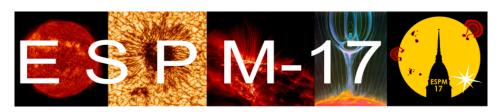
## 17th European Solar Physics Meeting ESPM-17



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## Spectroscopic Study of Heating Distributions and Mechanisms Using Hinode/EIS

This study aims to reveal the heating mechanism in coronal loops by observationally deriving the relation among the heating flux  $F_{\rm H}$ , the magnetic field  $B_{\rm base}$ , and the loop half-length  $L_{\rm half}$ . While the previous studies investigated the heating mechanism assuming some parameters (e.g., heating scale height), this study directly derives the parameters from the observations.  $F_{\rm H}$  is obtained by the heating distributions derived from Hinode/EIS,  $B_{\rm base}$  is derived from SDO/HMI, and  $L_{\rm half}$  is determined by SDO/AIA. We estimate the heating distribution by applying a Bayesian analysis to the electron temperature and electron density distributions derived by spectroscopic data from Hinode/EIS; we define the heating distribution decreasing with a heating scale height  $s_{\rm H}$  toward the loop-top with a heating rate  $E_0$  at the transition region. We obtain  $s_{\rm H}$ =4.3–22 Mm for our analysis of 18 loops with  $L_{\rm half}$ =24–107 Mm, suggesting the heating concentration near the lower part. Compared to the previous studies using the imaging data,  $s_{\rm H}$  is comparable, but  $E_0$  and  $F_{\rm H}$  are approximately an order of magnitude larger. We confirm that using the imaging data leads to the underestimation of the electron density due to the assumption of plasma volume, and consequently the underestimation of  $E_0$  and  $F_{\rm H}$ . From  $F_{\rm H}$ ,  $B_{\rm base}$ , and  $L_{\rm half}$  of 18 loops, we obtain  $\beta = 1.04^{+0.18}_{-0.36}$  and  $\lambda = -0.99^{+0.04}_{-0.05}$  in  $F_{\rm H} \propto B_{\rm base}^{\beta} L_{\rm half}^{\lambda}$ , Mandrini et al. (2000) expressed the heating models as the power-law relation and tried to classify them by  $\beta$  and  $\lambda$ . This presentation discusses the heating models allowed by the derived  $\beta$  and  $\lambda$ .

Primary author: ISHIGAMI, Shun (NAOJ/SOKENDAI)

Co-authors: Prof. HARA, Hirohisa (NAOJ/SOKENDAI); Dr OBA, Takayoshi (MPS)

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within