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Dissipation scales estimated from Cluster measurements in the Earth's plasma sheet

Z. Vörös (1), R. Nakamura (1), W. Baumjohann (1), M. Volwerk (1), A. Runov (1), Y. Asano (1), A. Balogh (2) and H. Réme (3)

(1) Space Research Institute, Graz, Austria, (2) Imperial College, London, UK, (3) CESR, Toulouse, France

Recent studies provided evidence for the multi-scale nature of bursty-bulk flow (BBF) driven intermittent magnetic turbulence in the plasma sheet. The large scale of the high speed BBFs in the midtail plasma sheet was determined using multipoint observations from the Cluster spacecraft and was found to be a few R_E. The smallest scale of turbulence, where part of the large-scale flow energy is dissipated, is expected to be near the ion Larmour radius or the ion inertial length, a few hundred kilometers in the plasma sheet. Using burst mode magnetic data from the Cluster spacecraft we estimate the dissipation scale of magnetic fluctuations from scaling characteristics of two-point probability density functions. On the basis of statistical analysis of BBF associated magnetic fluctuations we show that the estimated values of the dissipation scale depend strongly on the large scale velocity of plasma flows. This result provides basic clues for understanding the multi-scale energy transfer pointing from MHD scales to kinetic scales in the plasma sheet.