

Reply to 'Some observations on 'Spectral laws for the enstrophy cascade in a two-dimensional turbulence' '

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## COMMENT

# Reply to "Some observations on 'Spectral laws for the enstrophy cascade in a two-dimensional turbulence'"

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**Abstract.** This comment purports to respond to some remarks made on my paper in a recent comment in an effort to clarify a somewhat controversial situation in the enstrophy cascade of two-dimensional turbulence.

Paladin and Vulpiani remark, in their comment [1] on the paper [2], that it is not appropriate to calculate the scaling law of the energy spectrum by using the scaling laws of the velocity difference because of non-locality of the interactions in the Fourier space. But, a locality in the Fourier space is exactly what is assumed in deriving the Batchelor-Kraichnan scaling law  $E(k) \sim k^{-3}$  for the enstrophy cascade! (The spectral localness of the nonlinear interactions is produced by the intermittency arising from the formation of coherent structures, see McWilliams [3].) The authors further object to the use of a  $\beta$ -model to calculate the intermittency corrections to the Batchelor-Kraichnan scaling law for the enstrophy cascade and propose that the intermittency in question is due to the fact that the isovorticity lines are not space filling. But that would anyway tend to support that the set on which the enstrophy dissipation is concentrated cannot be space-filling, as assumed in the  $\beta$ -model in question!

## References

- [1] Paladin G and Vulpiani A 1990 *J. Phys. A: Math. Gen.* **23** 4717
- [2] Shivamoggi B K 1990 *J. Phys. A: Math. Gen.* **23** 1689
- [3] McWilliams J C 1983 *Predictability of Fluid Motions (La Jolla Institute, 1983) (AIP Conf. Proc. 106)* ed G Holloway and B J West (New York: American Institute of Physics) p 205