

the volume and weight, and used for TSE observation. The camera is used to test and verify key components including function of bandpass filter, polarizer, and CCD during observing the Total Solar Eclipse. In this poster we focus on optical engineering works including designing, analyzing, testing, and building for the TSE observation.

[포 TG-02] An Operating Software Development of A Prototype Coronagraph for The Total Solar Eclipse in 2017

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We develop a coronagraph to measure the coronal electron density, temperature, and speed by observing the linearly polarized brightness of solar corona with 4 different wavelengths. Through the total solar eclipse on 21 August 2017, we test an operating software of a prototype coronagraph working with two sub-systems of two motorized filter wheels and a CCD camera that are controlled by a portable embedded computer. A Core Flight System (CFS) is a reusable software framework and set of reusable software applications which take advantage of a rich heritage of successful space mission of NASA. We use the CFS software framework to develop the operating software that can control the two sub-systems asynchronously in an observation scenario and communicate with a remote computer about commands, housekeeping data through Ethernet. The software works successfully and obtains about 160 images of 12 filter sets (4 bandpass filters and 3 polarization angles) during the total phase of the total solar eclipse. For the future, we can improve the software reliability by testing the software with a sufficient number of test cases using a testing framework COSMOS. The software will be integrated into the coronagraph for balloon-borne experiments in 2019.

[포 TG-03] Comparison of Coronal Electron Density Distributions from MLSO/MK4 and SOHO/UVCS

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The coronal electron density is a fundamental and important physical quantity in solar physics for estimating coronal magnetic fields and analyzing solar radio bursts. To check a validation of coronal electron density distributions (CEDDs) from polarized brightness (pB) measurements with Van de Hulst inversions, we compare CEDDs derived from a polarized brightness (pB) observation [MLSO/MK4 coronameter] and one spectroscopic observation [SOHO/UVCS]. For this, we consider data observed in 2005 with the following conditions: (1) the observation time differences from each other are less than 1 minutes; and (2) O VI doublet (O VI 1031.9 Å and 1037.6 Å) is well identified. In the pB observation, the CEDDs can be estimated by using Van de Hulst inversion methods. In the spectroscopic observation, we use the ratio of radiative and collisional components of the O VI doublet to estimate the CEDDs. We find that the CEDDs obtained from pB measurements are higher than those based on UVCS observations at the heights between 1.6 and 1.8 Rs ($\times 1.9$ for coronal streamer, 1.2 ~ 1.8 for background corona, and 1.5 for coronal hole), while they are lower than those based on UVCS at the heights between 1.9 and 2.6 Rs ($\times 0.1 \sim 0.6$ for coronal streamer, 0.5 ~ 0.7 for background corona, and 0.6 for coronal hole). The CEDDs of coronal streamers are higher than those of background corona at the between 1.6 and 2.0 Rs: $\times 1.2 \sim 2.4$ for MK4 and 1.5 ~ 1.9 for UVCS.

[포 TG-04] Improvement of Corona Temperature and Velocity Determination Method Using a Coronagraph Filter System

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We have developed a methodology to determine the coronal electron temperature and solar wind speed using a four filter coronagraph system. The method developed so far have been applied to total eclipse observation and have yielded plausible results. The current methodology starts from the assumption that 1) coronal free electrons are isothermal and 2) coronal free electrons have spherically symmetric distribution. However, the actual solar corona differs significantly from the two assumptions above. The coronal electron density is not spherically symmetric due to

streamers, plumes, and coronal loops, and the electron temperature is also expected to increase rapidly with distance from the sun. We will discuss how to determine the temperature and wind speed of the corona in the case of corona with thermal structures and non-spherical symmetric electron density.

항성/항성계

[포 SA-01] Correlation between Photometric Parameters and Morphology of the Proplyds in the Orion Nebula Cluster

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오리온 성운은 지구와 매우 가까이에 있고, 무거운 별이 포함된 성단과 성운이 밀접하게 연관되어 있어, 오리온 성운 성단은 가장 많이 연구된 천체 중 하나이다. 1993년 HST를 이용한 오리온 성운 성단의 관측으로 나이가 어린 별을 둘러싼 물질의 실루엣을 처음으로 보았다. 이후 이러한 천체를 원시행성계원반(proto-planetary disk, Proplyd)이라 불렀으며, 그 형태와 구조, 물리적 과정에 대해 꾸준히 연구가 진행되고 있다. 이 연구에서는 지상 관측에서 얻은 UBV_I 및 H α 측광 자료와 원시행성계원반을 상호 동정하고, 원시행성계원반의 형태학적 특징과 측광인자의 관련성을 조사하였다. 또한 Spitzer 중적외선 자료와 Natta et al.(2004)의 근적외선 자료를 통합하여, 현재 사용되고 있는 자외선 초과와 근적외선 방출선을 이용한 질량 강착률 등의 해석에서 주의해야 할 천체들이 있다는 것을 발견했다.

[포 SA-02] On the origin of blue straggler stars in dwarf galaxies

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Blue stragglers (BSs) are the objects that are brighter and bluer than the stars at main-sequence turn-off point. In this study, we present the Ca-by and VI photometry for Galactic dwarf spheroidal galaxies using Subaru/Suprime-Cam and investigate the spatial

distribution characteristics of BS stars using the hk index as a photometric metallicity indicator. We compare the cumulative radial distribution of the BS stars with those of two groups of red-giant-branch (RGB) stars divided by the hk-index strength, and find that the spatial distribution of all BS stars is closer to that of hk-weak (i.e. metal-poor) RGB stars. We also find that the hk-strong BS stars are more centrally concentrated than the hk-weak ones. We will discuss the use of hk-index as a metallicity indicator for the hot BS stars and suggest possible explanations for the results in terms of the origin of BS stars in the dwarf gal

[포 SA-03] The photometric studies of KIC 8804824 and KIC 10229723 with extremely low mass ratio: Discovery of small peculiar structures in the light residuals from the light-curve synthesis

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2개의 케플러 접촉쌍성인 KIC 8804824와 KIC 10229723의 초정밀 측광 자료를 가장 최신 버전의 윌슨-디비니 코드로 분석하여 정밀한 측광 해를 산출하고, 그 잔차들을 매우 자세하게 조사하였다. 두 개의 케플러 접촉쌍성은 제2식이 편평한 광도곡선을 가지고 있어, 이 두 쌍성은 W UMa형 A sub-group에 속한다. 또한, 광도곡선의 모양이 매우 대칭이며, 시간에 따른 변화가 크지 않다. 두 별의 측광 해를 살펴 본 결과, 두 별은 모두 주성의 온도가 부성의 온도보다 높고, 0.2보다 작은 극단적인 질량비와 90도에 거의 가까운 궤도경사각을 갖고 있다. 무엇보다도, 두 별의 측광 해의 잔차에서 공통적으로 전 위상에 걸쳐 모호화 되지 않은 특이한 구조를 발견하였다. 이 구조는 phase smearing 효과를 고려하더라도 그 구조의 모습만이 약간 달라질 뿐, 구조의 진폭에는 크게 영향을 미치지 않는 것을 발견하였다. 흥미롭게도 이 현상은 두 별의 주기가 각각 다름에도 불구하고 공통적으로 나타나며, 관측된 전 쿼터에 대해 나타난다. 이 현상의 가능한 원인에 대해 논의한다.

[포 SA-04] Broad Wings around H α and H β in the S-type Symbiotic Stars

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Symbiotic stars are binary systems composed of a hot white dwarf and a mass losing giant. Many