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Turbulence in anisotropic MHD plasmas

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An alternative approach is presented to overcome the limitations of Direct Numerical Simulations (low Reynolds numbers and small statistics for any reasonable computational cost), providing insight into the statistical properties of highly-turbulent, intermittent, anisotropic MHD turbulence: a set of shell-models coupled by Alfvén waves travelling along the axial magnetic field and which interact non-linearly, producing perpendicular fluctuations of the fields at small scales. This model can be applied to different physical situations; we present the cases of heating in solar coronal loops, and of turbulence in open coronal regions at the base of the solar wind. In these cases, different profiles of the heating and of the properties of turbulence are obtained, depending on the imposed stratification of the solar atmosphere (density and axial magnetic field).