

Abstract Submitted  
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**In-plane electric fields in magnetic islands during collisionless magnetic reconnection** LI-JEN CHEN, University of New Hampshire, WILLIAM DAUGHTON, LANL, NAOKI BESSHO, AMITAVA BHATTACHARJEE, ROY TORBERT, University of New Hampshire, VADIM ROYTERSHTEYN, UC San Diego — Magnetic islands are a common feature in both the onset and nonlinear evolution of magnetic reconnection. In collisionless regimes, the onset typically occurs within ion-scale current layers leading to the formation of magnetic islands when multiple X lines are involved. The nonlinear evolution gives rise to extended electron current layers (ECL) which are also unstable to formation of magnetic islands. Here we show that the excess negative charge and strong out-of-plane electron velocity in the ECL are passed on to the islands generated therein, and that the corresponding observable distinguishing the islands generated in the ECL is the strongly enhanced in-plane electric fields near the island core. The islands formed in ion-scale current layers do not have these properties of the ECL-generated islands. The above result provides a way to assess the occurrence and importance of extended ECLs that are unstable to island formation in space and laboratory plasmas.

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