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We investigate the relationships between the peak fluxes of 18 solar energetic particle (SEP) events and associated coronal mass ejection (CME) 3D parameters (speed, angular width, and separation angle) obtained from SOHO, STEREO-A and/or B for the period from 2010 August to 2013 June. We apply the STEREO CME Analysis Tool (StereoCAT) to the SEP-associated CMEs to obtain 3D speeds and 3D angular widths. The separation angles are determined as the longitudinal angle between flaring regions and magnetic footpoints of the spacecraft, which are calculated by the assumption of Parker spiral field. The main results are as follows. 1) We find that the dependence of the SEP peak fluxes on CME 3D speed from multi-spacecraft is similar to that on 2D CME speed. 2) There is a positive correlation between SEP peak flux and 3D angular width from multi-spacecraft, which is much more evident than the relationship between SEP peak flux and 2D angular width. 3) There is a noticeable anti-correlation (r=-0.62) between SEP peak flux and separation angle. 4) The multiple regression method between SEP peak fluxes and CME parameters shows that the longitudinal separation angle is the most important parameter, and the CME 3D speed is secondary on SEP peak flux.

[포 SS-06] Development of Solar Activity Monitoring Map and Its Application to the Space Weather Forecasting System

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SDO/AIA와 STEREO/EUVI 두 태양 관측 위성의 193 파장에서의 실시간 영상 이미지를 이용하여 Stonyhurst Heliographic Map을 작성하고 각각의 위성 데이터 분석으로부터 얻어진 결과들을 종합적으로 재구성하여 태양 전면 및 후면의 활동 영역들을 동시에 표출하는 태양 활동성 지도 (Solar Activity Monitoring Map)를 작성하는 프로그램을 제작하였다. 태양 활동성 지도를 이용하여 태양 후면에서의 극자외선 밝기 분포를 경도에 따라 등간격으로 나눈 후 각 지역에서 얻은 극자외선량을 실시간으로 갱신하며 그래프를 작성하는 프로그램도 함께 제작하고 그로부터 태양 후면 영역의 활동성이 향후 지구에 어떠한 방식으로 영향을 미칠 것인지 사전에 예측 가능하도록 하였다.

또한 태양 후면에서 발생하는 활동 영역 (Active Region) 및 코로나홀들을 자동적으로 탐지한 후 실시간으로 변화 정도를 추적 및 기록하는 프로그램도 제작하였다. 태양 활동성 지도는 193 파장에서 뿐만 아니라 두 위성이 공유하는 세 개의 동일 혹은 유사한 파장대 (171,211,304)에서 얻어진 데이터들도 함께 이용하여 각 파장대에서 독립적으로 작성하였는데 이로 인해 각각의 에너지 영역의 특성에 해당하는 태양 활동성을 동시에 표출하는 것이 가능하게 되었다. 이러한 프로그램을 이용하여 태양 후면에서의 활동 영역의 발생 및 변화를 사전에 인식하고 그들이 태양 전면으로 나타나기 전에 대비할 수 있는 예보 장치가 마련되었다.

본 연구들과 더불어 극자외선 영역에서의 태양 활동성 조사로부터 플레어의 발생을 예측할 수 있을 것인지의 가능성 여부를 타진하기 위해 과거 극자외선 관측에서 얻어진 활동 영역들의 데이터와 연 X-선 관측으로부터 기록된 플레어 발생 여부의 상관관계를 조사하는 연구가 현재 진행 중이다. 이러한 연구로부터 긍정적인 결과가 도출되는 경우 극자외선 영역에서의 관측 데이터를 이용하여 플레어 발생 가능성을 예측하는 새로운 방법을 제시하는 것이 가능해질 것이다.

[포 SS-07] Observations of Light bridge jets using the New Solar Telescope

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We report observations of light bridge (LB) jets taken with the New Solar Telescope. Jets as dark, fine threads occurred lined along both edges of a LB of a sunspot, which is a bright and elongated structure that divides a sunspot's umbra into two or more parts. This LB jets are observed for about three hours with Hα filtergraph at ±0.4Å, ±0.8Å from the line center, TiO filtergraph, and near infra-red imaging spectropolarimeter (NIRIS). High resolution Hα data revealed that subsequent ejection of LB jets were associated with subsequent brightening along the edge of the LB. Also, this subsequent brightening was spatially correlated with both photospheric flow and magnetic field change detected from the TiO and NIRIS data, respectively. Preliminary results of LB jet observation and discussions on its formation mechanism will be presented.

[포 SS-08] Observation of a 2016 Ganymede stellar occultation event with the SOAO 0.6m telescope

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On 2016 April 13th the Jovian satellite Ganymede occulted a 7th magnitude star. The predicted occultation track (occultation shadow) crossed the Northern Pacific Ocean, Japan, and South Korea. Hence, it was a very favorable event due to the star brightness in order to be accessible for small-aperture telescopes as well.

While no other similar event is expected for the next 10 years, only two occultation events are reported in the literature in the past, from Earth in 1972 and from Voyager, in large disagreement in respect to the atmospheric detection. However, evidence of an exosphere around Ganymede was inferred through H Lyman alpha emission detected by Galileo UVS, through HST/GHRS detection of far-UV atomic O airglow emissions, signature of dissociated molecular oxygen.

We organized a short-notice international coordinated occultation monitoring network with the aim to search for a signature of Ganymede's exosphere in the occultation light-curve by using facilities on Mauna Kea (NASA-IRTF) and Sobaeksan Optical Astronomy Observatory (SOAO) in South Korea. Scientific

New Frontier of Gravitational Wave Research

[포 GW-01] Structural Analysis of SLGT Platform

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SLGT (Superconducting Low-frequency Gravitational-wave Telescope) platform has three arms whose ends support six superconducting test masses. Therefore, any motion of the platform could cause noises on measuring the displacements of test masses which contain the effect of gravitational waves passing by. Thermal motions of the platform are the main noise source, and are related to resonant motions of the platform structure. We briefly report preliminary results of nodal analysis in finite element method performed for various platform configurations including 2-m, 30-m, 50-m and 100-m arm lengths. Platform designs giving resonant frequencies outside of the signal bandwidth (e.g., 0.1~10 Hz) have been identified.

[포 GW-02] Newtonian Noise and Mitigation for SLGT

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The pilot study of SLGT (Superconducting Low-frequency Gravitational-wave Telescope) is being performed by KKN (KASI-KISTI-NIMS) collaboration. Among environmental noise sources, Newtonian noise (NN) is one of the most challenging obstacles in order to achieve a good sensitivity in low frequency below 10Hz for terrestrial gravitational wave (GW) detectors. So we should mitigate them for operating the SLGT to detect GWs on the ground. In this poster, we discuss the NNs and its mitigation for SLGT.

TOWARD NEXT GENERATION CORONAGRAPH

[포 TG-01] Development of the Camera System for Total Solar Eclipse

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Korea Astronomy and Space Science Institute (KASI) has been developing the Camera System for the Total Solar Eclipse (TSE) observation. In 2016 we have assembled a simple camera system consisting of a commercial camera lens, a polarizer, bandpass filters, and a Canon camera to observe the solar corona during the Total Solar Eclipse in Indonesia. For 2017 TSE observation, we have studied and adapted the compact coronagraph design proposed by NASA. The compact coronagraph design dramatically reduces