MHD-KINETIC TRANSITION IN THE SOLAR WIND TURBULENCE

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MHD Alfvénic turbulence provides an important source for solar wind heating and acceleration. The turbulence cascades anisotropically towards shorter length scales across (and to a less extend along) the background magnetic field. In this talk, I will discuss how the turbulence is modified when its perpendicular scales approach the ion gyroradius scale. At the scale where kinetically modified nonlinear interaction becomes as strong as the MHD one, the turbulence undergoes a MHD-kinetic transition. The transition scale is still larger than the ion gyroradius and the wavenumber spectra just below this scale are significantly steeper (power-law index about -3) than at larger MHD scales (-5/3) and smaller electron-MHD scales (-7/3). Anisotropy scalings at ion scales are also modified and in certain conditions may be reverted, reducing obliquity of turbulent fluctuations. Cherenkov-resonant and non-adiabatic nonlinear dissipation mechanisms become strong at ion kinetic scales and lead to a strong mutual influence between turbulence and plasma particles. New theoretical results are supported by observations and suggest a turbulence-particles feedback loop operating in the solar wind.