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Electron self-reinforcing process and nonsteady state magnetic reconnection WEIGANG WAN[1], Los Alamos National Laboratory, GIOVANNI LAPENTA, Katholieke Universiteit Leuven — We study the evolutions of collisionless nonsteady state magnetic reconnection with full kinetic particle-in-cell simulations. Simulations are setup for scenarios of forced reconnection with open boundary conditions. We find the change of reconnection rate is not empowered or dependent on the length of the EDR. During the early growing stage, the EDR is elongated while the reconnection rate is growing. During the later stage, the reconnection rate may significantly decrease but the length of the inner EDR is largely stable. Reconnection is controlled by the availability of plasma inflows from upstream, consistent with our previous discovery of the electron self-reinforcing process that drives fast reconnection [W. Wan and G. Lapenta, Phys. Rev. Lett. **101**, 015001 (2008)]. The Hall current induced by the quadrupole magnetic field is discovered to play an important role in this process through the electron pressure tensor. The electron super-Alfvénic outflow jet structure could be elongated during the bipolar stage, and remains stable during steady state. The sufficiency of the electron inflow is crucial for the elongation.

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