여 지구와 비슷한 성질을 가진 외계행성을 찾아낼 것이다. 우리은하 팽대부를 관측할 수 없는 기간(10월부터 다음해 2월까지)에는 CCD 카메라의 넓은 시야각(2° × 2°)을 활용하여 여러 가지 과학연구를 수행할 계획이며, 일부 연구과제는 이미 진행 중이다. 관측을 통해 신뢰할 수 있는 측광결과를 얻기 위해서는 KMTNet 망원경의 필터와 CCD로 구성된 측광계의 특성을 이해하여야 한다. 본 연구에서는 많은 수의 표준별 영역을 관측하여 KMTNet 측광계의 특성을 파악하고, 정밀한 Johnson-Cousins 표준계 변환관계를 얻기 위한 표준화 관측 계획 및 초기 관측 결과를 제시하고자 한다.

[구 KMT-04] KMTNet Supernova Project : The Initial Status

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We are at the initial performance-verification phase of our KMTNet Supernova Project (KSP) using the three wide-field telescopes of the KMTNet in the southern hemisphere. The primary science objectives of KSP, which take advantage of its unique 24-hour continuous sky coverage, are to study early (i.e., within a few hours from explosion) and rare/peculiar (e.g. fast decay) supernovae (SNe), SN progenitors, explosion mechanisms, as well as other exotic optical transients. We present the initial status/results of the program, along with the program strategy, science objectives, target fields, and future plan. While the target field selection will be made based on the performance of the system and consideration of various scientific merits, the initial target fields are focused on nearby galaxies with increased cadence and filter coverage.

[구 KMT-05] KMTNet Supernova Project : Pipeline and Alerting System Development

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The KMTNet Supernovae Project utilizes the large 2° x 2° field of view of the three KMTNet telescopes to search and monitor supernovae, especially early ones, and other optical transients. A key component of the project is to build a data pipeline with a descent latency and an early alerting system that can handle the large volume of the data in an efficient and a prompt way, while minimizing false alarms, which casts a significant challenge to the software development. Here we present the current status of their development. The pipeline utilizes a difference image analysis technique to discover candidate transient sources after making correction of image distortion. In the early phase of the program, final selection of transient sources from candidates will mainly rely on multi-filter, multi-epoch and multi-site screening as well as human inspection, and an interactive web-based system is being developed for this purpose. Eventually, machine learning algorithms, based on the training set collected in the early phase, will be used to select true transient sources from candidates.

[구 KMT-06] DEEP-South: Round-the-clock Census of Small bodies in the Southern Sky

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As of early 2015, more than 12,000 Near-Earth Objects (NEOs) have been catalogued by the Minor Planet Center, however their observational properties such as broadband colors and rotational periods are known only for a small fraction of the population. Thanks to time series observations with the KMTNet, orbits, optical sizes (and albedo), spin states and three dimensional shapes of asteroids and comets including NEOs will be systematically investigated and archived for the first time. Based on SDSS and BVRI colors, their approximate surface mineralogy will also be characterized. This so-called DEEP-South (Deep Ecliptic Patrol of the Southern Sky) project will provide a prompt solution to the demand from the scientific community to bridge the gaps in global sky coverage with a coordinated use of the network of ground-based telescopes in the southern hemisphere.

We will soon finish implementing dedicated software subsystem consisted of automated observation scheduler and data pipeline for the

sake of increased discovery rate, rapid follow-up, timely phase coverage, and efficient data analysis. We will give a brief introduction to test runs conducted at CTIO with the first KMTNet telescope in February and March 2015 and experimental data processing. Preliminary scientific results will also be presented.

[구 KMT-07] Deep Wide-Field Imaging of Nearby Galaxies with KMTNet telescopes

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We will obtain deep wide-field images of the 150-200 nearby bright galaxies in the southern hemisphere, in order to explore the origin of faint extended features in the outer regions of target galaxies. Using KMTNet telescopes, we will take very deep images, spending ~ 4.5 hr for the B and R filters for each object. With this dataset, we will look for diffuse, low-surface brightness structures including outer disks, truncated disks, tidal features/stellar streams, and faint companions.

[구 KMT-08] Test Observations for SULF (Southern ULtra-Faint dwarf galaxies) Survey using KMTNet

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We have proposed a deep observing program to survey more than 3,000 sq. degree of southern sky with the KMTNet telescopes to search for ultra-faint dwarf galaxies. Recently, the test observations for our survey were made in B, V, R, I-band. We will report the performance of the KMTNet camera system and our detailed strategy in both of observations and analysis for the three-year survey.

[구 KMT-09] KMTNet Test Observation of Nearby Southern Galaxy Groups

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We present a test observation result of the KMTNet Intensive Nearby Southern Galaxy group Survey (KINGS). The KINGS is designed to study nearby galaxy groups (NGC 55, NGC 253, NGC 5128, and M83 groups), taking the advantage of the wide field coverage of the KMTNet. The main goal of the KINGS is to produce extensive catalogs of dwarf galaxies, ultra compact dwarfs (UCDs), and intraglobular clusters in the galaxy groups. We will also investigate the spatial distribution of intragroup light in each group. We present a progress report of the project based on the test BVI observations of two galaxy groups. We discuss the result from the test observation and possible improvement for future observations.

특별 세션 — Centennial of the General Relativity

[구 GR-01] General Relativity and Light Bending/Gravitational Lensing (일반상대성이론과 빛의 꺾임/중력렌즈)

Myeong-Gu Park (박명구)
KNU (경북대학교)

Light bending by gravity was the key prediction of general relativity. Solar eclipse expedition of 1919 provided the observational support for the theory of general relativity. Diverse gravitational lensing, i.e., light bending, phenomena have been speculated and predicted by general relativity and ultimately discovered many years later. Gravitationally lensed quasars, luminous arcs, weak lensing, and microlensing have provided invaluable information about the distribution of matter, especially of dark matter, and the cosmology. Gravitational lensing is one of the most spectacular manifestation of general relativity and will remain as an extremely useful astrophysical tools in the future.

[구 GR-02] General Relativity and Modern Cosmology (일반상대성이론과 현대우주론)

Jai-chan Hwang (황재찬)
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