

ON THE FREQUENCY DISTRIBUTION OF HEATING EVENTS IN CORONAL LOOPS, SIMULATING OBSERVATIONS WITH HINODE/XRT

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Alfvén waves are good candidates to heat and maintain the solar corona to the observed few million degrees (Alfvén 1947, Hollweg 1982). Another appealing candidate is the nanoflare heating, in which energy is released through many small reconnection events (Parker 1988; Priest et al. 2002). Distinguishing the observational features of each mechanism is an extremely difficult task. On the other hand, solar flares down to microflares are found to follow a power law distribution in frequency (Shimizu 1995). The power law index is important as it shows which events are the main heating contributors (Hudson 1991). In this work we propose a link between this index and the operating heating mechanism in a loop. We set up two coronal loop models using the CIP-MOCCT scheme (Evans & Hawley 1988, Yabe & Aoki 1991). The first model, following Moriyasu et al. 2004, is a 1.5-D MHD code in which Alfvén waves created by sub-photospheric motions at both footpoints dissipate their energy through shocks. The second model is a 1-D HD code in which numerous heating events are input randomly along the loop (uniformly or footpoint concentrated). We analyze the intensity flux distribution as would be observed with Hinode/XRT and find that Alfvén wave heated coronas and nanoflare heated coronas present intensity histograms with power-law indexes which differ considerably. The difference in the index as a signature of the heating mechanism is discussed.