



Multi-scale Hall-MHD turbulence in the solar wind

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The origin of the steepening of the spectra of solar wind magnetic fluctuations above 1Hz is investigated through dispersive Hall magnetohydrodynamics. We perform numerical simulations in the framework of a highly turbulent shell-model and show that the large-scale magnetic fluctuations are characterized by a $k^{-5/3}$ -type spectrum which steepens at scales smaller than the ion inertial length d_i to $k^{-7/3}$ if the magnetic energy overtakes the kinetic energy, or to $k^{-11/3}$ in the opposite case. These results are in agreement both with a heuristic description and with observations of the solar wind.