Structure and Dynamics of the Large Impulses in the Solar Wind

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Large variations are regularly present in the solar wind plasma. These variations have strong effects on the Earth's magnetosphere. At the same time, the structure and the dynamics of large enhancements in the solar wind have not been investigated in sufficient details up to now.

We have studied the large impulses of the solar wind ion flux (or density) by measurements onboard INTERBALL-1 and WIND spacecraft. One minute resolution data were used to investigate in details the fronts and cores of these events. Wide-separated spacecraft configuration allows to examine the spatial and temporal changes in the solar wind density during the propagation time from L1-point to the Earth. Many cases demonstrate a good coincidence both time profiles and absolute values. Meanwhile other examples show appreciable differences due to the dynamical processes regulated by magnetic and gas pressure gradients. The tendency to widen space of solar wind plasma packages for the time of movement between two spacecraft is reported for several cases.

Also we used high resolution one second data by INTERBALL-1 to investigate in detail statistical properties of the solar wind plasma impulses. Duration, absolute and relative amplitudes, the steepness of increasing or decreasing fronts were studied for about 200 examples. The most part of plasma density impulses appears as the enhancements on a factor about two during the time intervals from 10 to 50 seconds.