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Ion heating characteristics of magnetic reconnection in TS-3 & TS-4 tokamak and spheromak merging experiments HIROSHI TANABE, Univ. Tokyo, HIROTAKA OKA, AKIHIRO KUWAHATA, MASAAKI ANNOURA, SETTHIVOINE YOU, Univ. Washington , MICHIAKI INOMOTO, YASUSHI ONO — For the past ten years, we have developed a novel 2-D ion temperature measurement by use of computer tomography and studied the characteristic of ion heating during magnetic reconnection. Its spatial resolution of line-integrated Doppler measurement is 7×5 in r and z directions but will be upgraded to 7×10 by increasing the number of optical fiber [1]. We confirmed the evidence of ion outflow heating in wider range of guide field using co and counter helicity merging spheromaks and (co-helicity) merging tokamaks. In all cases, we observed two high ion temperature Ti regions in the two downstream area of magnetic reconnection and their heating energies depend on the varied guide toroidal field Bt. The maximum ion temperature Ti∼140eV is obtained in the counter helicity merging spheromaks with no guide field Bt, Ti∼100eV in the co-helicity merging spheromaks with Bt∼Bp (reconnection field) and Ti∼50eV in the tokamak merging with Bt>Bp. The tokamak merging experiment with varied guide field Bt revealed that the ion temperature increment ΔTi after reconnection decreases inversely with the guide field Bt but that ΔTi tends to be constant in high guide field regime Bt>3Bp.
[1] H. Tanabe., et al., Rev. Sci. Instrum., submitted (2011)

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