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Ion Heating Characteristics of Merging/Reconnection Startup in MAST Spherical Tokamak Experiment HIROSHI TANABE, Univ. Tokyo, TAKUMA YAMADA, Kyusyu Univ., TAKENORI WATANABE, KEII GI, AKIHIRO KUWAHATA, KAZUTAKE KADOWAKI, YASUHIRO KAMINOU, HIDEYA KOIKE, KENTO NISHIDA, SUGURU IMANAKA, HARUKI YAMANAKA, Univ. Tokyo, SETTHIVOINE YOU, Univ. Washington, BRENDAN CROWLEY, General Atomics, NEIL CONWAY, RORY SCANNEL, CCFE, MIKHAIL GRYAZNEVICH, Tokamak Solutions, MICHIAKI INOMOTO, YASUSHI ONO, Univ. Tokyo — The high power reconnection heating has been investigated in MAST ST (spherical tokamak) merging startup experiment using a new 32-chords ion Doppler tomography diagnostics with optimized spatial resolution for the current sheet. The magnetic reconnection is observed to heat mostly ions in the downstream by the outflow and to heat electrons inside the current sheet. However, the high T_e area is highly localized at the X-point probably due to the X line acceleration of electrons. Finally both of T_i and T_e profiles are observed to form triple-peak structures after the ion-electron energy relaxation time τ_{ie}^E. The guide field does not affect ion heating under high guide field condition $B_t > 3B_{rec}$, while it increases significantly the localized electron heating at the X point. The increment of ion temperature reaches ∼200eV in TS-3 and over ∼1keV in MAST, as predicted in the B_{rec}^2 (reconnecting field energy) scaling of reconnection heating. This scaling suggests the promising high B_{rec} merging startup scenario for spherical tokamak.

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