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Lundquist Number Scaling of Solar Coronal Heating Due to Random Photospheric Footpoint Motion in a Three-Dimensional Tectonics Model[1] L. LIN, University of New Hampshire, C.S. NG, Geophysical Institute, University of Alaska Fairbanks, A. BHATTACHARJEE, Center for Integrated Computation and Analysis of Reconnection and Turbulence and Center for Magnetic Self-Organization, University of New Hampshire — We have recently obtained new scaling results in 2D for a "tectonics model" of coronal heating which suggest that the heating rate becomes independent of resistivity in a statistical steady state [Ng & Bhattacharjee, Astrophys. J., **675**, 899 (2008)]. Here we extend our 2D results to 3D by means of numerical simulations. Random photospheric footpoint motion is applied for a time much longer than the correlation time to obtain converged average coronal heating rates. Simulations are done for different values of the Lundquist number to determine scaling. In the large Lundquist number limit, we recover the case in which the heating rate is independent of the Lundquist number, predicted by previous analysis as well as 2D simulations. In the same limit the average magnetic energy built up by the random footpoint motion saturates at a constant level, apparently limited by nonlinear processes, such as instabilities and/or magnetic reconnection.

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