



## **Waves associated with interplanetary shocks: Types and properties**

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Interplanetary (IP) shocks are often associated with high-frequency (several Hz) wave packets in both upstream and downstream regions. These waves could be resolved in Wind fast magnetic field data but the time resolution of plasma instruments is insufficient for their detection. The BMSW instrument onboard the Spektr-R spacecraft measures solar wind parameters with a resolution of 32 ms and it allows a detailed analysis of these waves. Our previous analysis of subcritical low-Mach-number fast forward shocks has shown that the both upstream and downstream waves conserve over the spacecraft separation of the order of 200  $Re$  and their wavelengths are directly proportional to the shock ramp thickness that is controlled by the ion thermal gyroradius. Comparing observations of both Wind and Spektr-R spacecraft, we discuss a nature of these waves in both regions and their properties and their dependence on upstream solar wind and magnetic field parameters.