

[박 SE-13] Observational Studies of Magnetic Reconnection in Solar Preflare Activities

Kim, Sujin^{1,2}, Moon, Yong-Jae²

¹*Korea Astronomy and Space Science Institute,* ²*Department of Astronomy and Space science, Kyunghee University*

We have studied preflare activities associated with three X-ray flares using multi-wavelength observations, such as soft X-ray, EUV, UV, H α , longitudinal magnetogram, and EUV spectral data with raster scan images. To find the events which show the detail structure and the time sequential evolution of the preflare activity, we examined 242 events associated with flares. First two events showed morphological evolutions during the preflare phase and final one showed spectroscopic properties at the preflare site before the preflare time. In morphological studies, we have found several interesting common features as follows: 1) preflare is cospatial with the main flaring region, 2) there was a sigmoidal structure along the sheared polarity inversion line before the preflare activity, 3) the preflare activity causes a change of field connectivity, 4) the entire flaring process is made of two reconnection steps, and 5) both reconnection steps show the tether-cutting picture. In the spectroscopic study, we examined the physical properties at the preflare site using Hinode/EIS, which was appeared to be a soft X-ray brightening. We found that there was strong nonthermal motion and hot component at the lower temperature atmosphere at the preflare site just before the preflare time. Regarding hot component, we suggest two possibilities: the activity of multi-thermal loops or lower atmospheric heating caused by a small-scale magnetic reconnection process.

[SE-14] Are EUV bright points flare loops?

Ryun Young Kwon, Jongchul Chae

Astronomy Program, Department of Physics and Astronomy, Seoul National University

The heights of EUV bright points (hereafter BPs) are measured by a stereoscopic method using SECCHI EUVI aboard STEREO. The STEREO mission consists of the twin spacecrafts so-called 'Ahead' and 'Behind' (hereafter SC/A and SC/B) and they provide us with a pair of the images observed by SC/A and B at the same time for the determining and estimating the 3D geometry of the coronal features. We have developed simple a 3D reconstruction method for point-like features like BPs. The basic idea is that the position of a point in the 3D space is specified the intersection of the lines of sights which start from two points on two observed images. In order to analyze the heights of the BPs and their morphologies, we have taken a data set consisting of 171Å, 195Å, 284Å, and 304Å images on 13 days data arbitrarily selected during a period of more than about a month. From the selected data set, we could detect 386 individual BPs that were visible on all of four passband images. As a result we found that the BPs on 304Å images have the average height 4.1 ± 1.8 Mm and they are associated with the footpoints of the loops. On the other hand, the BPs on the 171Å, 195Å, and 284Å images are the loop-like structures, and the average heights are 5.0 ± 2.2 , 6.7 ± 2.1 , and 6.2 ± 2.2 Mm, respectively. In addition, we have determined the lengths of the BPs for the 171Å, 195Å, and 284Å BPs and we found that the average heights are half of the average lengths approximately. From the temperature structures, heights and lengths relations, and analyzing relative morphologies observed on SC/A and B images, we suggest that the BPs may be similar to the flare loops.