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Universal background spectrum of magnetic field fluctuations from fluid to kinetic scales

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During quiet solar activity conditions, the interplanetary magnetic field power density spectrum, which can be found within the low speed portion of a corotating high-speed stream, shows the remarkable features of a universal background spectrum extending from fluid to kinetic scales.
The typical fast and slow corotating wind flows remarkably differ not only for the average magnetic field and plasma parameters values but also for the type of fluctuations they carry. Fast wind is characterized by large amplitude, incompressible fluctuations, mainly Alfvénic, slow wind is generally populated by smaller amplitude and much less Alfvénic fluctuations. When moving from fast to slow wind the power level of magnetic field fluctuations within the inertial range largely decreases, although keeping the typical Kolmogorov scaling. After a short transition region, within which the spectral index decrease from about -4 to a value around -2.7, depending on the power level within the inertial range, the spectrum does not experience further variations.
In particular, the high frequency part of the spectrum, i.e. the kinetic range, remains unchanged irrespective of the wind type, i.e. fast or slow and, irrespective of the epoch that the observations refer to.
This last point suggests that the role of the Alfvénic turbulence wears off around proton scales, where the turbulent energy generates thermal anisotropies in the particle velocity distribution function. In other words, the solar wind generation mechanism is such that an Alfvénic spectrum would be added to a sort of universal background spectrum, probably characteristic of the lower layers of the solar atmosphere, any time the wind is generated within a coronal hole, source of fast wind.
Unfortunately, high cadence magnetic measurement, typical of search-coil magnetometers, are not so common in the solar wind and only a limited but meaningful number of cases will be reported and discussed.
Future observations by Solar Orbiter and THOR will help to fully understand the mechanism governing the observed universal background spectrum.