY, University of Wisconsin-Madison, RAUL SANCHEZ, Universidad Carlos III de Madrid — While studying turbulence it is common to analyze the Fourier transform of the evolved fields. However, most of these studies focus only on the amplitude of the Fourier transform, completely ignoring the complex phase. From the time of Kolmogorov, the slopes of the power spectrum have been extensively investigated. In contrast, studies of the phase are scarce, mainly due to the difficulties of its interpretation. Here, we continue previous studies on a 2D plasma turbulence model in which we showed that clear coherent patterns do appear in the complex phase of the Fourier spectrum, mainly within the dissipation range. These events have been shown to be associated with intermittent structures in real space.[2] In this contribution, these results have also been obtained using the more general case of 2D incompressible Navier-Stokes equations, including different types of dissipation. The conclusions of our previous work remain in the sense that the coherent events continue to appear intermittently in the phase, being rather insensitive to the particular details of the model. This is the first time that such clear coherence patterns have been identified in the phase of the Fourier spectrum for a turbulence simulation.

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[2]J.M. Reynolds-Barredo et al., 54th APS (2012)

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