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Overshoot dependence on the shock parameters

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The structure of the solar wind plasma flow downstream of the ramp of the interplanetary and bow shocks was studied based on the BMSW plasma spectrometer installed onboard the SPEKTR-R spacecraft. Particular attention was paid to the overshoot region, where correlated oscillations of the ion flux and magnetic field are observed. They are formed by two populations of ions: the inflowing solar wind and the beam of coherent gyrating ions. Based on the statistical analysis it was shown that overshoots form both in supercritical and subcritical shocks. It is found that maximum values of the overshoot amplitudes are significantly influenced by the angle between the shock normal and magnetic field vectors, Mach number, plasma and magnetic compression at the shock front. It was established that the oscillation wavelength determined from the magnetic field measurements onboard the WIND spacecraft, on average, coincides with the oscillation wavelength determined from the ion flux on the SPEKTR-R, while the rates of relaxation of these oscillations can greatly differ. It was also shown that the estimates of the overshoot wavelength good correlate with the convected ion gyroradius.