Abstract Submitted
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Solar Coronal Heating and Magnetic Energy Build-Up in a Tectonics Model[1] M. GILSON, C.S. NG, A. BHATTACHARJEE, Center for Integrated Computation and Analysis of Reconnection and Turbulence and Center for Magnetic Self-Organization, University of New Hampshire — Observations from SOHO and TRACE have shown that the solar surface is covered with a so-called "magnetic carpet," in which small-scale magnetic flux loops are continually emerging and interacting. The magnetic flux at the photosphere is thus being replaced in every 10-40 hours. This magnetic carpet has important implications for the problem of coronal heating. We have extended a tectonics model of coronal heating [E. Priest, J. Heyvaerts and A. Title, Astrophys. J. **576**, 533 (2002)] and shown, based on analysis and numerical simulations, that the heating rate is independent of the Lundquist number as well as the photospheric coherence time, if the magnetic footpoints are subject to random photospheric motion. We have also found that magnetic energy can be built up to a statistically high level before the energy is released by some mechanisms, such as instabilities and/or magnetic reconnection. We have also shown that even if such processes limit the build-up of magnetic energy, the overall heating rate is still independent of the Lundquist number.

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