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Magnetic reconnection as mechanism for inverse energy transfer in nonhelical magnetic turbulence PALLAVI BHAT, University of Leeds, MUNI ZHOU, NUNO LOUREIRO, Massachusetts Institute of Technology MIT — Recently, it has been shown numerically that there exists an inverse transfer of magnetic energy in decaying, nonhelical, magnetically dominated, magnetohydrodynamic turbulence in 3-dimensions (3D). We suggest that magnetic reconnection is the underlying physical mechanism responsible for this inverse transfer. In the two-dimensional (2D) case, the inverse transfer is easily inferred to be due to smaller magnetic structures merging to form larger ones via reconnection. The scaling behaviour is found to be similar between the 2D and the 3D cases, i.e., the magnetic energy evolves as t^{-1}, and the magnetic power spectrum follows a slope of k^{-2}. We show that the reconnection timescale is the relevant timescale governing the dynamics. We constantly compare the 2D and the 3D cases, also via studies of the conserved quantities in the system and the energy transfer functions, to make the case that the dynamics in 3D could be approximately explained by what we understand in 2D.

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