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Effective Ion Heating in Guide Field Reconnection XUEHAN GUO, The University of Tokyo, RITOKU HORIUCHI, SHUNSUKE USAMI, National Institute for Fusion Science, YASUSHI ONO, The University of Tokyo — The energy conversion mechanism for ion perpendicular thermal energy is investigated by means of two-dimensional, full particle simulations in an open system. It is shown that ions gain kinetic energy due to the plasma potential drop, which is caused by the charge separation in the one pair of separatrix arms. Based on the force balance in the inflow direction, the strength of the normalized charge density can be expressed by electron Alfvén velocity, which is measurable value in the laboratory experiment and/or satellite observation. Meanwhile, we found that the accelerated ions form a ring shape like distribution in $f(v_1, v_2)$, as a result, the ion perpendicular temperature $T_{i,perp}$ increases from inflow region. Here, both v_1 and v_2 are perpendicular to the magnetic field and v_2 is parallel to the in-plane. The mixing of particle populations is verified by means of tracing ions and it is shown three typical particle orbits and each orbit has different entry angle to the potential drop. This ring shape like distribution consists three different population due to the difference of the entry angles to the potential drop. This mixing process will thermalize ions and produce entropy without collisions.

Xuehan Guo
The University of Tokyo

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