경도상 위치가 적당히 3등분 되어있어 동일한 천체를 최대 24시간 연속하여 관측 가능하다. 우리는 이 시스템이 가진 장점을 최대한 살릴 수 있는 연구주제를 선정하여 2015년 10월부터 본격적으로 관측을 수행해오고 있다. 3월부터 10월에는 3개 관측소에서 우리은하 중심부를 24시간 연속 관측하여 미시중력렌즈 방법을 이용한 외계행성 탐색연구를 수행하고 은하 중심부를 관측할 수 없는 기간에는 초신성, 소행성 및 외부은하 등을 관측한다. 각 관측 프로그램의 시간배정 및 관측결과 요약 등의 정보를 홈페이지에 제공함으로써(http://kmtnet.kasi.re.kr/kmtnet-monitor/) 각 프로그램의 관측 상황을 효율적으로 모니터링 할 수 있도록 지원한다. 이 발표에서는 지난 2015년 우리은하 중심부를 관측하여 얻은 약 31.5TB의 관측 자료 분석 결과를 통해 구한 관측시스템의 성능을 리뷰하고 2016년 관측시스템 운영계획에 대하여 논의한다.

[구 KMT-02] KMTNet Supernova Program : Year One Progress Report

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With the official start of the operations of the three 1.6 m KMTNet telescope systems from 2015 October, we have initiated a program named KMTNet Supernova Program (KSP) from 2015 to 2019 aiming at searching for supernovae (SNe), other optical transients and related sources. Taking advantage of the 24-hour coverage, high cadence and multi-color monitoring observations, this is optimal for discovering early SNe and peculiar ones. From the start of the previous test observing runs of ~half a year, we have performed observations on several nearby galaxy groups and nearby galaxies with short separations on the sky. We have developed data reduction/variable object search pipelines, meanwhile we have discovered some interesting transient objects. We also stacked all the images for given fields, searched for new objects/galaxies, and discovered several new dwarf galaxies, e.g., in the NGC 2784 galaxy group field (H. S. Park et al.'s talk). We will report the current project status and the results obtained.

[구 KMT-03] New Dwarf Galaxies in the Nearby NGC 2784 Galaxy Group Discovered in the KMTNet Supernova Program

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We present surface photometry results of the dwarf galaxies in the nearby NGC 2784 galaxy group. We newly detected about 30 dwarf galaxy candidates at about 30 square degree area around the nearby NGC 2784 galaxy (D~10 Mpc and MV=-20.5) applying a visual inspection technique on the wide-field optical images taken by the KMTNet Supernova Program (KSP). Surface brightnesses of the objects estimated from the stacked-images with total exposure time of about 6 hours reach approximately μV ~28.5 mag/arcsec2 around 3σ above sky background. The central surface brightness and the total absolute magnitude for the faintest candidate dwarf galaxy among about 40 galaxies including the previously known ones is μ0,V~26.1 mag/arcsec2 and MV~-9.5 mag, respectively. The effective radii of the candidates are larger than ~200 pc. The radial number density of the dwarf galaxy candidates from the center of NGC 2784 is decreasing. The mean color (<(B-V)0>~0.7) and Sérsic structure parameters of the dwarfs, assuming them to be located in the NGC 2784 group, are well consistent with those of the dwarf galaxies in other groups (e.g. M83 group and the Local Group (LG)). The faint-end slope of the cumulative luminosity function (CLF) of the galaxies in NGC 2784 group is about α=-1.2, which is steeper than that of the LG galaxies, but is much flatter than that of the CLF expected by a ΛCDM model.

[구 KMT-04] KINGS: A Preliminary Result of the Fornax cluster

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We present a preliminary result of the Fornax cluster survey as a part of the KMTNet Intensive Nearby Southern Galaxy Group Survey (KINGS). We discovered about 200 new dwarf galaxy candidates from the survey of the $8^\circ \times 6^\circ$ area around the Fornax cluster. They have magnitudes ranging from V=17.5 to 22 mag (Mv = -13.8 to -9.3), and they are almost complete to V = 20 mag. Surface

brightness profiles of most of these galaxies are fit well by a Sersic law with n ~ 1.0. Structural parameters of these galaxies follow well the scaling relations of dwarf galaxies in the fundamental plane. The color-magnitude diagram of these galaxies shows that they are mostly located at the faint end of the red sequence, indicating that they are the probable member of the Fornax cluster. We also derive a luminosity function of the Fornax cluster by combining the new galaxies with the known galaxies in the previous catalogs. We will discuss the future of the KINGS-Fornax.

[구 KMT-05] Current Status of the KMTNet Active Nuclei Variability Survey (KANVaS)

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Multi-wavelength variability is a staple of active galactic nuclei (AGN). Optical variability probes the nature of the central engine of AGN at smaller linear scales than conventional imaging and spectroscopic techniques. Previous studies have shown that optical variability is more prevalent at longer timescales and at shorter wavelengths. Intra-night variability can be explained through the damped random walk model but small samples and inhomogeneous data have made constraining this model hard. To understand the properties and physical mechanism of intra-night optical variability, we are performing the KMTNet Active Nuclei Variability Survey (KANVaS). Using KMTNet, we aim to study the intra-night variability of ~1000 AGN at a magnitude depth of ~19mag in R band over a total area of ~24 deg^2 on the sky. Test data in the COSMOS, XMM-LSS, and S82-2 fields was obtained over 4, 6, and 8 nights respectively during 2015, in B, V, R, and I bands. Each night was composed of 5-13 epoch with ~30 min cadence and 80-120 sec exposure times. As a pilot study, we analyzed data in the COSMOS field where we reach a magnitude depth of ~19.5 in R band (at S/N~100) with seeing varying between 1.5-2.0 arcsec. We used the Chandra-COSMOS catalog to identify 166 AGNs among 549 AGNs at B<23. We performed differential photometry between the selected AGN and nearby stars, achieving photometric uncertainty ~0.01mag. We employ various standard time-series analysis tools to identify variable AGN, including the chi-square test. Preliminarily results indicate that intra-night variability is found for ~17%, 17%, 8% and 7% of all X-ray selected AGN in the B, V, R, and I band, respectively. The majority of the identified variable AGN are classified as Type 1 AGN, with only a handful of Type 2 AGN showing evidence for variability. The work done so far confirms there are more variable AGN at shorter wavelengths and that intra-night variability most likely originates in the accretion disk of these objects. We will briefly discuss the quality of the data, challenges we encountered, solutions we employed for this work, and our updated future plans.

[구 KMT-06] DEEP-South: Round-the-Clock Physical Characterization and Survey of Small Solar System Bodies in the Southern Sky

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Korea Microlensing Telescope Network (KMTNet) is the first optical survey system of its kind in a way that three KMTNet observatories are longitudinally well-separated, and thus have the benefit of 24-hour continuous monitoring of the southern sky. The wide-field and round-the-clock operation capabilities of this network facility are ideal for survey and the physical characterization of small Solar System bodies. We obtain their orbits, absolute magnitudes (H), three dimensional shape models, spin periods and spin states, activity levels based on the time-series broadband photometry. Their approximate surface mineralogy is also identified using colors and band slopes. The automated observation scheduler, the data pipeline, the dedicated computing facility, related research activity and the team members are collectively called 'DEEP-South' (DEep Ecliptic Patrol of Southern sky). DEEP-South observation is being made during the off-season for exoplanet search, yet part of the telescope time is shared in the period between when the Galactic bulge rises early in the morning and sets early in the evening. We present here the observation mode, strategy, software, test runs, early results, and the future plan of DEEP-South.

[구 KMT-07] DEEP-South: Automated Scheduler and Data Pipeline

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