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Formation of non-Maxwellian distribution and its role in collisionless driven reconnection RITOKU HORIUCHI, HIROAKI OHTANI, National Institute for Fusion Science — The dynamical evolution of collisionless driven reconnection is investigated by using a newly developed electromagnetic particle simulation code in a microscopic open system ("PASMO"). The plasma inflows, which are described by the shifted Maxwellian, are symmetrically driven from two upstream boundaries by imposing the external electric field in the z direction. The plasma flows into the current sheet while modifying the current density profiles. Since charged particles are not magnetized near the neutral sheet, their motions change from magnetized gyration to unmagnetized thermal motion called meandering motion as they approach the neutral sheet. The existence of unmagnetized meandering motion in the current sheet modifies particle distribution function from the shifted Maxwellian to an anisotropic one. An ion hole appears at the center of current sheet in the phase space, where distribution becomes two-peaked and no ions exist in low velocity region between two peaks. The strong modification of distribution function leads to the generation of off-diagonal components of pressure tensor term, which is one of major causes to violate frozen-in constraint and trigger collisionless reconnection.

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