소개하고자 한다. 아울러, 백두산천문대 설립을 위한 최근의 활동과 앞으로의 계획에 대해서도 발표하고자 한다.

[구 IKAC-04] Site Condition of Mt. Baekdu observatory (백두산 천문대 관측환경)

Youngsik Park, Hong-Jin Yang, Hong-Seo Yim, Do-Young Byun, Jong-Kyun Chung, Young-Jun Choi, Insung Yim
Korea Astronomy and Space Science Institute,

2018년 7월 국회의원회관에서 백두산과학기지 구축 방안에 대한 포럼이 있었고, 2018년 11월 한국천문연구원에서는 백두산천문대 구축에 대한 포럼을 통해 광학, 전파, 태양·우주환경 그리고 전통천문 분야에 대한 연구 계획을 소개한 바 있다. 천문대를 건설하기 위한 기본적인 조건인, 기상, 청정일수, 습도, 광해, 시상 등의 정보들을 획득한 후 최종 관측소를 결정해야 한다. 그러나 우리는 북한에 대한 정보를 직접 획득할 수도 없기 때문에, 일단 필요한 정보들을 인터넷 자료를 활용하여 후보지역을 물색하고, 백두산 천문대 건설이 추진된다면 실제 사이트를 방문하여 최종 관측소 후보지역을 선정을 해야 할 것이다. 수집한 자료들 위주로 백두산 주변의 관측소 후보지역들에 대해 이야기 하고자 한다.

특별세션 - KMTNet

[구 KMT-01] The Status and Plan of KMTNet Operation

Chung-Uk Lee, Seung-Lee Kim, Dong-Joo Lee, Sang-Mok Cha, Yongseok Lee, Dong-Jin Kim, Yunjong Kim, Hong Soo Park, Hyun-Woo Kim, Jin-Sun Lim
Korea Astronomy and Space Science Institute

A total of 10,317 hours of the KMTNet telescope time were allocated for the predefined science programs, and 7,765 hours have been used for science exposures in Chile, Australia and South Africa last year. The success rate of science observation has increased from 70.7% to 75.3%, and the system operation rate has also increased from 97.6% to 99.6%. There were many improvements in mechanical parts of the dome structure and telescope system, and newly installed filter driers of the CCD camera increased the stability of the system by preventing contamination of oil in the gas line in advance. In order to prepare for the time domain astronomy and multi messenger astronomy era, a pilot program was designed and is now being tested. It targets for fast follow-up observations of optical transient events, however it runs during twilight times only so it does not interrupt any granted science program. A total of 32 SCI papers were published using the system in 2018 and it is a good indication of the high science performance of KMTNet. The selection process of the next observation programs starting from October 2020 and its timeline will be discussed in this meeting.

[구 KMT-02] The progress of KMTNet microlensing

Sun-Ju Chung[1,2], Andrew Gould[3,4], Youn Kil Jung[1], Kyu-Ha Hwang[1], Yoon-Hyun Ryu[1], In-Gu Shin[1], Jennifer C. Yee[5], Wei Zhu[6], Hyun-Woo Kim[1]

[1]Korea Astronomy and Space Science Institute, Korea, [2]Korea University of Science and Technology, Korea, [3]Department of Astronomy, Ohio State University, USA, [4]Max-Planck-Institute for Astronomy, Germany, [5]Harvard-Smithsonian Center for Astrophysics, USA, [6]Canadian Institute for Theoretical Astrophysics, University of Toronto, Toronto, ON M5S 3H8, Canada

We report the status of KMTNet (Korea Microlensing Telescope Network) microlensing. From KMTNet event-finder, we are annually detecting over 2500 microlensing events. In 2018, we have carried out a real-time alert for only the Northern bulge fields. It was very helpful to select Spitzer targets. Thanks to the real-time alert, KMT-only events for which OGLE and MOA could not detect have been largely increased. The KMTNet event-finder and alert-finder algorithms are being upgraded every year. From these, we found 18 exoplanets and various interesting events, such as an exomoon-candidate, a free-floating candidate, and brown dwarfs, which are very difficult to be detected by other techniques including radial velocity and transit. In 2019, the KMTNet alert will be available in real-time for all bulge fields. As before, we will continue to collaborate with Spitzer team to measure the microlens parallaxes, which are required for estimating physical parameters of the lens. Thus, the KMTNet alert will be helpful to select Spitzer targets again. Also we plan to do follow-up observations for high-magnification events to study the planet multiplicity function. The KMTNet alert will play an important role to do follow-up observations for high-magnification events. Also, we will search for free-floating planets with short timescale (< 3 days) to study the planet frequency in our Galaxy.

[구 KMT-03] Status Report of the KMTNet Supernova Program

Hong Soo Park[1], Dae-Sik Moon[2], Sang Chul Kim[1,3], and Youngdae Lee[1]
[1]Korea Astronomy and Space Science Institute (KASI), [2]Deptment of Astronomy, University of Toronto, Toronto, ON M5S 3H4, Canada, [3]Korea University of Science & Technology (UST)

The key science goal of the KMTNet Supernova Program (KSP) is to detect and study the early explosions of supernovae using one fifth of the KMTNet time. The *BVI*-band observations of the nearby target fields mostly closer than 30 Mpc distance and the follow-up spectroscopy provide valuable information on the early phase of the supernovae. These data can also be used for the studies of optical transients such as novae, dwarf novae, variable stars, and active galactic nuclei. Stacked images of several hundred images obtained from the time domain observations can be used for the search of low surface brightness galaxies reaching 28 mag arcsec^{-2}. Results and status of the KSP including $\gtrsim$20 infant supernovae and $\gtrsim$100 faint dwarf galaxies will be presented in this talk.

[구 KMT-04] Thirty-Minute ToO (TMT) with KMTNet

Jae-Woo Kim[1], Min-Su Shin[1], Seo-Won Chang[2], Chang Hee Ree[1], Seung-Lee Kim[1], Chung-Uk Lee[1]
[1] Korea Astronomy and Space Science Institute
[2] Australian National University

Current large observational projects perform both static and dynamic sky surveys. The Thirty-Minute Target of Opportunity (TMT) is the project focusing on the dynamic sky survey using Korea Microlensing Telescope Network (KMTNet) that is the best observing system to investigate the dynamic sky. TMT aims to perform and experiment on following components : 1) to select transient or variable sources having hour to day scale cadences for future science cases, 2) to optimize the observation strategy for these objects, 3) to provide automated photometric pipelines for the time series data, and 4) to test the data release environment for all astronomers. In the near future, it is expected that a huge number of events will be alerted through large area surveys such as LSST. Therefore, the TMT project will provide opportunities to prepare the future large survey era as well as to understand the nature of interesting astronomical events.

[구 KMT-05] Properties of High-Redshift Dust-Obscured Galaxies Revealed in the ADF-S

Seongjae Kim[1,2], Woong-Seob Jeong[1,2], Daeseong Park[1], Minjin Kim[3], Hoseong Hwang[1], Sung-Joon Park[1], Kyeongyeon Ko[1,2], Hyun Jong Seo[1], the ADF-S Team[1,2,3,4,5]
[1]Korea Astronomy and Space Science Institute, Korea, [2]University of Science and Technology, Korea, [3]Kyungpook National University, Korea, [4]ISAS/JAXA, Japan, [5]RAL, UK

The ADF-S (AKARI Deep Field – South) toward South Ecliptic Pole is one of the deep survey fields designed for the study of Extragalactic Background Light (EBL). The deep extragalactic survey was initiated by AKARI far-infrared deep observations. Other space missions (e.g., Euclid, NISS, SPHEREx) will perform the deep observations in the ADF-S. Based upon the recent optical survey with KMTNet, we can identify the optical counterparts for dusty star-forming galaxies such as ULIRG, DOG, SMG. Among them, the Dust-Obscured Galaxies (hereafter DOGs with f(24um)/f(R) > 1,000) in the heavily obscured system are expected to play an important role in the formation of most massive galaxies. We have newly discovered ~100 DOGs in ~12 sq. deg. of the ADF-S from our optical survey with KMTNet. We also confirmed that some of DOGs host the most luminous AGN for their black hole masses through the near-infrared spectroscopic follow-ups. Here, we report the properties of high-z hyperluminous DOGs in the ADF-S.

[구 KMT-06] Searching for Electromagnetic Counterpart of Gravitational Wave Source with KMTNet

Joonho Kim[1], Myungshin Im[1], Chung-Uk Lee[2], and Seung-Lee Kim[2]
[1]Center for the Exploration of the Origin of the Universe (CEOU), Department of Physics and Astronomy, Seoul National University, Gwanak-gu, Seoul 08826, Korea, [2]Korea Astronomy and Space Science Institute, 776 Daedeokdae-ro, Yuseong-gu, Daejeon 34055, Korea.

After first identification of electromagnetic counterpart of gravitational wave source (GW170817), era of multi-messenger astronomy has begun. For specifying coordinate, magnitude, and host galaxy information, optical follow-up observation of GW source becomes important. With following engineering run and O3 run of LIGO and VIRGO starting in March 2019, we present searching strategy for optical counterpart of GW source using KMTNet. 24 hours monitoring system and large field of view (4 square-degree) of KMTNet are advantage to discover a transient like GW event. By performing tiling observation of high