

channels of IR and 2 of UV. We are proposing an optical design based on three mirror aplanatic off-axis reflective system. The entrance pupil diameter and effective focal length are 45 mm and 270 mm, respectively. The FOV is $5.5^\circ \times 1^\circ$ and the secondary mirror is set for stop. The optical specification is required to have an encircled energy of at least 80 % within a diameter of 21 μm . We performed sensitivity analysis for the longest wavelength of 772 nm in consideration of the diffraction limit of system. The results show that tolerance limits for positions and angles of the mirrors are not very sensitive compared with typical error budgets of manufacturing and assembling process. The secondary mirror has the most sensitive tolerance for surface figure of 250 nm in root-mean-square.

[포 AT-10] An Approach for Implementing PCI Express Interface Based Storage System for Wideband Observation Data

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VLBI에서 관측 대역폭이 n배 증가될 경우 관측감도는 \sqrt{n} 만큼 향상되고, 이는 관측 연구 측면에서 기존에는 불가능하던 천체에 대한 연구 수행이 가능함을 의미한다. 관측 대역폭의 확대는 관측 데이터의 용량 증가를 의미하며 여기서 해당 데이터의 처리를 위한 초고속 데이터 기록 시스템은 핵심적 역할을 한다. 이에 따라 현재 KVN에서는 미국 MIT Haystack 천문대에서 개발된 초고속 기록 시스템인 Mark5B/B+와 Mark6를 운용 중에 있다. 하지만 이들 시스템의 경우 사실상 VLBI연구를 위한 목표로 특수 개발되었기에 유지 및 운영 측면에서 여러 불편이 있고, 성능에 있어서도 단일 스트림 기준으로 8Gbps를 넘지 못하는 한계를 안고 있다. 본 발표에서는 기존 시스템을 대체할 수 있는 기술로서 PCI 익스프레스 기반의 데이터 처리를 소개하고자 한다. 나아가 실제 관측 데이터에 대한 입출력 및 기존 시스템과의 성능 비교를 통해 광대역 관측 연구에 최적화된 기록 시스템을 제안하고자 한다.

항성/항성계/외계행성

[포 ST-01] Photometric Observations of AB And

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경희대학교 우주과학과 학술동아리 [New K.O.A.L.A.]는 학부 학생들의 학술적 관심을 바탕으로 1996년에 결성되었다. 지난 20년 동안, 학생들은 측광 및 분광학적 관측을 중심으로 다양한 프로젝트들을 진행해왔으며, 본 프로젝트는 그 중 하나다. 우리는 2014년 10월에 교내 76cm 반사망원경을 이용하여 W UMa형 접촉쌍성 AB And를 측광 관측했고, 이번에 그 분석 결과들을 발표한다. 마지막으로, 학부 학생들의 입장에서 바라본 ‘연구’에 대한 고찰 및 애로사항들도 간단히 소개한다.

[포 ST-02] On the Use of the Number Count of Blue Horizontal-Branch Stars to Infer the Dominant Building Blocks of the Milky Way Halo

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The formation of the Milky Way stellar halo is thought to be the result of merging and accretion of building blocks such as dwarf galaxies and massive globular clusters. Recently, Deason et al. (2015) suggested that the Milky Way outer halo formed mostly from big building blocks, such as dwarf spheroidal galaxies, based on the similar number ratio of blue straggler (BS) stars to blue horizontal-branch (BHB) stars. Here we demonstrate, however, that this result is seriously biased by not taking into detailed consideration on the formation mechanism of BHB stars from helium enhanced second-generation population. In particular, the high BS-to-BHB ratio observed in the outer halo fields is most likely due to a small number of BHB stars provided by GCs rather than to a large number of BS stars. This is supported by our dynamical evolution model of GCs which shows preferential removal of first generation stars in GCs. Moreover, there are sufficient number of outer halo GCs which show very high BS-to-BHB ratio. Therefore, the BS-to-BHB number ratio is not a good indicator to use in arguing that more massive dwarf galaxies are the main building blocks of the Milky Way outer halo. Several lines of evidence still suggest that GCs can contribute a significant fraction of the outer halo stars.

[포 ST-03] Properties of microlensing events of wide-separation planets with a moon

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Thanks to high cadence monitoring and high photometric accuracy of Korea Microlensing

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

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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

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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

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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