# ELECTRON HEATING IN THE MAGNETOTAIL CURRENT SHEET.

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We consider the electron distribution in current sheets observed by Cluster and THEMIS missions in the Earth magnetotail. We use the statistics of 70 fast crossings of horizontal current sheets by Cluster to investigate the vertical distribution of the electron temperature in the magnetotail. We demonstrate that electron temperature decreases with increase of magnetic field $|B_x|$ away from the current sheet center and can be approximated as $T_{e\perp}/T_{e\perp\max} \approx 1 - \alpha_{T\perp}(B_x/B_{ext})^2$ and $T_{e\parallel}/T_{e\parallel\max} \approx 1 - \alpha_{T\parallel}(B_x/B_{ext})^2$, where $B_{ext}$ is value of $B_x$ in the lobes and $\langle\alpha_{T\perp}\rangle \approx \langle\alpha_{T\parallel}\rangle \approx 1$. The electron temperature anisotropy is about $T_{e\parallel}/T_{e\perp} = 1.1 - 1.2$ and vertical profiles $T_{e\parallel}/T_{e\perp} \approx$ const. We also show that the observed electron temperature anisotropy is provided by the electron population in the energy range between 50 ev and 3 keV. The cold core of electron distribution ($< 50$ eV) is isotropic and the hot tail ($> 5$ keV) has $T_{e\parallel}/T_{e\perp} \sim 1$ or even $T_{e\parallel}/T_{e\perp} < 1$. We use THEMIS spacecraft observations to study the electron temperature distribution and the structure of the current sheet along the magnetotail. We perform a statistical study of 40 crossings of the current sheet when the three spacecraft THB, THC, and THD were distributed along the tail in the vicinity of the midnight with coordinates $X_B \in [-30R_{\rm E}, -20R_{\rm E}]$, $X_C \in [-20R_{\rm E}, -15R_{\rm E}]$, and $X_D \sim -10R_{\rm E}$. We obtain profiles of the average electron temperature $\langle T_e\rangle$ and the average magnetic field $\langle B_z\rangle$ along the tail. Electron temperature and $\langle B_z\rangle$ increase towards the Earth with almost the same rates, i.e. ratio $\langle T_e\rangle/\langle B_z\rangle \approx 2\text{keV}/7\text{nT}$ is approximately constant along the tail. We demonstrate that anisotropy of the electron temperature $\langle T_{e\parallel}/T_{e\perp}\rangle \approx 1.1$ is almost constant along the tail for $X \in [-30R_{\rm E}, -10R_{\rm E}]$. We discuss several mechanism which can describe the acceleration (heating) of electrons in the magnetotail with conservation of the electron temperature anisotropy.