STUDY OF INTERPLANETARY SHOCK PROPERTIES

Z. Nemecek[1], J. Safrankova[1], L. Prech[1], O. Goncharov[1], and G. Zastenker[2]

[1] *Charles University, Faculty of Mathematics and Physics, Prague, Czech Republic,*
[2] *IKI RAN, Moscow, Russia*

The paper presents measurements of interplanetary (IP) shocks registered by the BMSW instrument onboard the Spektr-R project. The main advantage of these measurements is their speed that can reach 32 Hz. In this contribution, we concentrate our attention on (1) the IP shock ramp thickness and on (2) wave trains upstream and downstream of the IP shock ramp.

(1) A formation of low-Mach-number quasi-perpendicular shocks is expected to be well understood. From theoretical considerations as well as from observations, it follows that the shock ramp thickness would scale with the ion inertial length. We present analysis of subcritical or marginally critical interplanetary shocks that reveals that the ion transition scale determined from direct measurements of plasma moments is of the same order as the ramp thickness determined from the magnetic field and that the ion transition scale is directly proportional to the ion thermal gyroradius.

(2) It is known that a subcritical shock has a nonlinear whistler wave train upstream of its front. For perpendicular shocks, a wave train is formed downstream of the magnetic ramp. For shocks with a more oblique geometry, an upstream wave train is formed. The upstream wave precursor is approximately phase standing in the upstream flow. We discuss an evolution of the ion velocity distribution within these wave trains for different shock conditions.