

Magnetic Fluctuations in the Terrestrial Magnetosheath

Authors : Alexandre Gurchumelia, Luca Sorriso-Valvo, David Burgess, Khatuna Elbakidze, Oleg Kharshiladze, Diana Kvaratskhelia

Abstract : The terrestrial magnetosheath is a highly turbulent medium, with a high level of magnetic field fluctuations throughout a broad range of scales. These often include an inertial range where a magnetohydrodynamic turbulent cascade is observed. The multifractal properties of the turbulent cascade, strictly related to intermittency, are observed here during the transition from quasi-parallel to quasi-perpendicular magnetic field with respect to the bow-shock normal. The different multifractal behavior in the two regions is analyzed. A standard coarse-graining technique has been used to evaluate the generalized dimensions and the corresponding multifractal spectrum $f(\alpha)$. A p-model fit provided a quantitative measure of multifractality and intermittency, to be compared with standard indicators: the width of the multifractal spectrum, the peak of the kurtosis, and its scaling exponent. Results show a clear transition and sharp differences in the intermittency properties for the two regions.

Keywords : magnetos heath, turbulence, multifractal, instabilities

Conference Title : ICEA 2021 : International Conference on Electromagnetics and Applications

Conference Location : Sydney, Australia

Conference Dates : December 02-03, 2021