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Electron and ion heating characteristics during magnetic reconnection in MAST[1] HIROSHI TANABE, Univ.Tokyo, TAKUMA YAMADA, Kyusyu Univ., TAKENORI WATANABE, KEII GI, KAZUTAKE KADOWAKI, MICHIAKI INOMOTO, Univ.Tokyo, RYOTA IMAZAWA, JAEA, MIKHAIL GRYAZNEVICH, CLIVE MICHAEL, NEIL CONWAY, RORY SCANNELL, BRENDAN CROWLEY, KEN MCCLEMENTS, CCFE, YASUSHI ONO, Univ.Tokyo, MAST TEAM — Localized electron heating at X point and global ion heating in the downstream during merging/reconnection startup of ST in MAST have been studied in detail using 130 channel YAG- and 300 channel Ruby-Thomson scattering measurement and a new 32 chord ion Doppler tomography diagnostics. In addition to the previously achieved record heating of ∼1keV, 2D profile of electron temperature revealed highly localized heating structure at X point with the characteristic scale length of 0.02-0.05m $< c/\omega_{pi}$, while the ion temperature increases in the downstream of outflow jet with the width of $c/\omega_{pi} \sim 0.1$m where reconnected field forms thick layer of closed flux surface. The effect of $T_i - T_e$ energy relaxation also affects both heating profiles in MAST, finally the formation of triple peak structure for both profiles was observed with the delay of τ_{ei}^E. The toroidal guide field mostly contributes to the formation of a localized electron heating structure at the X point but not to bulk ion heating downstream.

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