[S06-1] Data Processing of a Solar Filament using Tunable H-a Filter

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A prominence (filament) is one of the prominent features on the Sun. Usually Ha observations of filaments have been performed at a single specified wavelength, centerline or blue/red wing. But these observations are limited to the Ha morphology and its time evolution. In this study, we present imaging spectroscopy of a solar filament using a tunable H-alpha filter (FWHM=0.25Å) which could scan five wavelengths (-0.65Å,-0.35Å,-0.05Å,+0.25Å, and +0.55Å) with a very fast (30 fps) CCD camera. Our observation of the filament was carried out on 2004 August 4 at Big Bear Solar Observatory using 10 inch telescope. To minimize seeing effect, we adopted a method to select the best frame out of 30 frames according to the contrast measure. Then we applied various data analysis methods such as masking, subtraction of bias/dark, flat fielding, filtering, enhancement to these multi-wavelength data. In this talk, we introduce how to do data analysis and their main results.

[S06-2] CME Geoeffectiveness Depending on Field Orientation and ICME Property

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Coronal mass ejections(CMEs) have been regarded as major solar disturbances of strong geomagnetic storms, especially when there exist southward components of the interplanetary magnetic field(IMF). To look for a possibility of solar origin for the southward components, we have examined the CME geoeffectiveness characterized by Dst $\leq$ -50 nT depending on both the field orientation of CME source regions and ICME property(magnetic cloud or ejecta). For this we considered 133 CME-ICME pairs(1996 to 2001) whose CME source locations are identified by SOHO/LASCO and SOHO/EIT data. Then we identified the shapes(S or Inverse-S) of 63 X-ray sigmoids associated with these CMEs using Yohkoh/SXT data. To determine the field orientation in the sigmoids, we applied the coronal flux rope(CFR) model and the force-free field(FFF) model to these 63 sigmoids using SOHO/MDI images. As a result, we present the contingency tables of the CME geoeffectiveness depending on the field orientation and the ICME property. We found that (1) the prediction of geomagnetic storms(Dst $\leq$ -50 nT) based on the CFR model is much better than that on the FFF model, (2) all the statistical parameters for magnetic clouds are much better than those for ejecta, implying that the field orientation of the magnetic clouds are well conserved through the heliosphere, (3) for about 86 % of the magnetic clouds, the directions of their leading fields are consistent with those in the CME source regions. Our results support that the southward orientations of the magnetic field in CME source regions play an important role in producing geomagnetic storms.