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Fourier power spectra analysis of Doppler shift and brightness in coronal loops observed by Hinode/EIS

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Title:
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Abstract:
The solar corona, the upper atmosphere of the Sun, is maintained its temperature above 1MK, while the temperature in the lower atmosphere is less than 0.01 MK. Since this fact was discovered in 1940's, the number of mechanisms to explain the heating of corona has been presented. The heating mechanisms can be classified into two groups: (1) supplying energy through wave dissipation processes like shock waves, resonant absorption, or phase mixing, (2) releasing energy by many tiny reconnections (called nanoflare) of entanglement strands in coronal loops caused by the random footpoint motions. In this study, Fourier power spectra of the temporal variation of Doppler shift in coronal loops is investigated, using the spectroscopic data obtained by EUV Imaging Spectrometer (EIS) on board Hinode satellite. We are trying to detect waves and oscillations in coronal loops, and to determine their modes (torsional Alfven, global kink, global sausage, slow). Fourier power spectra were calculated in order to compare the energy flux of each mode. It is important to study which mode dominates in coronal loops, in the sense that we can consider the heating properties of loops. At the conference, some restrictions to the heating mechanism of the solar corona deduced from obtained Fourier spectra will be discussed.