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Forced Magnetic Reconnection with Open Boundary Conditions
WEIGANG WAN, GIOVANNI LAPENTA[1], Los Alamos National Laboratory — We present kinetic simulations of collisionless forced magnetic reconnection driven by different models of magnetic flux inflows, with open boundary conditions applied in the outflow directions. We use the implicit Particle-in-Cell code CELESTE3D [1], which retains kinetic effects for both electrons and ions. Different from results of fluid simulations, the reconnection rate is intermittent rather than steady even when the driving inflow is constant. Similar to the pervious discoveries by W. Daughton *et al.* [2], we find secondary islands grow as the electron diffusion region is elongated over time. For the well-studied Newton Challenge reconnection problem, compared to results with periodic boundary conditions, here we find that with the open boundaries, at the same driving amplitude, fast reconnection starts earlier and reaches a bigger maximum reconnection rate. We will study the dependence of the maximum reconnection rate on the driving amplitude and other factors. References: [1] G. Lapenta, J. U. Brackbill, and P. Ricci, Phys. Plasmas **13**, 055904 (2006) [2] W. Daughton, J. Scudder and H. Karimabadi, Phys. Plasmas **13**, 072101 (2006)

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