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Magnetotail thermal electrons as tracers of thin current sheets fine structure.

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The report is devoted to the investigation of the electron temperature T_e distribution in thin currents sheet of the Earth magnetotail. The statistical dependences of $T_e(B_x)$ are obtained for 62 thin current sheet crossings by Cluster spacecraft. The profiles $T_e(B_x)$ can be approximated by the equation $T_e = T_{emax}(1 + \alpha(B_x/B_{ext})^2)$, where T_{emax} and B_{ext} are the maximum value of electron temperature and the maximum value of the B_x component of magnetotail magnetic field obtained from the pressure balance. The averaged value of the parameter $< \alpha > \approx -1$. Observed $T_e(B_x)$ profiles could be quantitatively described by the model of adiabatical electron heating during earthward plasma convection. The comparison between the observed values of α and the theoretical predictions allows to estimate the thin current sheet scales along the magnetotail L_x and to obtain the ratio of L_x to the current sheet thickness L. For the majority of the observed thin current sheets we obtain $5R_E < L_x < 20R_E$ and the corresponding ratio of scales $L_x/L \approx 25$. We also discuss the possibility of the remote detection of the thin current sheet structure in the deep and middle parts of magnetotail. The influence of thin current sheet embedding inside the thick plasma sheet on the distribution of the electron temperature could be also analyzed with the help of adiabatic model. Embedding produces characteristic features often manifested in $T_e(B_x)$ profiles.