M25b Analysis of the distribution of heating events in intensity histograms as a possible indicator of the heating distribution in coronal loops simulating observations with Hinode/XRT

○ P. Antolin, K. Shibata (京大理), D. Shiota (地球シミュレーターセンター), D. Brooks (NRL)

The coronal heating problem, one of the most important astrophysical problems, consists in identifying and understanding the physical mechanism responsible for the few million degree solar corona temperatures. Coronal loops, closed magnetic field structures, constitute the main building blocks of the high temperature corona. Understanding how these loops are heated is then fundamental for solving the coronal heating problem. The two competing heating mechanisms at present are the Alfven wave heating model in which Alfven waves transport the energy into the corona (Alfven 1947, Moriyasu et al. 2004), and the Nanoflare heating model, in which the energy is released through many small reconnection events (Parker 1988; Priest et al. 2002). Further, it is not well known whether the heating distribution in coronal loops is uniform (Priest et al. 1998), footpoint (Aschwanden 2001) or apex concentrated (Reale 2002). In this work 1.5-D MHD numerical simulations of loop heating have ! been carried out considering Alfven waves generated at the footpoints, and Nanoflares with different heating distributions. The obtained coronas differ in many aspects, for instance, in the simulated intensity profile obtained with Hinode/XRT. For each case we construct the distribution of the heating event number in intensity flux histograms. We discuss the power-law emerging from the distributions as a diagnostic tool for heating distribution along the loop as well as its implications for coronal heating.