Spread Function (PSF) produced by scatterings and diffraction effects within the optical system and beyond (baffle). To assess the various factors affecting the PSF in this design, we use PhoSim, the Photon simulator, which is a fast photon Monte Carlo code designed to include all these effects, and also atmospheric effects (for ground-based telescopes) and phenomena occurring inside of the sensor. PhoSim provides very realistic simulations results and is suitable for simulations of very weak signals.

Before the application to the MESSIER optics system, PhoSim had not been validated for confocal off-axis reflective optics (LAF-TMS). As a verification study for the LAF-TMS design, we apply Phosim sequentially.

First, we use a single parabolic mirror system and compare the PSF results of the central field with the results from Zemax, CODE V, and the theoretical Airy pattern. We then test a confocal off-axis Cassegrain system and check PhoSim through cross-validation with CODE V.

At the same time, we describe the shapes of the freeform mirrors with XY and Zernike polynomials. Finally, we will analyze the LAF-TMS design for the MESSIER optical system.

[포 AT-04] Standard Calibration for Broadband and Narrowband Filters of KHAO 0.4 m Telescope

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Maemi Dual Field Telescope System (MDFTS) is a dual telescope system located at Kyung Hee University. The system consists of 0.4 m telescope and 0.1 m telescope for wide-field observation. The 0.4 m telescope provides photometric observation which covers a field of view of 21'×16'. It has been used for various purposes with Johnson-Cousins UBVRI broadband filter system, e.g., SomangNet and Intensive Monitoring Survey of Nearby Galaxies. In this poster, we present the standard calibration result for our broadband filter system. Also, we suggest a new usage of the KHAO 0.4m telescope which is narrowband photometry by demonstrating the standard calibration of H-alpha filter. For flux calibration, not only R filter but also V filter is used for compensating the central wavelength discrepancy between R filter and H-alpha filter.

[포 AT-05] Characterization of the performance of the next-generation controller for the BOES CCD

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We present the characterization of the performance of the next-generation controller (SDSU Gen III) for BOAO Echelle Spectrograph CCD (BOES CCD) at the Bohyunsan Optical Astronomy Observatory. The current controller (SDSU Gen II) of the BOES CCD will be upgraded to SDSU Gen III to provide a more stabilized operation. To assess the performance of the new controller (e.g., conversion gain, full well capacity, S/N), we obtain various types of calibration images (e.g., bias, flat, science images of standard stars). Based on those datasets, we find that the overall performance of the new controller is somewhat comparable to that of the old controller if the slow mode is adopted for the readout. This may demonstrate that the new controller can be successfully substituted for the old controller without a substantial loss of performance. However, further analysis with a large dataset obtained in various observational conditions is necessary to confirm our results.

[포 AT-06] Development Plan for the First GMT ASM Reference Body

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GMT secondary mirror system consists of 7 segmented adaptive mirrors. Each segment consists of a thin shell mirror, actuators and a reference body. The thin shell has a few millimeters of thickness so that it can be easily bent by push and pull force of actuators to compensate the wavefront disturbance of light due to air turbulence. The one end of actuator is supported by the reference body and the other end is adapted to this thin shell. One of critical role of the reference body is to provide the reference surface for the thin shell actuators. Therefore, the reference body is one of key components to succeed in development of GMT ASM. Recently,