

Particle Acceleration in Three-dimensional Magnetic Reconnection

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We investigate the particle acceleration in magnetic reconnection by tracing particle trajectories in the fields obtained from a three-dimensional MHD simulation of local magnetic reconnection. We focus our study on the effects of localized reconnection. It is found that the particles follow different orbits, depending on their energies, injection or ejection points, and the pitch angles. The finite cross-tail extent of the electric field region produces dawn-dusk asymmetries in the energization of particles. We also present the pitch angle dependence in the energization of particles. The differences with the results of two-dimensional studies are discussed.