burst.

[포 SS-04] 2016 Total Solar Eclipse Expedition

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A total solar eclipse occurs on March 9 along the path through Indonesia and the Pacific. KASI organized an expedition team for total solar eclipse observation. The main purpose of this observation is to test the coronal temperature and outflow velocity diagnostics based on filter observation, which is proposed for the next generation coronagraph. In addition, various white light observations including automatic programmed observation, manual observation, linear polarization, and time-lapse movie will be tried. We report the preliminary result of the expedition.

[포 SS-05] Detrended fluctuation analysis of magnetic parameters of solar active regions

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Many signals in the nature have power-law behaviors, namely they are "scale-free".
The method of detrended fluctuation analysis (DFA), as one of the popular methods (e.g., Rescaled range analysis and Spectral analysis) for determining scale-free nature of time series, has a very important advantage that the DFA can be applied to both stationary and non-stationary signals. The analysis of time series using the DFA has been broadly used in physiology, finance, hydrology, meteorology, geology, and so on. We performed the DFA of 16 Spaceweather HMI Active Region Patch (SHARP) parameters for 38 HMI Active Region Patches (HARPs) obtained by Solar Dynamics Observatory (SDO) from May 2010 to June 2014. The main results from this study are as follows. (1) The most of the time series data are non-stationary. (2) The DFA scaling exponents of "mean vertical current density" for 38 HARPs have a negative correlation coefficient (-0.41) with flare index. (3) The DFA scaling exponents of parameters such as "Sum of the absolute value of net currents per polarity", "Absolute value of the net current helicity", and "Mean photospheric excess magnetic energy density" for the most active HARPs having more than 10 major flares, have positive correlation coefficients (0.64, 0.59, and 0.53, respectively) with the ratio of "the number of CMEs associated with major flares" to "the number of major flares". Physical interpretations on our results will be discussed.

[포 SS-06] Comparison between observation and theory for the stand-off distance ratios of CMEs and their associated ICMEs

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We examine whether the observational stand-off distance ratios of CMEs and their associated ICMEs could be explained by theoretical model or not. For this, we select 16 CME-ICME pairs from September 2009 to October 2012 with the following conditions: (1) limb CMEs by SOHO and their associated ICMEs by twin STEREO spacecraft and vice versa when both spacecraft were roughly in quadrature; (2) the faint structure ahead of a limb CME is well identified; and (3) its associated ICME clearly has a sheath structure. We determine the observational stand-off distance ratios of the CMEs by using brightness profiles from LASCO-C2 (or SECCHI-COR2) observations and those of the ICMEs by solar wind data from STEREO-IMPACT/PLASTIC (or OMNI database) observations. We also determine the theoretical stand-off distance ratios of the CME-ICME pairs using semi-empirical relationship based on the bow shock theory. We find the following results. (1) Observational CME stand-off distance ratio decreases with increasing Mach number at the Mach numbers between 2 and 6. This tendency is consistent with the results from the semi-empirical relationship. (2) The observational stand-off distance ratios of several ICMEs can be explained by the relationship.

태양계

[포 SS-07] Thermal Modeling of Comet-Like Asteroids

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Recent analysis on asteroidal thermophysical property revealed that there is a tendency that their thermal inertia decrease with their sizes at least for main belt asteroids. However, little is known about the thermal properties of comet-like bodies. In this work we utilized a simple thermophysical model to calculate the thermal inertia of a bare nucleus of comet P/2006 HR30 (Siding Spring) and an asteroid in comet-like orbit 4015 Wilson—Harrington from AKARI observation data. It is also shown that the determination of their thermal inertia is very sensitive to their spin vector, while the diameter is rather easy to be constrained to a certain range by combining multi-wavelength observational data. Thus, we set diameter and hence the geometric albedo as fixed parameters, and inferred the spin vector and thermal inertia of the targets. Further detailed analyses on these cometary bodies will shed light on our understanding of the detailed surfacial characteristics of them.

[포 SS-08] Relationship between solar flares and halo CMEs using stereoscopic observations

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To find the relationship between solar flares and halo CMEs using stereoscopic observations, we investigate 182 flare-associated halo CMEs among 306 front-side halo CMEs from 2009 to 2013. We have determined the 3D parameters (radial speed and angular width) of these CMEs by applying StereoCAT to multi-spacecraft data (SOHO and STEREO). For this work, we use flare parameters (peak flux and fluence) taken from GOES X-ray flare list and 2D CME parameters (projected speed, apparent angular width, and kinetic energy) taken from CDAW SOHO LASCO CME catalog. Major results from this study are as follows. First, the relationship between flare peak flux (or fluence) and CME speed is almost same for both 2D and 3D cases. Second, there is a possible correlation between flare fluence and CME width, which is more evident in 3D case than 2D one. Third, the flare fluence is well correlated with CME kinetic energy (CC=0.63). Fourth, there is an upper limit of CME kinetic energy for a given flare fluence (or peak flux). For example, a possible CME kinetic energy ranges from 1030.6 to 1033 erg for a given X1.0 class flare. Our results will be discussed in view of the physical mechanism of solar eruptions.