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3D Collisionless Reconnection with Strong Guide Field YU LIN, XUEYI WANG, Physics Department, Auburn University, LIU CHEN, Department of Physics and Astronomy, University of California Irvine, ZHIFANG GUO, Physics Department, Auburn University — 3D physics of magnetic reconnection under a strong guide field with $B_G/B_0 \gg 1$, as in the solar and laboratory plasmas, is investigated using the gyrokinetic electron and fully-kinetic ion (GeFi) particle simulation model. Here, B_G and B_0 are the guide and the anti-parallel components of the magnetic field, respectively. Using the GeFi model, 3D physics of reconnection with a realistically large ion-to-electron mass ratio, m_i/m_e , can be calculated. In the computation, the time variation of background magnetic field for gyrokinetic electrons must be taken into account. Turbulence spectrum, wave properties, and electron heating in the high guide field reconnection are analyzed. Secondary instabilities, which are excited near the separatrix region of the magnetic island associated with the primary reconnection, are also studied.

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