

Telescope Network (KMTNet), we expect the detection of many events caused by wide-separation planets and free-floating planets, which is not easy due to the short event duration. Thus, it is important to understand wide-separation planetary lensing events. Several studies on the wide-separation events have been reported, but events caused by wide-separation planetary systems with a moon have not yet been studied. In this paper, we study the properties of events caused by planetary systems where wide-separation planets host a moon. We also study the effect of a finite background source star on the moon feature in the wide planetary-lensing events.

[포 ST-04] A Comparison between Infrared and Visible Light Curves of Short Period Variables

Jihye Lim, Jungjoo Sohn
Dept. of Earth Science Education, Korea National University of Education

단주기 변광성들의 적외선 광도곡선이 가시광선 광도 곡선과 어떠한 차이가 있는지 알아보기 위해 주기가 하루 이내로 짧은 다양한 유형의 변광성을 대상으로 보현산 천문대의 1.8m 반사망원경과 적외선검출기(KASINICS)를 이용한 J(1.25 μ m), H(1.64 μ m), K(2.15 μ m) 필터 관측을 수행하였다. 관측 대상은 맥동변광성으로 분류되는 BO Lyn 외 2개 대상, 격변변광성으로 분류되는 RX And 외 3개 대상, 그리고 식변광성으로 분류되는 V1007 Cas 외 1개 대상이다. IRAF를 이용한 전처리 및 구경 측광을 실시하여 각 필터별 적외선 광도곡선을 얻었다. 이를 통해 현재 각 분류 대상별 주기분석과 여러 해 동안 관측한 자료를 이용하여 각 대상들의 장주기에서의 변광 요인 유무도 확인하여 가시광선 광도곡선과의 비교 분석 연구를 수행하고 있다. 격변변광성의 경우 가시광 광도 곡선이 주로 강착원반의 더 뜨거운 내부고리와 대기에 의한 것인 반면 적외선 광도 곡선은 동반성과 차가운 강착원반에 의한 것이라 여겨지며, 맥동변광성과 식변광성의 경우도 가시광선과 적외선이 서로 다른 깊이를 보게 될 것이므로 파장대별 최대 밝기 위치와 광도 윤곽에서의 차이가 기대된다.

[포 ST-05] The IGRINS Spectra of Late-Type Stars

Sunkyoung Park¹, Jeong-Eun Lee¹, Wonseok Kang², Sang-Gak Lee², Moo-Young Chun³, Kang-Min Kim³, In-Soo Yuk³, Ueejeong Jeong³, and Daniel T. Jaffe⁴
¹*School of Space Research, Kyung Hee University*
²*National Youth Space Center*
³*Korea Astronomy and Space Science Institute*
⁴*Department of Astronomy, University of Texas at Austin, TX, USA;*

We present a library of high spectral resolution ($R \sim 40,000$) and high signal-to-noise ratio ($S/N \sim 200$) near-infrared spectra of ~ 50 late-type stars. The spectra of late-type stars were obtained with Immersion GRating INfrared Spectrograph (IGRINS) covering the full H and K band. The stars are mainly from MK standard stars which have well-defined spectral types and luminosity classes and cover wide ranges of effective temperatures and surface gravities. The spectra are corrected for telluric absorption lines and absolutely flux calibrated using the Two Micron All Sky Survey (2MASS) photometry. In this work, we present the preliminary results of spectroscopic diagnostics for stellar physical parameters. Our ultimate goal is to provide a library of near-infrared spectra of standard stars, which covers all spectral types and luminosity classes, with a high spectral resolution and high signal-to-noise ratio.

[포 ST-06] Blue Straggler Stars and Open Clusters

Hyun-Uk Lee^{1,2}, Heon-Young Chang^{1,2}
¹*Department of Astronomy and Atmospheric Sciences, Kyungpook National University, Daegu 41566*
²*Research and Training Team for Future Creative Astrophysicists and Cosmologists (BK21 Plus Program)*

Blue Straggler Stars (BSSs), kind of unusual main sequence stars, are the brighter and bluer stars than the main sequence turn off (MSTs) stars in coeval clusters. Since the first detection in globular clusters (GCs), BSSs have been shown to reveal an anti-correlation between the luminosity of their host star cluster and the number of BSSs in the cluster. Further, conclusions based on this result can be expanded to the open clusters. BSSs seem to play an important role in GCs according to the relation between the dynamical time scale of GCs and the number of BSSs along the cluster radius. This relation, however, remains to be verified in open clusters. In this study, we divide open clusters by the existence of BSSs into two groups. Then we compare parameters between these groups to specify the role of BSSs in open clusters.

[포 ST-07] Source frequency phase referencing observations of H₂O and SiO masers toward the semi-regular variable star R Crateris

Dong-Jin Kim^{1,2}, Se-Hyung Cho², Young-Joo Yun²,
JaeHeon Kim², Yoon Kyung Choi², Dong-Whan
Yoon², Suk-Jin Yoon¹

¹*Department of Astronomy, Yonsei University,*

²*Korea Astronomy and Space Science Institute*

We have performed single dish and VLBI monitoring observations of H₂O and SiO masers toward the semi-regular variable star R Crateris using the Korean VLBI Network(KVN) 4 band receiving system. In the case of VLBI observations at 3 epochs, successful superposed maps of H₂O and SiO masers were obtained on 2015 May by adopting the Source Frequency Phase Referencing(SFPR) method. These results enable us to investigate the development of outflow and asymmetric motions from SiO maser to H₂O maser regions according to stellar pulsation which are closely related with a mass-loss process. Single dish monitoring observations were carried out from 2009 June to 2015 May. Intensity variations between H₂O and SiO masers were investigated according to stellar phases together with peak velocity variations. We will compare the VLBI results with those of single dish.

교육홍보/기타

[포 AE-01] Educational Application of GMT Project

Chang Hyun Baek¹, Byeong-Gon Park^{2,3}

¹*National Science Museum,*

²*Korea Astronomy & Space Science Institute,*

³*Korea University of Science and Technology*

대형 천문학 연구 프로젝트들의 교육자 및 일반인을 위한 교육자료 제공이 증가하고 있는 추세이다. 국내에서도 천문학 연구에 대한 홍보와 일반인들의 천문학에 대한 이해 증진을 위하여 교육자료 개발 및 보급이 절실히 필요하다. 본 발표에서는 현재 우리나라가 참여 중인 GMT 프로젝트의 교육자료 개발의 첫 단계로 ebooks author로 개발될 GMT e-book을 소개하고자 한다. 또한 향후 다양한 교육 매체 개발 및 활용에 대한 방안을 제시하고 천문학 대중화에 관심 있는 분들의 의견을 듣고자 한다.

[포 AE-02] Astronomical seeing analysis of Deokheung Optical Astronomy Observatory

Taewoo Kim, Wonseok Kang, Sun-gill Kwon,

Sang-Gak Lee

National Youth Space Center

국립고흥청소년우주체험센터는 2014년부터 덕흥천문대

에 설치된 SBIG사의 "Seeing Monitor"로 시상을 측정하고 있다. "Seeing Monitor"는 북극성을 대상으로 TDI(Time Delay and Integration) 방식을 적용하여 얻어진 시상을 분 단위로 저장해준다. 따라서 구름이 없는 맑은 날의 분 단위 시상 자료와 주변 환경 정보를 조합하여 시상에 영향을 미치는지 환경 요인을 정량적으로 분석하는 것이 가능하다. 그 첫 단계로 측정된 시상 자료와 기상청의 온도·습도·풍속 자료, 그리고 GFS(Global Forecast System)의 고도별 상층 풍속 자료를 비교하여 기상정보와 시상과의 관계를 분석해보았다. 습도와 바람이 시상에 가장 큰 영향을 주었으며, 지상 풍속 1~2m/s, 습도 75% 이하, 제트기류 풍속은 250km/h 이하 일 때 좋은 시상 값을 얻을 수 있었다. 이를 통해 덕흥천문대에서 기상정보를 통해 시상이 안정적인 날을 예측할 수 있다면, 앞으로 도입될 1m 망원경으로 훌륭한 관측 자료를 얻을 수 있을 것이라 기대된다.

[포 AE-03] JTCS Software Design and Tracking Performance of NYSC 1m Telescope

Wonseok Kang¹, Sun-gill Kwon¹, Sang-Gak Lee¹,

Teyun Kwak², Donghyun Koo²

¹*National Youth Space Center,* ²*Justek, Inc.*

National Youth Space Center will complete installation of the NYSC 1m Telescope in this year. Before completion of the telescope, we present the software design of JTCS, and the preliminary result of tracking performance by JTCS and mount of the telescope. JTCS currently uses commercial software of the Sky X, for the real-time coordinates of various objects, such as asteroids, comets, and even satellites. In order to guarantee flexibility in CCD detectors, the MaxIm DL software was adopted and JTCS provides auto-guiding and scheduled image-taking with MaxIm DL. We are now stabilizing the telescope mount and JTCS with long-exposure tests, and gathering the preliminary data of tracking performance.

[포 AE-04] A Study on the Status of the Astronomical Science Museum among the Science Museum in Korea(우리나라 과학관 중 천문과학관이 차지하는 위상에 관한 연구)

Hee-Jin Do^{1,2}, Heon-Young Chang^{1,3}

¹*Department of Astronomy and Atmospheric Sciences, Kyungpook National University, Daegu, Korea*

²*GimHae Astronomical Observatory, GimHae, Korea*

³*Research and Training Team for Future Creative Astrophysicists and Cosmologists (BK21 Plus Program), Kyungpook National University, Daegu, Korea*