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Guide field magnetic reconnection using the GS2 code T. TATSUNO, W. DORLAND, J.F. DRAKE, University of Maryland, M.A. SHAY, University of Delaware, B.N. ROGERS, P. RICCI, Dartmouth College — The processes that control magnetic reconnection in the limit of weak and strong guide field differ in a number of important ways. As the guide field becomes strong, the role of whistler dynamics is superseded by the physics of the kinetic Alfven wave [1], and the reconnection electric field becomes nearly aligned with the total magnetic field. Recent particle simulations of guide field reconnection [2] have shown that the formation of electron density cavities along the separatrices and the associated electric fields in these regions are an important source of high energy electrons. Other effects that are strongly influenced by the guide field include secondary island formation and diamagnetic stabilization. As a follow-up to the GEM challenge study of the zero guide field case [3], here we will elucidate the physics of guide- field reconnection using the GS2 code. This code was originally developed for tokamak microturbulence simulations and evolves the ion and electron distribution functions in a five dimensional phase space [4]. The GS2 simulations will be compared to the results from PIC and Hall MHD models. [1] B.N. Rogers et al., Phys. Rev. Lett. 87, 195004 (2001). [2] J.F. Drake et al., Phys. Rev. Lett. 94, 095001 (2005). [3] J. Birn et al., J. Geophys. Res. 106, 3715 (2001). [4] W. Dorland et al., Phys. Rev. Lett. 85, 5579 (2000).

Tomoya Tatsuno

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