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Role of Chaotic Orbits of Meandering Particles in Magnetic Reconnection H. OHTANI, NIFS, Jpn., Grad.Univ. Adv. Studies, Japan, W. HORTON, T. PETROSKY, UT Austin, R. HORIUCHI, NIFS, Jpn., Grad. Univ. Adv. Studies, Japan — Ions become un-magnetized and execute a complex thermal motion called meandering motion in the ion dissipation region of magnetic reconnection. The complex meandering (chaotic) motion leads to the growth of off-diagonal components of pressure tensor term, which is one of main causes to break ion frozen-in condition in the vicinity of magnetic neutral sheet. In this paper we investigate the role of the meandering motion in the formation of ion dissipation region by examining particle simulation results of collisionless driven reconnection based on the simple model. Because the meandering motion is relevant to the mechanism of dissipation, the size of the dissipation region is given by the orbit amplitude of the meandering motion. Since the average velocities outside the dissipation region are approximately given by ExB drift in inflow direction and thermal velocity in out-of-plane direction respectively, the pressure tensor term in the force balance equation is written down analytically. The tendency of this analytic solution is in agreement with that of the simulation result. Moreover, we will report the effect of the chaotic orbits on the energy gain of the particles passing through the dissipation region.

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