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The Coalescence of Magnetic Islands in a Large Aspect Ratio Current Sheet JIANHUA CHENG, University of Colorado at Boulder — The formation of secondary islands and their coalescence play an important role in dissipating energy during magnetic reconnection. Recently, we have studied magnetic reconnection initiated by the tearing instability using a hybrid simulation with Lorentz force ions and fluid electrons. For current sheets with small aspect ratios, only a single island is present. For current sheets with large aspect ratios, multiple islands form and eventually coalesce into one large elongated island. We have observed ion pressure anisotropy near the X point, which may prevent the full contraction of the islands and hence keep them from breaking into smaller islands. In addition, we find that a larger fraction of the dissipated magnetic energy is converted into the ion kinetic energy as the aspect ratio increases. Asymptotically, the ratio reaches slightly over 50%. Ion heating is identified by the ion energy spectra inside the island region which exhibits a slightly larger tail than the Maxwell distribution function. We believe that the bipolar in-plane electric field associated with the Hall term is related to the ion acceleration. Diagnostics from tracer particles are presented to illustrate how and where the ions are accelerated.

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