[구IGR-02] Optimization and Performance Evaluation for the Science Detector Systems of IGRINS

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IGRINS (the Immersion GRating INfrared Spectrometer) is a high resolution wide-band infrared spectrograph developed by the Korea Astronomy and Space Science Institute (KASI) and the University of Texas at Austin (UT). This spectrograph has H-band and K-band science cameras, both of which use Teledyne's 2.5μm cutoff 2k×2k HgCdTe HAWAII-2RG CMOS science grade detectors. Teledyne's cryogenic SIDECAR ASIC boards and JADE2 USB interface cards were installed to control these detectors. We performed lab experiments and test observations to optimize and evaluate the detector systems of science cameras. In this presentation, we describe a process to optimize bias voltages and way to reduce pattern noise with reference pixel subtraction schemes. We also present measurements of the following properties under optimized settings of bias voltages at cryogenic temperature (70K): read noise, Fowler noise, dark current, and reference-level stability, full well depth, linearity and conversion gain.

[구IGR-03] IGRINS Mirror Mount Design for Five Flat Mirrors

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A near infrared wide-band high resolution spectrograph, immersion grating infrared spectrometer (IGRINS) has been jointly developed by the Korea Astronomy and Space Science Institute and the University of Texas at Austin.

The compact white-pupil design of the instrument optics includes five cryogenic flat mirrors including a slit mirror, an input fold mirror, a dichroic mirror, and H&K camera fold mirrors.

In this study, we introduce the optomechanical mount designs of the five cryogenic mirrors. In order to meet the structural stability and thermal requirements of the mount models, we conducted the design work with the aid of 3-dimensional computer modeling and the finite element analysis (FEA) method. We also present the actual fabricated parts and assemblies of the mounts and mirrors as well as their CAD models.