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Quantification of anisotropy in quasi-static magnetohydrodynamic turbulence MAHENDRA VERMA, IIT Kanpur, India, K.S. REDDY, LPS, Ecole Normale Superieure, Paris, France — We perform a numerical and analytical study of quasi-static magnetohydrodynamic (MHD) turbulence for moderate and large interaction parameters N. The kinetic energy is concentrated near the equator (plane perpendicular to the mean magnetic field) due to the strong dissipation in the polar regions. This distribution is conveniently quantified using the ring spectrum, which provides more details than the one-dimensional shell spectrum. We also show that for large N the energy spectrum is exponential in wavenumbers.[1] The direct computation of energy flux reveals an inverse cascade of energy of the perpendicular component of the velocity at low wavenumbers (similar to that in two-dimensional turbulence), but a forward energy cascade for the parallel component of velocity. We quantify these using ring-to-ring energy transfers. We show that the rings with higher polar angles transfer energy to ones with lower polar angles. For large interaction parameters, the dominant energy transfer takes place near the equator (polar angle $\theta \approx \pi/2$). These energy transfer are consistent with the anisotropic energy spectrum.[2]

[1]K. S. Reddy and M. K. Verma, Phys. Fluids, **26**, 025109 (2014)
[2]K. S. Reddy, R. Kumar, and M. K. Verma, Phys. Plasmas, **21**, 2014

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