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太陽圏終端衝撃波の微細構造
Microstructure of the heliospheric termination shock

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Microstructure of the heliospheric termination shock is investigated by utilizing one-dimensional electromagnetic full particle simulation. A relative pickup ion density of 30% and two different shock angles 90 and 87 deg. are assumed. In addition a run with a 60% relative pickup ion density is performed to investigate a pickup ion dominated shock. There is an exteded foot upstream of the ramp due to reflected pickup ions. In this foot a large shock potential is produced mainly due to the positive bulk velocity of the pickup ions perpendicular to the magnetic field and to the shock normal. The maximum value of the potential is over 30% of the shock ram energy. Pickup ion reflection at the shock is almost 100%; part of the pickup ions are essentially specularly reflected by the magnetic field force term of the Lorentz force in the overshoot, part are reflected in the extended foot due to a combination of magnetic force term and the cross-shock potential. In the 30% pickup ion case about 90% of the total thermal energy in the shock is gained by pickup ions, 10% by the solar wind ions and electrons. The thermal energy gain by pickup ions increases as the pickup ion relative density increases. The pickup ion temperature increases continuously from the upstream edge of the extended foot to the shock ramp and stays then constant through the overshoot and downstream.

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