



Heliospheric current sheet and its interaction with solar cosmic rays

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We investigated effects resulting from the interaction of solar cosmic rays (SCR) with the heliospheric current sheet (HCS) in the solar wind. Self-consistent kinetic model of the HCS is developed, where ions demonstrate quasi-adiabatic dynamics. HCS is considered as the equilibrium embedded current structure, where the two main kinds of plasma with different temperatures give the main contribution to the current (low-energy background plasma and SCR). It is shown that HCS is a relatively thin multiscale configuration of the current sheet, embedded in a thicker plasma layer. The taking into account of SCR particles in HCS could lead to a change of its structure and to enhancement of its properties such as the embedding and multi-scaling. Parametric family of solutions is considered where the current balance in HCS is provided at different temperatures of SCR and different concentrations of high-energy plasma. Concentrations of SCR are determined which may contribute to the thickening of the HCS that can be observed in satellite studies. The possibility to apply this modeling for the explanation of experimental observations is considered.