

## Mass ratio dependence of the anomalous resistivity due to plasma instabilities in the current sheet.

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Magnetic reconnection is widely believed as a fundamental process of active and global phenomena in space and fusion plasma in which topological change of magnetic field and fast energy conversion from magnetic field to particles take place. Instead of binary collisions, microscopic nonideal effects can violate frozen-in condition of magnetic field and cause collisionless magnetic reconnection in these systems. Anomalous resistivity due to microscopic plasma instability in the current sheet is one of the candidates which trigger collisionless magnetic reconnection. The roles of these instabilities in the magnetic reconnection are investigated by means of 2+1/2 dimensional explicit particle simulation. The force balance in a fluid description, which includes microscopic nonideal effects (particle kinetic effects and wave-particle interactions), is examined based on particle simulation result.

Small mass ratio simulation has revealed following results. In the early phase of the simulation, the interaction between electrons and the waves excited by Lower Hybrid Drift instability(LHDI) generates the outward flow and deforms the current sheet profile at the periphery of the current sheet. On the other hand, the LHDI also modifies the orbits of meandering particles which affects indirectly the pressure tensor term at the neutral sheet. After the saturation of LHDI, the growth of Drift Kink Instability(DKI) is observed to grow dominantly at the neutral sheet. Dissipation of current density due to the generation of anomalous resistivity and magnetic flux reduction takes place in this phase.

In addition, simulations with various mass ratio are carried out, in which both electron scale and ion scale are changed independently from initial Harris equilibrium formed from diamagnetic current. We will discuss the nonlinear effect of these instabilities and these influences on the generation of anomalous resistivity in the series of these simulations.