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Velocity-Shear Driving for Magnetic Reconnection in Kinetic Simulations CARRIE BLACK, SPIRO ANTIOCHOS, NASA/GSFC, KAI GERMASCHEWSKI, NAOKI BESSHO, UNH, C. RICHARD DEVORE, JUDITH.T. KARPEN, NASA/GSFC — In the standard model for coronal mass ejections (CME) and/or solar flares, the free energy for the event resides in the strongly sheared magnetic field of a filament channel. The pre-eruption force balance consists of an upward force due to the magnetic pressure of the sheared field countered by a downward tension due to overlying unsheared field. Magnetic reconnection is widely believed to be the mechanism that disrupts this force balance, leading to explosive eruption. For understanding CME/flare initiation, therefore, it is critical to model the onset of reconnection that is driven by the build-up of magnetic shear. More generally, shearing of magnetic fields is seen throughout the heliosphere. In MHD simulations, the application of a magnetic-field shear is a trivial matter. However, kinetic effects are important in the diffusion region and thus, it is important to examine this process with PIC simulations as well. The implementation of such a driver in PIC methods is nontrivial, however, and indicates the necessity of a true multiscale model for such processes in the solar environment. The field must be sheared self-consistently and indirectly to prevent the generation of waves that destroy the desired system. In the work presented here, we show results of velocity shear perpendicular to the plane of reconnection in a system with open boundary conditions. This material is based upon work supported by the National Science Foundation under Award No. AGS-1331356.

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