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A Kinetic Approach to Shear Driven Magnetic Reconnection for Multi-Scale Modeling of CME Initiation CARRIE BLACK, Catholic University of America, SPIRO ANTIOCHOS, RICK DEVORE, NASA/GSFC, KAI GERMASCHEWSKI, UNH, JUDY 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 consisting of an upward force due to the magnetic pressure of the sheared field balanced by a downward tension due to overlying, un-sheared field is widely believed to be disrupted by magnetic reconnection. Therefore, understanding initiation of solar explosive phenomena requires a true multi-scale model of reconnection onset driven by the buildup of magnetic shear. While, the application of a magnetic field shear is a trivial matter in MHD simulations, it is significantly challenging to do so in a PIC code. The driver must be implemented in a self-consistent manner and with boundary conditions that avoid the generation of waves that destroy the applied shear. In this work, we describe such a driver for 2.5D, aperiodic, PIC system and discuss the implementation of driver consistent boundary conditions that allow a net electric current to flow through the walls. Preliminary tests of these boundaries with a MHD equilibrium are shown.

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