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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DEEP-South Scheduling and Data reduction System (DS SDS) consists of two separate software subsystems: Headquarters (HQ) at Korea Astronomy and Space Science Institute (KASI), and SDS Data Reduction (DR) at Korea Institute of Science and Technology Information (KISTI). HQ runs the DS Scheduling System (DSS), DS database (DB), and Control and Monitoring (C&M) designed to monitor and manage overall SDS actions. DR hosts the Moving Object Detection Program (MODP), Asteroid Spin Analysis Package (ASAP) and Data Reduction Control & Monitor (DRCM). MODP and ASAP conduct data analysis while DRCM checks if they are working properly. The functions of SDS is three-fold: (1) DSS plans schedules for three KMTNet stations, (2) DR performs data analysis, and (3) C&M checks whether DSS and DR function properly. DSS prepares a list of targets, aids users in deciding observation priority, calculates exposure time, schedules nightly runs, and archives data using Database Management System (DBMS). MODP is designed to discover moving objects on CCD images, while ASAP performs photometry and reconstructs their lightcurves. Based on ASAP lightcurve analysis and/or MODP astrometry, DSS schedules follow-up runs to be conducted with a part of, or three KMTNet telescopes.

[구 KMT-08] DEEP-South: Preliminary Lightcurve Analysis of Potentially Hazardous Asteroids (PHAs)

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Near Earth Asteroid (NEA) population has attracted keen attention not only from the scientific community but from the general public ever since their terrestrial impact risk achieved wide recognition. Potentially Hazardous Asteroids (PHAs), the subset of NEAs, recently became the center of interest of planetary defense folks and mining industry due to their proximity to, and the potential effects on planet Earth. However, we have long been ignorant about either the physical properties or dynamical source regions of individual objects. For instance, their rotational periods are only known for five percent of the total population (The NEA Database of DLR, updated on Feb 2016).

The primary scientific objective of DEEP-South (DEep Ecliptic Patrol of the Southern sky) is to physically characterize 70 percent of km-class PHAs until 2019. In order to achieve this goal, we implemented an observation mode so-called “OC (Opposition Census)” targeting objects around opposition. OC observations were conducted during the period between Feb 2015 and Mar 2016, at CTIO in early periods, and at three KMTNet stations (CTIO, SSO and SAAO) since late July 2015, excluding the “bulge season” when the telescope time is exclusively used for exoplanet search. We present the preliminary lightcurves of 66 PHAs and 59 NEAs that we obtained during the OC runs.

[구 KMT-09] DEEP-South: Photometric Study of NPA rotators 5247 Krolv and 14764 Kilauea

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The spin states of asteroids is regarded as an important clue to understand not only the physical property of an individual object but also the dynamical evolution of the of the population as a whole. Single asteroids can be broadly classified into two separate groups according to their rotational states; Principal Axis (PA) and Non-Principal Axis (NPA) rotators. To date, lightcurve observations have been carried out mostly for PA asteroids. However, discovery of NPA objects has recently been increased due to new observing techniques, and this is the reason why rotational properties of NPA rotators became an issue.

As a DEEP-South pilot study for NPA, we selected two targets, 5247 Krolv (1982 UP6) and 14764 Kilauea (7072 P-L) considering their Principal Axis Rotation (PAR) code and visibility. Observations were made between Jan. and Feb. 2016 for 17 nights employing Korea Microlensing Telescope Network (KMTNet) 1.6 m telescopes installed at SSO and SAAO using DEEP-South TO (Target of Opportunity) mode. To obtain