

environment. The dewar inside the telescope is designed to operate the infrared detector at 80K stage. From the thermal analysis, we confirmed that the telescope and the dewar can be cooled down to around 200K and 80K, respectively in order to reduce the large amount of thermal noise. The stray light analysis is shown that a light outside a field of view can be reduced below 1%.

After the fabrications of the parts of engineering qualification model (EQM), the NSS EQM was successfully assembled and integrated into the satellite. To verify operations of the satellite in space, the space environment tests such as the vibration, shock and thermal-vacuum test were performed. Here, we report the results of the critical design review for the NISS.

### [ㄱ SO-03] Error Compensation Algorithm for Higher Surface Accuracy of Freeform Mirrors Based On the Method of Least Squares

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Off-axis reflective optical systems have attractive advantages relative to their on-axis or refractive counterparts, for example, zero chromatic aberration, no obstruction, and a wide field of view. For the efficient operation of off-axis reflective system, the surface accuracy of freeform mirrors should be higher than the order of wavelengths at which the reflective optical systems operate. Especially for applications in shorter wavelength regions, such as visible and ultraviolet, higher surface accuracy of freeform mirrors is required to minimize the light scattering. In this work, we propose the error compensation algorithm (ECA) for the correction of wavefront errors on freeform mirrors. The ECA converts a form error pattern into polynomial expression by fitting a least square method. The error pattern is measured by using an ultra-high accurate 3-D profilometer (UA3P, Panasonic Corp.). The measured data are fitted by two fitting models: Sag (Delta Z) data model and form (Z) data model. To

evaluate fitting accuracy of these models, we compared the fitted error patterns with the measured error pattern.

## 항성 및 항성계

### [ㄱ ST-01] The Globular Cluster NGC 6273: Another Candidate for the Milky Way Building Blocks

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In our recent investigation (Lim et al. 2015), we have shown that the combination of narrow-band Ca photometry and low-resolution spectroscopy can effectively search for globular clusters (GCs) with supernovae (SNe) enrichments. We apply this technique to the metal-poor bulge GC NGC 6273 and find two distinct subpopulations having different light and heavy element abundances. Our result suggests that NGC 6273 was massive enough to retain SNe ejecta, which would place this cluster in the growing group of GCs with Galactic building block characteristics, such as  $\omega$  Centauri and M22.

### [ㄱ ST-02] Simultaneous source frequency phase referencing observations of H<sub>2</sub>O and SiO masers toward VX Sgr

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We performed simultaneous observations of H<sub>2</sub>O and SiO masers toward VX Sgr using the Korean VLBI Network (KVN) and Source Frequency Phase Referencing (SFPR) method. The observations were carried out at 5 epochs from 2014 February to 2015 June. The relative locations of the SiO with respect to the H<sub>2</sub>O maser emission were determined at two epochs by SFPR for the first time. The H<sub>2</sub>O masers show well developed asymmetric outflow features which are spread up to ~300 mas in diameter. On the other hand, the SiO masers show a ring-like structure close to the central star with ~ 30 mas diameter. The SFPR observational results at two epochs ( $\phi=0.83$  and 0.99) provide similar relative locations of H<sub>2</sub>O and SiO maser features. These superposed maps of H<sub>2</sub>O and SiO masers lead us to investigate the