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Numerical Simulations of Strong MHD Turbulence[1] J. MASON, F. CATTANEO, University of Chicago, S. BOLDYREV, University of Wisconsin
— Magnetohydrodynamic turbulence plays an important role in many astrophysical phenomena, including the solar wind, angular momentum transport in accretion disks and interstellar scintillation. Despite more than 40 years of investigations much within the subject remains controversial. Recently a new theory has been developed [1, 2]. It predicts a scale-dependent dynamic alignment between the velocity and magnetic fluctuations and leads to the field-perpendicular energy spectrum $E(k) \propto k^{-3/2}$. Here we discuss this new theory and present the results of a series of numerical tests. Quantities measured include the alignment angle, the spectrum and the third order structure functions for which the exact relations due to Politano & Pouquet [3] hold.
[1] Boldyrev, S. (2005) Astrophys. J. 626, L37.
[2] Boldyrev, S. (2006) Phys. Rev. Lett. 96, 115002.
[3] Politano, H. & Pouquet, A. (1998) Geophys. Res. Lett. 25, 273.

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