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Particle acceleration in magnetically dominated reconnection in the presence of an external guide field FAN GUO, HUI LI, WILLIAM DAUGHTON, Los Alamos Natl Lab, XIAOCAN LI, University of Alabama in Huntsville, YI-HSIN LIU, NASA Goddard Space Flight Center — Recent studies have shown that magnetically dominated reconnection leads to strong energy release and nonthermal particle acceleration. Here we report results from 2D fully kinetic simulations of magnetic reconnection in guide field geometry, within the magnetically dominated regime. While the Fermi-like process driven by particle curvature drift motion is the main acceleration mechanism for the nearly anti-parallel geometry, acceleration by parallel electric field dominates particle energization in the strong guide field regime. Although the mechanism of particle acceleration is strongly modified, the simulations reveal that nonthermal power-law distributions still develop for a range of magnetic shear angles. This implies that power-law distributions are a robust feature of particle acceleration in a magnetically dominated reconnection layer. We also present a quantitative model to explain the observed spectral index.

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