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PIC simulations of core magnetic field generation in magnetic islands by reconnection N. BESSHO, L.-J. CHEN, A. BHATTACHARJEE, Center for Integrated Computation and Analysis of Reconnection and Turbulence (CICART), University of New Hampshire — We will present results of particle-in-cell (PIC) simulations where core field generation in magnetic islands by magnetic reconnection is studied. Cluster observations reveal that multiple magnetic islands are generated by reconnection in Earth's magnetotail, and some islands have strong core fields accompanied by peaks of electron density and energetic electron flux. Using a 2D PIC simulation code, we study magnetic reconnection with multiple X-lines and magnetic islands. We will show that each X-line has a quadrupolar magnetic field due to magnetic reconnection, and at the same time, strong core fields are generated in magnetic islands even when the initial guide field is very small ($< 0.01B_0$, where B_0 is the asymptotic magnetic field). Some simulation results show that the peak of the core field is located at the center of each island in an early stage of the evolution of islands. As the islands evolve, the structure changes and each island has multiple peaks of core fields in a later stage. We will also study energy spectra of electrons in those islands. This research is supported by NSF, NASA, and DOE.

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