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Electron heating during magnetic reconnection in the UTST merging experiment KOTARO YAMASAKI, SHUJI KAMIO, KOICHIRO TAKEMURA, QINGHONG CAO, TAKENORI WATANABE, HIROTOMO ITAGAKI, TAKUMA YAMADA, YASUSHI ONO, MICHIAKI INOMOTO, the University of Tokyo — We have been investigating the electron heating at current sheet during magnetic reconnection in the UTST spherical tokamak merging experiment. The external magnetic pressure of PF coils accelerated / collided two ST plasmas together under the high guide field condition (typically $B_t \sim 0.2$ T $\sim 10B_{//}$ at X-point). Triple Langmuir probes were used to measure the radial profiles of electron density and temperature inside the current sheet. As the current sheet grew, the electron density inside the sheet was observed to increase from $0.5\text{x}10^{19}$ to $3.0\text{x}10^{19}\text{m}^{-3}$. After it reached the maximum value, the electron temperature around the X-point increased rapidly from 5eV to 15-20eV. The electron temperature profile was found to peak at the X-point which had strong toroidal electric field and toroidal guide field but almost zero poloidal magnetic field. This fact suggests that the toroidal electric field accelerates electrons toroidally along the X-line and that the Ohmic heating of the current sheet is the most probable cause for the peaked electron temperature profile.

Kotaro Yamasaki
the University of Tokyo

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