Geophysical Research Abstracts
Vol. 21, EGU2019-12933, 2019
EGU General Assembly 2019


# The turbulent properties of solar wind streams associated with magnetic clouds

Maria Riazantseva (1), Liudmila Rakhmanova (1), Gerogy Zastenker (1), Yuri Yermolaev (1), Irina Lodkina (1), Jana Safrankova (2), Zdenek Nemecek (2), and Lubomir Prech (2)

(1) Space Research Institute of the Russian Academy of Sciences (IKI), Moscow, Russian Federation (orearm@gmail.com), (2) Charles University in Prague, Czech Republic

The turbulent cascade in the solar wind is not stable and strongly affected by surrounding plasma conditions. In particular the large scale solar wind structures play a critical role in its formation. Classical turbulent spectra are observed as a rule in the steady solar wind whereas solar wind disturbed by some transient events can spawn spectra strongly differing from traditional view. Current study is dedicated to modification of plasma fluctuation spectra in regions associated with magnetic clouds (MC) and compression regions before them (SHEATH MC), which characterized by high speed streams with strong magnetic field. Large statistic of spectra of ion flux fluctuations is observed and compared both in discussion regions and in the slow steady solar wind. The shapes and properties of frequency spectra of solar wind ion flux fluctuations are observed in broad range of scales 0.01-10 Hz using high time resolution plasma measurement by BMSW spectrometer on board of Spektr-R satellite. The study shows that the power of fluctuation spectrum is higher in streams associated with MC and SHEATH MC than in the steady solar wind in all observed frequency ranges. At magnetohydrodynamic scale the spectral slopes are similar in all discussed regions and correspond in average to Kolmogorov model. At kinetic scales spectrum view predicted by models is predominantly observed in steady slow solar wind. Wherein, MC and SHEATH MC regions are characterized often by non classical spectra shape with faster steepening at kinetic scales which can't be approximated by linear function. The abnormal steepening of spectra at kinetic scale can indicate the more effective dissipation processes which occur in areas associated with MC and SHEATH before them. The work is supported by RFBR grant 19-02-00177a