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The Schwarzschild-Chang off-axis telescope is a “linear astigmatism-free” confocal system. The telescope comprises two pieces of aluminum-alloy freeform mirrors that are fabricated with diamond turning machine (DTM) process. We designed optomechanical structures where optical components in the telescope system can be adjustable on a linear stage. Optomechanical deformation caused by the weight of system itself and its temperature variation is analyzed by the finite element analysis (FEA). The results show that the deformation is estimated in the tolerance range. For the optic-axis alignment of telescope system, three-point alignment (TPA) method is chosen. The TPA method uses three parallel lasers and a plane mirror. Point source images were taken from collimated light and field observation. The performance of optical system was tested by point spread function and aberration measurement of the point sources.

[포 AT-02] Improvement and quasi optical analysis of wide band prototype feedhorn for ASTE focal plane array

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As an upgrade we report the current ASTE ultra-wideband corrugated horn design. The length of the feedhorn gets shortened from 12.5 mm to 11 mm, and it shows better side lobe level at the far-field patterns compared with the previous design.

We looked into possible quasi-optical solution to match the feedhorn beam to the optics of the current ASTE telescope, starting from frequency-independent solution using two ellipsoidal mirrors to which wideband performance of the feedhorn naturally fits. We used a commercial physical optics package (GRASP) with an user-defined optimizer to give physical

constraints to evaluated optical designs for highest efficiency.

[포 AT-03] Design of Integrated Control Software for Automated Observing System

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Remote and robotic telescopes are the most effective instrument for astronomical survey projects. The system is based on the dynamic operation of all astronomical instruments such as dome and telescope control system (TCS), focuser, filter wheel and data taking camera. We adopt the ASCOM driver platform to control the instruments through the integrated software. It can convert different interface libraries from various manufacturers into a uniform standard library. This allows us to effectively control astronomical instruments without modifying codes. We suggest a conceptual design of software for automation of a small telescope such as the new wide-field 0.25m telescope at McDonald Observatory. It can also be applied to operation of multi-telescopes in future projects.

[포 AT-04] Fabrication of Freeform Aluminum mirrors for Wide Field Infrared Telescopes

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Single Point Diamond Turning (SPDT) is a cost-effective technique to fabricate metallic mirrors. In particular, the servo-assisted diamond turning option is highly useful for the fabrication of freeform surfaces. However, the SPDT process

leaves periodic tool marks on machined mirror surfaces, leading to undesirable diffraction effect, as well as the deviation of input beam. In order to solve this problem, we propose new SPDT machining conditions to minimize tool marks. We will also show the results from optical measurement and Power Spectral Density (PSD) analysis to evaluate the expectable performance for applications in wide field infrared telescopes.

[포 AT-05] BVRI Filter Standardization of DOAO 1m Telescope

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National Youth Space Center has recently founded the Deokheung Optical Astronomy Observatory (DOAO) 1m Telescope, which accepts community observing applications since 2016. Standardization and calibration of the new observing facility are essential for astronomical research. In this poster, we present standardization processes and preliminary results for photometry of the Johnson-Cousins BVRI filter system. We selected sample data from a night in stable weather condition. After bias, dark, and flat corrections and photometry using ccdred and daophot package of IRAF, we derived standardized band pass parameters including color terms. The corrected photometry results of the BVRI filter system show reduced deviations from the standard magnitudes in the literature. In addition, we calculated atmospheric extinction coefficients and limiting magnitudes of the telescope system. We plan to extend these standardizing processes to flux calibration of narrow band filters, e.g. H α filter.

[포 AT-06] The Development of The Observing System for Goheung Radio Telescope (고흥전파망원경 관측시스템 개발)

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2013년 청소년 교육목적으로 개발된 고흥전파간섭계시

스템을 활용하여 청소년으로 하여금 전파관측을 체험케 하고, 전파천문학 연구 기회를 제공하고자 한다. 안정된 단일경 전파관측과 간섭계모드 전파관측을 위해 현 시스템이 갖추어야 할 기능을 개선하고 있다. 보다 정밀하게 관측대상을 추적하고, 전파 점광원을 관측할 수 있도록 새로운 전파관측시스템을 개발한다. 정밀한 관측대상 추적과 함께 데이터 취득 시간을 확장하여 점광원 관측이 가능하게 되면, 청소년에게 전파관측 및 전파간섭원리와 관측 방법을 실험체험 프로그램으로 전해 줄 수 있다.

KMTNet

[포 KMT-01] Progress report of the deep and wide-field imaging survey of nearby galaxies with KMTNet

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In a Λ CDM universe, galaxies are believed to evolve by mergers and accretions. The debris resulting from such processes remains as diffuse, low-surface brightness structures, such as outer disks, stellar halos, and faint companions. These structures will give us fruitful insight into the recent mass assembly history of galaxies, but it is challenging to observe them due to their low surface brightness. In order to explore the structural properties of outskirts of nearby galaxies, we conduct deep wide-field imaging survey with KMTNet. Here we present a progress report of data reduction for the images of NGC 1291, a lenticular barred galaxy with outer rings. To achieve accurate flat fielding, we use dark sky flat and remove the sky gradient of each exposure with a polynomial fit. As a result, we are able to reach 1 sigma depth of $\mu_R \sim 29.6$ mag arcsec⁻². We expect to investigate the surface brightness profile of NGC 1291 in 1-D profile, and color-gradient in the outer part of the galaxy using the B- and R-band images.

항성 및 항성계

[포 ST-01] Raman O VI Profile Analysis of