[구 AT-11] Preliminary observational results with MIRIS

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The first Korean infrared space telescope MIRIS (Milti-purpose InfraRed Imaging System) was successfully launched in November 2013, as the main payload of Korean STSAT-3 (Science and Technology Satellite-3). After initial on-orbit operation for verification, the observations have been made with MIRIS for the fluctuation of Cosmic Infrared Background and the Galactic Plane survey. For the study of near-infrared background, MIRIS completed the survey of large areas (> 10° x 10°) around the pole regions: the north ecliptic pole (NEP), the north and south Galactic poles (NGP, SGP). We are also continuously and frequently monitoring the NEP region for the instrumental calibration and the zodiacal light study. One the other hand, the Paschen-α Galactic plane survey has been carried out using two narrow-band filters (at 1.88 μm and 1.84+1.92 μm) of MIRIS. This survey is planning to cover the whole Galactic plane with the latitude of ±3°, and the longitude regions of +280°< l < 360° and 0° < l < +210° have been completed (~ 80%) by February 2015. The data are still under the stage of reduction and analysis, and we present some preliminary results.

특별세션 KMTNet

[구 KMT-01] Observational performance of the KMTNet system

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한국천문연구원에서는 2도×2도 시야의 1.6m 광시야 망원경과 18k×18k 모자이크 CCD 카메라로 이루어진 관측시스템을 남반구천문대 3곳에 설치하여 24시간 모니터링 관측이 가능한 Korea Microlensing Telescope Network(KMTNet)을 구축하고 있다. 망원경 1,2,3호기는 각각 칠레 CTIO, 남아공 SAAO, 호주 SSO 관측소에 2014년말 까지 성공적으로 설치 완료하였으며, 2015년 2월 현재 칠레와 남아공에는 연구용 18k CCD 카메라, 호주에는 시험관측용 4k CCD 카메라를 부착하여 시험관측을 수행중이다. 시험관측을 통해 KMTNet 시스템에서 가장 중요한 부분인 광시야 광학계가 요구사양을 만족함을 확인하였고, 과학연구 수행에 어려움이 없을 것으로 예상한다. 우리는 시험관측을 통해 얻어진 각각의 시스템 성능을 검토하고, 관측 후 파일전송, 전처리 및 자료 배포와 더불어 안정적인 측광성능 유지를 위한 시스템 운영 및 향후 계획에 대하여 발표한다.

[구 KMT-02] Photometric Monitoring of Globular Clusters with KMTNet pre-science Camera

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한국천문연구원에서 개발 중인 KMTNet 망원경은 2014년 칠레(5월), 남아공(8월), 호주(11월)에 설치가 완료되었다. 망원경 설치 이후, 연구관측용 광시야 18k CCD 카메라를 설치하기 전까지의 기간 동안 시험관측용 4k CCD 카메라(STX-16803)를 활용하여 관측을 수행하였다. 시험관측 대상으로는 KMTNet의 주 관측 영역인 우리은하 팽대부처럼 별이 밀집된 영역에서 영상차감법(Difference Image Analysis; DIA)을 활용해 변광하는 천체를 찾기 위해 25′×25′의 CCD 관측 영역에 적당한 6개의 남반구 구상성단을 선정하였다. 본 발표에서는 관측된 성단의 측광 결과와 영상차감법을 이용해 찾은 변광성에 대해 논의할 예정이다.

[구 KMT-03] Standardization of the KMTNet Photometric System

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Korea Microlensing Telescope Network(이하 KMTNet) 망원경이 남반구의 세 관측소(칠레, 남아프리카 공화국, 그리고 호주)에 각각 설치되었다. 이 망원경은 주로 우리은하 팽대부 방향에 있는 무수히 많은 별을 관측하

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