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Simulation of secondary islands with a Lorentz ion/fluid electron hybrid model JIANHUA CHENG, SCOTT PARKER, DMITRI UZDENSKY, YANG CHEN, University of Colorado at Boulder — Secondary islands have been intensively studied due to their role in the energy dissipation process of reconnection. Recently, we have studied magnetic reconnection initiated by the tearing instability. The simulation uses a hybrid model with Lorentz force ions and fluid electrons. For large Δ' tearing mode, we have observed secondary islands forming and coalescing in the nonlinear regime. The competition between the two processes strongly influences the reconnection rate and eventually leads the reconnection to a steady state. To better understand these phenomena, detailed diagnostics are performed. The kinetic treatment of ions allows us to record the abnormally heated ions and the ion flow pattern around the secondary islands. These ion diagnostics help to explain how the hot ions are heated and hence how the magnetic energy is dissipated to the ion kinetic energy. Another interesting problem is the large in-plane electric fields inside the secondary islands, which has been observed in magnetosphere. Our simulation will help understand the origin of these in-plane electric fields.

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