



## **Observation statistics of fine dispersion structures in energetic particle spectra in auroral regions**

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An observation statistics of Fine Dispersion Structures (FDS) in energetic particle spectra in auroral zones is given. FDS were discovered in DOK-2 experiment on-board of Interball-1 and 2 spacecrafts (1995-2000). We have observed two type of FDS: 1) a long duration ( $>5$  min) events of a gradient drift type for which particles were dispersed according to their energy per charge and 2) a short ( $<2$  min) events of time-of-flight type (particles were dispersed according to their velocity). During the Interball mission about 1000 FDS of both types were observed,  $\sim 600$  of which were analyzed in detail. Dependences of FDS numbers on the spacecraft position (R, L, MLT, MLAT values) and on magnetosphere and solar wind parameters (Kp and DST indexes, Psw, Vsw, By and Bz IMF values) so as the MLT dependence of FDS duration and  $dE/dt$  at fixed proton and electron energies were studied. It was found that time-of-flight FDS type were observed in the night side of the magnetosphere (18 to 6 h MLT), while events of gradient drift type were observed at any MLT values with majority of observations in the day side. This fact and the MLT dependence of the FDS duration and  $dE/dx$  for protons and electrons confirm our hypothesis on the FDS as a result of spontaneous, pulse particle acceleration in the magnetotail neutral sheet. Fast time-of-flight FDS correspond to the direct arrival of particles from the distant magnetotail. Particle trajectory simulation showed that for a majority of such events particles return back after reflection from high magnetic field regions. But in some cases particles can start drift motion around the Earth creating slow FDS structures. Our statistical analysis showed that FDS structures were observed in a quiet state of the magnetosphere and solar wind. We don't find any dependence of their observation probability on corresponding parameters.