various wavelength and size of filters. 50 nm medium bandwidth filters from 600 – 1050 nm, seven SDSS (Sloan Digital Sky Survey) filters and Johnson-Cousin BVRI filters are installed for now. We also have a plan to use narrow band interference filters to classify high redshift quasars or to obtain SEDs of interesting astronomical sources in details more efficiently. We also developed KAP82 (Kyung Hee University Auto guiding Package for 82 inch telescope) for auto guiding software. CQUEAN and SQUEAN have been developed by CEOU (Center for the Exploration of the Origin of the Universe).

[구 AT-02] Transformation of Filter Systems for SQUEAN (SED camera for QUasars in EArly uNiverse)

Woojin Park[1], Soojong Pak[1], Sanghyuk Kim[1], Hye-in Lee[1], Minhee Hyun[3], Hyunjin Shim[2], Myungshin Im[3]
[1]School of Space Research, Kyung Hee University, Yongin, Gyeonggi 446-701, Korea,
[2]Department of Earth Science Education, Kyungpook National University, Daegu 702-701, Korea,
[3]CEOU, Astronomy Program, Department of Physics & Astronomy, Seoul National University, Gwanak-gu, Seoul, Korea

We have recently installed SQUEAN on the 82 inch telescope at the McDonald Observatory, USA. This instrument consists of an ANDOR CCD camera, a focal reducer, an electronic box, an auto guiding system and a new filter wheel which holds up to 20 filters. Currently the filter wheel is equipped with Johnson-Cousins BVRI filters, SDSS rizY and isiz filters, and 50nm medium band pass filters (M625(625nm), M675(675nm), M725(725nm), M775(775nm), M825(825nm), M875(875nm), M925s(925nm), M975(975nm), and M1025(1025nm)). Our medium band pass filter system is suitable with SED fitting. Filter transformation methods are essential for time-domain observations including transient objects, e.g., supernovae, variable stars, and solar system bodies. In this work, we develop a series of equations to convert the open clusters photometry data within these filter systems.

[구 AT-03] Performance of KHU Auto-guiding Package for McDonald 82 inch Telecope (KAP82)

Hye-In Lee[1], Soojong Pak[1], Tae-Geun Ji[1], Myungshin Im[2]
[1]School of Space Research Kyung Hee University

[2]CEOU/Department of Physics and Astronomy, Seoul National University

In astronomical observations, stable auto-guiding and accurate target centering capabilities are critical to increase observation efficiency and sensitivity. Recently, Center for the Exploration of the Origin of the Universe (CEOU) has developed SQUEAN (SED camera for QUasars in EArly uNiverse). SQUEAN is installed and had successful observations at the 82 inch Otto Struve Telescope of McDonald Observatory in 2015 February. We have upgraded the existing auto-guiding softwares to KAP82 (KHU Auto-guiding Package for the McDonald 82 inch Telescope). Keeping the original hardware systems and the software algorithms of CAP (CQUEAN Auto-guiding Package), KAP 82 is completely re-written in Visual C++. We developed several center finding algorithms, e.g., 2D-gaussian fitting and weighted mean methods. In this presentation, we compare the auto-guiding performances with these algorithms.

[구 AT-04] Participation in G-CLEF Preliminary Design Study by KASI

Kang-Min Kim[1], Moo-Young Chun[1], Chan Park[1], Sung-Joon Park[1], Jihun Kim[1], Jae Sok Oh[1], Jeong Gyun Jang[1], Bi Ho Jang[1], Gyungmo Tahk[1], Jakyoung Nah[1], Young Sam Yu[1], Andrew Szentgyorgyi[2], Timothy Norton[2], William Podgorski[2], Ian Evans[2], Mark Mueller[2], Alan Uomoto[3], Jeffrey Crane[3], Tyson Hare[3]
[1]Korea Astronomy and Space Science Institute (KASI),
[2]Harvard-Smithonian Center for Astrophysics,
[3]Observatories of the Carnegie Institution

The GMT-Consortium Large Earth Finder (G-CLEF) is a fiber-fed, optical band high dispersion echelle spectrograph that selected as the first light instrument for the Giant Magellan Telescope (GMT). This G-CLEF has been designed to be a general- purpose echelle spectrograph with the precisional radial velocity (PRV) capability of 10 cm/sec as a goal. The preliminary design review (PDR) was held on April 8 to 10, 2015 and the scientific observations will be started in 2022 with four mirrors installed on GMT. We have been participating in this preliminary design study in flexure control camera (slit monitoring system), calibration lamp sources, dichroic assembly and the fabrication of the proto-Mangin Mirror. We present the design concept on the parts KASI undertaken, introducing the specifications and