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Numerical Study of Energy Release in Magnetized Corona Driven by Continuous Footpoint Motions YI-MIN HUANG, ELLEN ZWEIBEL, DALTON SCHNACK, University of Wisconsin, Madison, ZORAN MIKIC, Science Applications International Corporation — The solar corona is a highly conducting plasma (Lundquist number $S \sim 10^{10-13}$). As such, Ohmic dissipation is negligible except within thin current filaments. In his coronal heating model, Parker suggests that thin current filaments can be induced in a magnetized corona via the shuffling of the field lines driven by continuous footpoint motions. One of the major difficulties in assessing the feasibility of Parker's mechanism is that the realistic parameters are way beyond the reach of current computer simulations. One possible approach is to establish the parametric dependence of the dissipation rate through simulations of attainable parameters. We study the Parker's model in two settings: (1) time independent footpoint twisting, and (2) footpoint shearing in alternating directions with random phases. Thin current filaments are created in both cases, and the system finally settles to a statistical steady state in which the Poynting power influx balances the viscous and resistive dissipation. Both configurations have only three relevant dimensionless parameters : Lundquist number, the aspect ratio, and the ratio between the Alfven transit time and the eddy turnover time. The parametric dependence of the dissipation power, as well as the similarities and differences between the two settings are discussed.

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