

Astronomical Filters

■ Astronomical Filters

Asahi Spectra has supplied astronomical filters with science-grade to world famous observatories, institutes or universities for over 15 years.

Unlike cheap astronomical filters for the amateurs, Asahi astronomical filters are definitely manufactured for professional astronomers to meet rigid specifications and environmental durability.

New discovery and progress of science shall be emerged by Asahi filters.

Asahi astronomical filters are actually installed in telescopes in Hawaii, Chile, Canary, Arizona, South Africa, Australia or other important observatories.

Our astronomical filters have been supplied or installed in the followings.

USA

- DECam, Fermi National Accelerator Laboratory
- NASA Goddard Space Flight Center
- LBC, Large Binocular Telescope
- IMACS, Magellan Telescope
- LFC, Hale Telescope
- SDSS, Apache Point Observatory
- Pan-STARRS, UH 2.2-meter Telescope
- Las Cumbres Observatory Global Telescope Network
- MMT Observatory
- Kitt Peak National Observatory
- McDonald Observatory
- Carnegie Observatories
- Smithsonian Astrophysical Observatory
- National Optical Astronomy

EUROPE

- European Southern Observatory
- OGLE, Warsaw University Telescope
- FORS1, Very Large Telescope
- ULTRACAM, William Herschel Telescope
- Instituto de Astrofisica de Canarias

ASIA

- Suprime-Cam, Subaru Telescope

AFRICA

- South African Large Telescope

Spiral Galaxy NGC2403

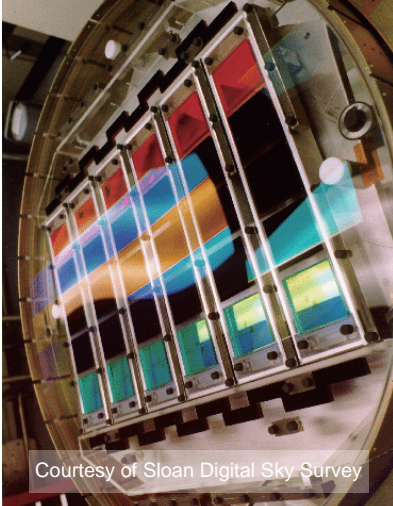
Courtesy of National Astronomical Observatory of Japan



Ordering Information

Order online: www.asahi-spectra.com E-mail: info@asahi-spectra.com

SDSS Filters / u, g, r, i, z-band

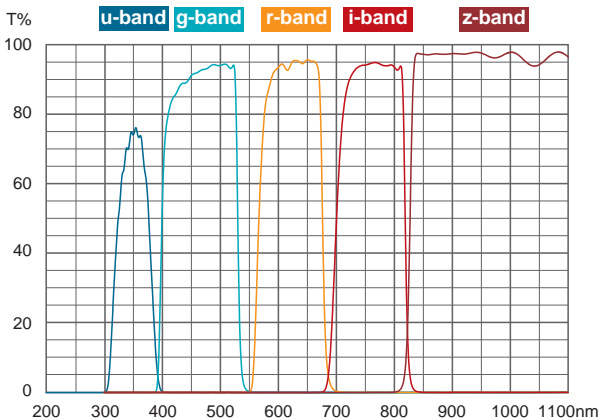


SDSS(Sloan Digital Sky Survey) photometric systems are currently the most common, important and unignorable in astronomy. We proudly supplied SDSS 2.5m telescope at Apache Point Observatory with original SDSS filters, where they have been used as the basis of SDSS photometric systems.

We know the specifications SDSS project defined, and strictly observe them. We promise that we will supply genuine SDSS filters which completely meet the original specifications for you.

Notice

Due to the serious quality problem in colored glass, it is probable to use alternative glass instead of the original filter prescription.

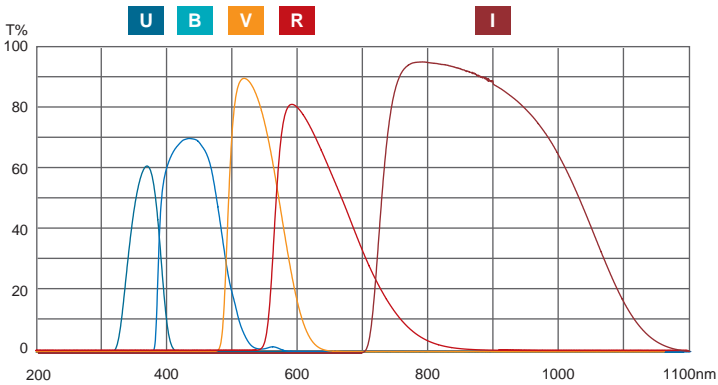


Astronomical Filters

Johnson / Bessell U, B, V, R, I Filters

Though more basic and rather classical photometric system, Johnson / Bessell filters are still important for astronomers.

We can supply not only typical Johnson / Bessell filters made by only colored glasses, but also the filters with interference film combination.



Notice

Due to the discontinuation of GG385 and BG12 (Schott), we currently make B filter by using L-38 (HOYA) and BG25.

Narrow Bandpass Filters

H-alpha, H-beta, OIII, SII or Stroemgren u, v, b, y...

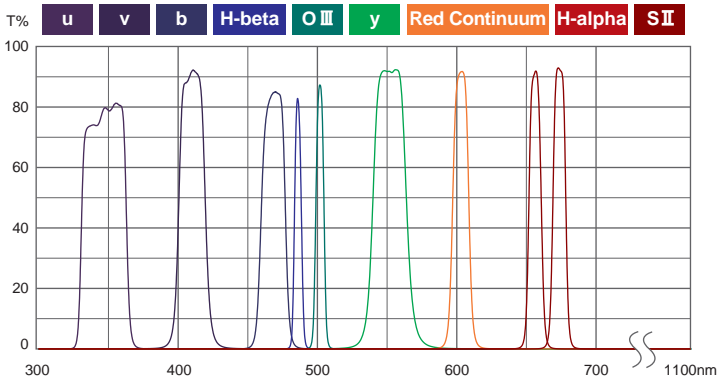
Astronomical narrow bandpass filters are necessary for most of telescopes and play the important role of the scientific advances.

Generally it is harder to fabricate the narrow bandpass filter, because the minimal error for film design is required to form the narrow passband, especially narrower e.g. 5nm FWHM.

Furthermore, smaller tolerance for CWL or FWHM is often required than broad bandpass. It means it is the key technology to keep the good uniformity over the clear aperture when the large format narrow bandpass filter is requested.

Asahi has achieved large format (diagonal line: approximate 300mm) H-alpha filters with good uniformity and monolithic substrate. They will be installed in Palomar Transient Factory wide-field survey camera.

Our goal is that we will be able to supply over 600mm narrow bandpass filter for Dark Energy Survey (DECam), WIYN Observatory (ODI) or Subaru Telescope (HSC).



Shortpass

Longpass

Bandpass

Neutral Density

UV Series

Super Cold

Others

Astronomical Filters

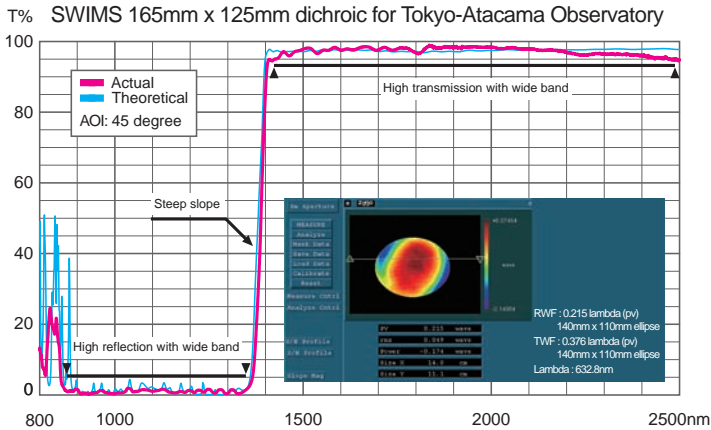
Dichroic Mirror

Astronomical dichroic mirror plays an important role to observe the multiple colors simultaneously and effectively, especially in GRB observation. Dichroic mirror determines the total optical performance of camera such as separation of each spectral band or imaging quality. That is, the dichroic is definitely one of the key components in your camera. Therefore, unprecedented specifications are always required for astronomical dichroic mirror compared to other applications.

- High reflection with wide range
- High transmission with wide range
- Sharp transition from reflection to transmission in spite of polarization
- Both good reflected wavefront (RWF) and transmitted wavefront (TWF)

In addition, the beam on the dichroic becomes ellipsoidal shape due to the angle of incidence, so large clear aperture is often requested.

Asahi is currently developing the astronomical dichroic mirror which can meet the requirements as above simultaneously for optical wavelength as well as IR.



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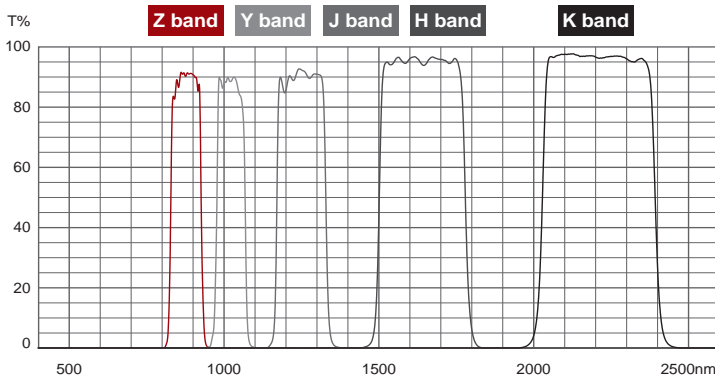
IR Filters

Unlike the filter for optical region, there are hard requirements for IR filter which is mounted in vacuum and cryogenic dewar. Both requirements, monolithic substrate and long blocking range for astronomical IR filter makes the fabrication difficult.

These days, the required blocking range becomes longer even from optical wavelength to e.g. $\sim 2.6 \mu\text{m}$ larger size is required like wide field CCD mosaic camera. We are currently developing IR filter which can meet monolithic substrate, long blocking range and larger size at the same time.

WFCAM Z, Y / The Mauna Kea near-infrared J, H, K filter set

The Mauna Kea near-infrared J, H and K filters were defined by Dr. Alan Tokunaga, IfA, University of Hawaii and become the standard photometric system in NIR region like SDSS in the optical. WFCAM Z and Y filters are also standard for IR astronomers. Each passband is achieved by dielectric interference film coated by ion assisted deposition, so spectral response is stable under 77 K cryogenic and vacuum condition.



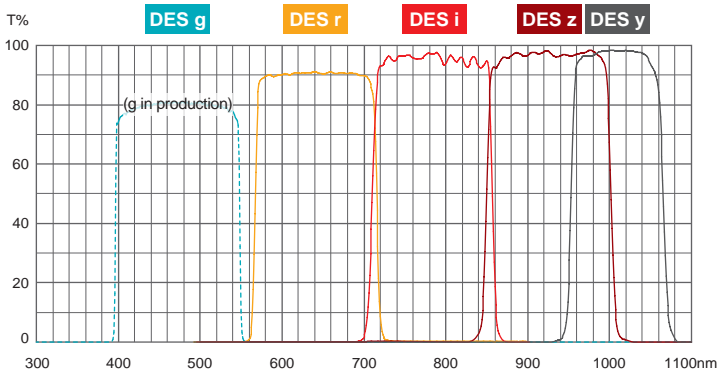
Astronomical Filters

Large filters for next - generation wide field telescope

Dark Energy Survey (DECam), WIYN Observatory (ODI), Subaru Telescope (HSC), Pan-STARRS, Discovery Channel Telescope or LSST.....

Next-generation wide field telescopes now come of age. Large filters with good coating uniformity over the clear aperture are definitely one of the essential components and help the success of science.

Asahi completed 620mm DES g, r, i, z, y filters, largest ever, not by conventional ion assisted deposition but magnetron sputtering technology. Our first goal is that we can supply broad bandpass filters such as SDSS photometric system including u-band with high quality. Next target will be narrow bandpass filters such as H-alpha or other emission lines. To achieve the best uniformity for narrow bandpass, we shall keep going.



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