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Solar wind plasma turbulence: one or several turbulent regimes?

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The average turbulent spectrum in the solar wind shows non trivial properties. At 1 AU, the average spectral index of the magnetic and kinetic spectra in the inertial range are respectively 5/3 and 3/2, which is not predicted by any turbulence theory. The spectral indices, as well as the amplitude of the fluctuations, actually vary around their average values in a non-random way: they appear to be controled by the average wind parameters, the best control parameter being the ion temperature, as first noted by Grappin Velli Mangeney 1991. We come back on this analysis here using a more refined method that isolates the inertial range from the 1/f range, allowing us to reveal a more reduced variation of the inertial range slope, which is however still controled by the ion temperature. We discuss the possible origin of the variation, and attempt to understand what it reveals on the birth of turbulence close to the Sun.