The scaling properties of dissipation in incompressible isotropic three-dimensional magnetohydrodynamict turbulence

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The statistical properties of the dissipation process constrain the analysis of large scale numerical simulations of three dimensional incompressible magnetohydrodynamic (MHD) turbulence, such as those of Biskamp and Müller [*Phys. Plasmas* **7**, 4889 (2000)]. The structure functions of the turbulent flow are expected to display statistical self-similarity, but the relatively low Reynolds numbers attainable by direct numerical simulation, combined with the finite size of the system, make this difficult to measure directly. However, it is known that extended self-similarity, which constrains the ratio of scaling exponents of structure functions of different orders, is well satisfied. This implies the extension of physical scaling arguments beyond the inertial range into the dissipation range. The present work focuses on the scaling properties of the dissipation process itself. This provides an important consistency check in that we find that the ratio of dissipation structure function exponents is that predicted by the She and Leveque [*Phys. Rev. Lett* **72**, 336 (1994)] theory proposed by Biskamp and Müller. This supplies further evidence that the cascade mechanism in three dimensional MHD turbulence is non-linear random eddy scrambling, with the level of intermittency determined by dissipation through the formation of current sheets.

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