

deployed in 2023 on the International Space Station (ISS). It is designed to obtain simultaneous measurements of electron density, temperature, and velocity in the 2.5 - 10 solar radius range using multiple filters. The filters are mounted in two filter wheel assemblies (FWAs), which have five filter positions each. One position of each FWA is occupied by windows, and remaining eight positions are occupied by three bandpass filters for temperature, two bandpass filters for velocity, one Ca II H filter for F-corona, one broadband filter for fast imaging and density, and one neutral density (ND) filter for direct Sun viewing and safety.

[포 SS-05] Next Generation Solar Telescope Global Network: Three Eyes for the Studies on the Space Weather Prediction and the Solar Chromospheric Activities (차세대 태양영상분광망원경 글로벌 네트워크: 세 개의 눈을 통한 우주환경예보와 채층활동 연구)

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NxST는 현재 천문원에서 개발중인 30cm 구경의 태양 망원경으로 태양 채층의 모습을 약 1각초의 적절한 영상 해상도로 고분광분해능의 채층선 스펙트럼 자료를 고속으로 얻어낼 수 있다. NxST는 미국과 유럽, 그리고 국내 1대를 건설하여 전지구적으로 연속적인 데이터를 획득할 수 있다. NxST의 관측자료는 1) 우주환경예보의 최초이며 유일인자인 태양을 실시간으로 감시할 수 있고 2) 태양 채층의 파동과 관련된 연구를 수행하는데 활용될 수 있다. 본 발표에서는 NxST의 연구주제들을 살펴보고 이로부터 도출된 시스템의 개념 설계를 제시한다.

[포 SS-06] Simple modeling to explore temperatures, heated temperature, and Kappa values of a current sheet observation

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We explore the range of possibilities of temperatures, heated temperature, and Kappa values of a current sheet observation on 2017 September 10. First, we construct a grid model with rapid heating (T_{heat}) and various Kappa (κ) values. We assume a simple density model and use

adiabatic cooling to set the temperature during expansion. Next, we calculate the ion fractions using a time-dependent ionization model with adiabatic cooling and various Kappa values. The calculated ion fractions are used to simulate the DN's of the Atmospheric Imaging Assembly on board the Solar Dynamic Observatory. Then, we explore the possible range of the temperatures and Kappa values, comparing the simulated images with the observations. Finally, we discuss the range of the heated temperature and Kappa values and whether the result of this study suggests continuous heating of the current sheet plasma during the expansion.

[포 SS-07] Development of a diagnostic coronagraph on the ISS: CODEX progress report

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The Korea Astronomy and Space Science Institute (KASI) has been developing a diagnostic coronagraph to be deployed in 2023 on the International Space Station (ISS) in collaboration with the NASA Goddard Space Flight Center (GSFC). The mission is known as "Coronal Diagnostic Experiment (CODEX)", which is designed to obtain simultaneous measurements of the electron density, temperature, and velocity using multiple filters in the 2.5-10 Rs range. The coronagraph will be installed and operated on the ISS to understand the physical conditions in the solar wind acceleration region, and to enable and validate the next generation space weather models. In this presentation, we will introduce recent progress and future plan.

[포 SS-08] Subsurface structure of a sunspot inferred from umbral flashes

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Sunspots' subsurface structure is an important subject to explain their stability and energy transport. Previous studies suggested two models for the subsurface structure of sunspots: monolithic model and cluster model. However, it is not revealed which model is more plausible so far. We obtain clues about the subsurface structure of

sunspots by analyzing the motion of umbral flashes observed by the IRIS Mg II 2796Å slit-jaw images (SJI). The umbral flashes are believed as shock phenomena developed from upward propagating slow magnetohydrodynamic (MHD) waves. If the MHD waves are generated by convective motion below sunspots, the apparent origin of the umbral flashes known as oscillation center will indicate the horizontal position of convection cells. Thus, the distribution of the oscillation centers is useful to investigate the subsurface structure of sunspots. We analyze the spatial distribution of oscillation centers in the merged sunspot. As a result, we found that the oscillation centers distributed over the whole umbra regardless of the convergent interface between two merged sunspots. It implies that the subsurface structure of the sunspot is not much different from the convergent interface, and supports that many field-free gaps may exist below the umbra as the cluster model expected. For more concrete results, we should confirm that the oscillation centers determined by the umbral flashes accurately reflect the position of wave sources.

항성, 항성계/외계행성

[포 SA-01] Current Status of Intensive Monitoring Survey of Nearby Galaxies and Core-Collapse Supernovae Observational Research

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Intensive Monitoring Survey of Nearby Galaxies (IMSNG) is a program monitoring nearby galaxies with a high cadence within a day. The main goal of the project is to constrain the SNe explosion mechanism and properties of their progenitors by catching the early lights from the shock-heated cooling emission. The observation campaign began in 2014 with two 1-m class telescopes in the northern hemisphere. Now more than ten telescopes are monitoring galaxies with 60 IMSNG targets, which have a high probability of supernova explosion every night all around the world. Since the project started, the following observations have been carried out on 14 SNe Ia (including -pec), 27 core-collapse supernovae (CCSNe), and around 40 transients in other types.

In this poster, we present the current status of IMSNG SNe data first and then focus more on the

CCSNe. CCSNe are the explosion of massive stars, more massive than eight times of the Sun. They have been studied for more than a half decades but still have key questions to be solved, such as distinct types, the characteristics driving their diversity, and so on. Here, we show our ongoing studies of CCSNe in IMSNG, focusing on their usefulness as distance indicators and properties of early light curves.

[포 SA-02] Identifying clusters of red supergiants in Galactic plane using 2MASS and GAIA G band colors

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Galactic young massive clusters are the ideal laboratories to study massive stellar evolution. Unfortunately, such objects are rare. Of particular interest are so-called Red Supergiant Clusters (RSGCs) that are currently only found toward the Scutum-Crux Galactic arm. Confirming their nature as RSGC is often not straight-forward as distinguishing RSGs from AGB stars is still difficult even with high spectral resolution spectra. Here we report that broad band colors using 2MASS JHK and GAIA G band data can be useful in reducing the AGB contamination, thus providing selection criteria that effectively reveal the known RSGCs with negligible false positives. On the other hand, we suggest that RSGC4, one of the proposed RSGC candidates, may not be a cluster of RSGs as their colors are not compatible with our selection criteria. We discuss the nature of these stars together with our IGRINS spectroscopic observations. We also employ the same selection criteria to search for RSGC candidates in other parts of the plane, resulting in no prominent candidates.

[포 SA-03] Pushing precision and accuracy of RR Lyrae variables as distance indicators

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RR Lyrae variables are excellent distance indicators thanks to their visual magnitude-metallicity relation and well-defined Period-Luminosity Relations (PLRs) at infrared wavelengths. These population II variables together with the tip of the red giant branch provide primary calibration for the first-rung of the population II distance ladder. We will present new empirical calibration of RR Lyrae PLRs at