Geophysical Research Abstracts
Vol. 19, EGU2017-5331, 2017
EGU General Assembly 2017

Plasma beta control of transition between inertial and ion scales

Jana Safrankova (1), Zdenek Nemecek (1), Frantisek Nemec (1), Lubomir Prech (1), Georgy N. Zastenker (2), and Maria Riazantseva (2)

(1) Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic, (2) Space Research Institute of Russian Academy of Science, Moscow, Russia

Solar wind turbulence has been studied for many decades because understanding its properties is important for determination of the universal features of turbulence and for estimation of collisionless plasma heating. Measurements of the solar wind turbulent spectra in the vicinity of ion and electron plasma scales may clarify our understanding of the processes of the dissipation (or dispersion) of turbulent energy. A wide range of scales is predicted and observed: from the fluid regime where the MHD approximation can be used down to small scales where kinetic effects should be taken into account. The power spectrum can be approximated with a power law within each particular scale and the transition from larger to smaller scales is distinctly seen as the increase of the exponent. The corresponding frequency is called the break frequency. The paper analyzes solar wind power spectra of density, bulk, and thermal speed fluctuations that are computed with a time resolution of 32 ms in the frequency range of 0.001–2 Hz and compares them with the power spectrum of magnetic fluctuations (using the data propagated from the Wind spacecraft). We discuss the break frequency between inertial and ion scales and show that this transition is controlled by the plasma beta