

micromesh detectors. This instrument was developed as a facility instrument on the Large Millimeter Telescope (LMT) and operates with a single bandpass centered at either 1.1, 1.4, or 2.1mm (Wilson et al. 2008). We observed blank and biased fields in the sky with AzTEC installed on the James Clerk Maxwell Telescope (JCMT) and searched for candidates of the SMGs. Multi-wavelength follow-up studies of these galaxies suggest that these are massive young galaxies seen during their formation epoch with an inferred star formation rate (SFR) exceeding 1000 Msun per year.

■ Session : 초청강연 (IS)

4월 30일(목) 11:30 - 12:30 제1발표장

[IS-02] The Sun's Magnetic Field and Activity Sami K. Solanki^{1,2}

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The Sun is a restless star. It shows a wide variety of transient or active phenomena, such as dark sunspots, the continuously changing hot corona, energetic flares and immense coronal mass ejections, together with the associated output of energetic radiation and particles. The single quantity that is responsible for the continuing unrest of the Sun is its tangled and dynamic magnetic field. It produces these and many more fascinating phenomena, including changes in the Sun's radiative output, which has been invoked as a source of solar influence on the Earth's climate.

[IS-03] Recent Developments of Space Astronomy and Planetary Missions in Japan Munetaka Ueno

*Institute of Space and Astronautical Science, Japan
Aerospace Exploration Agency*

I will present a current status of ISAS/JAXA missions on space astronomy and planetary science, covering the live missions as well as ongoing projects. ISAS scientific mission has now three categories as L, M, S classes. The former regular missions like AKARI, HINODE, SUZAKU are attributed to the M (middle) size class in the current system. The S (small) class mission is rather new category in Japan. The size of the mission is previous standard one as GINGA, YOHKOH, AKEBONO, all launched by M3-Sil rocket. This Japanese SMEX mission uses a "universal standard satellite bus" to reduce the individual mission cost, and which enables a higher frequency of the mission opportunity. A new solid fuel rocket is developed in JAXA to launch the S

class mission. My talk will focus on the following topics: a brief summary of AKARI observations, and a current status of mission development and scientific goal of PLANET-C/Venus Climate Orbiter scheduled to be launched in 2010, and PRINT-A/EXCEED (the first mission of S-class category) in 2012.

■ Session : 태양 및 우주환경 III (SE)

4월 30일(목) 09:00 - 10:45 제2발표장

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

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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

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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 171 Å, 195 Å, 284 Å, and 304 Å 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 304 Å 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 171 Å, 195 Å, and 284 Å 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 171 Å, 195 Å, and 284 Å 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.

[SE-15] Two types of active region EUV bright points observed by Hinode/EIS

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We have investigated seven Extreme-Ultraviolet (EUV) bright points in the active region (AR 0926) on 2006 December 2 by the EUV Imaging spectrometer (EIS) onboard Hinode spacecraft. We determined their Doppler velocities and non-thermal velocities from 15 EUV spectral lines ($\log T=4.7-7.2$) by fitting each line profile to a Gaussian function. We present the Doppler velocity map as a function of temperature which corresponds to a different height. As a result, these active region bright points can be classified into two types according to the pattern of doppler shifts. Type 1 bright point shows a systematic increase of Doppler velocity from -56 km/s (blue shift) at $\log T=5.8$ to 12 km/s (red shift) at $\log T=6.7$, while type 2 bright points have Doppler velocities in the range of -20 km/s and 20 km/s. Using MDI magnetograms, we found that only type 1 bright point was associated with the cancelling magnetic feature at

the rate of 2.1×10^{18} Mx /hour. When assuming that these bright points are caused by magnetic reconnection and the Doppler shift indicates reconnection outflow, the pattern of the Doppler shift implies that type 1 bright point should be related to low atmosphere magnetic reconnection. We also determined electron densities from line ratio as well as temperatures from emission measure loci using CHIANTI atomic database. The electron densities of all bright points are comparable to typical values of active regions ($\log Ne=9.9-10.4$). For the temperature analysis, the emission loci plots indicate that these bright points should not be isothermal. We are examining the multi-thermal structures using DEM (Differential Emission Measure) method.

[SE-16] Hinode SOT Observation of Recursive Solar Tornadoes

Su-Chan Bong¹, Kyung-Suk Cho¹, Yeon-Han Kim¹, Young-Deuk Park¹, and Jongchul Chae²

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We report an observation of recursive Solar tornadoes by Hinode Solar Optical Telescope (SOT). The solar active region AR10930 on the west limb produced a C2.0 flare on 2006 December 17. One day later, Hinode SOT observed the active prominence of AR10930 continuously from 11:21 UT December 18 to 09:58 UT December 19, using the Ca II H broadband filter. The pixel resolution was 0.1 arcsec and the time cadence was 8 s. During the observation, rise and fall motion accompanying rotation, which resembles tornado, appeared recursively. There occurred a total of 14 tornadoes and the lifetime of each tornado was usually less than an hour. A tornado started near the surface, rose up with rapidly untwisting motion, and fell down with slowly untwisting or straight motion. We analyse and discuss their kinematic properties and magnetic field configuration.

[SE-17] The Evolution of Pores Observed by HINODE/SOT

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Pores are small sunspots with strong magnetic flux density. They are important in understanding the mechanism of small-scale flux emergence and its interaction with neighboring plasma on the photosphere. However, it is still unknown how they form and evolve since their observational