Orion 1.25” Specialized Planetary Imaging Filter Set #5452

Your new Orion 1.25” Specialized Planetary Imaging Filter Set will add versatility and viewing pleasure to your astronomy experience. This set contains Ultraviolet (UV), Infrared (IR) and Methane (CH_4) filters. Please read these instructions thoroughly for proper use and care of the filters.

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Specialized Planetary Imaging Filters

The Orion 1.25" specialized planetary imaging filter set contains the following filters:

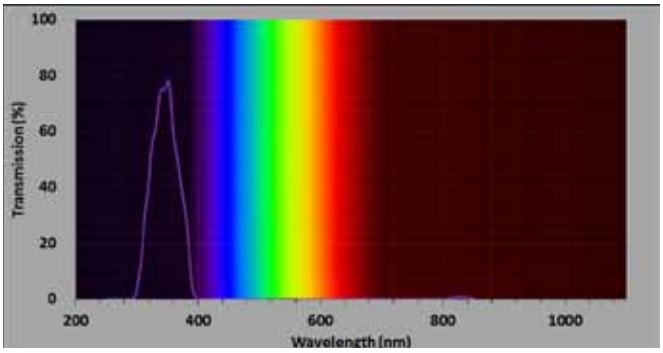
- Ultraviolet (UV) shortpass filter = 300nm to 400nm.
- Infrared (IR) longpass filter = 650nm and above.
- Methane (CH_4) narrowband filter = 890nm centered. 10nm bandwidth.

Equipment:

All three specialized planetary filters pass wavelengths outside of the visible light region of the spectrum (~400nm–700nm) and hence these filters can only be used for imaging but not for visual observing. Monochrome cameras sensitive in the ultraviolet (UV) and infrared (IR) regions are therefore required. Larger telescope apertures are also advised. Successful imaging requires longer exposures and larger telescope apertures in order to gather as much light as possible and reduce exposure times.

- Use a telescope aperture of 5" and above when using with a UV/IR sensitive CCD camera together with the UV or IR filters.
- Use a telescope aperture of 8" and above when using with a UV/IR sensitive Webcam together with the UV or IR filters.
- Use a telescope aperture of 12" and above when imaging with the CH_4 filter.

Ultraviolet Filter (UV)



Specifications: 320nm - 380nm Ultraviolet shortpass filter.

Description:The ultraviolet (UV) filter is generally used for imaging cloud structures of Venus, Jupiter and Saturn.

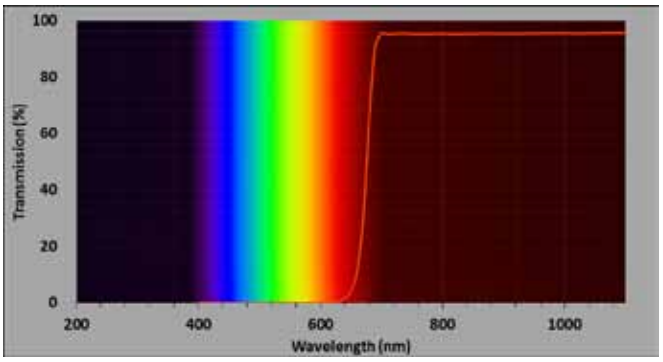
Venus

When imaging Venus the UV filter gives a high contrast of the higher atmosphere and upper cloud features The high atmosphere of Venus contains an unidentified chemical component that absorbs ultraviolet light. Its distribution follows atmospheric movements and allows us to see the wind patterns.Venus shows more contrasted details in UV than any other color band. Use in combination with RGB or IR data to provide false color image and highlight cloud detail (Figure 1).

Jupiter and Saturn

Image the cloud structure of Jupiter (Figure 2) and Saturn.

Infrared Filter (IR)



Specifications: 685nm and above Infrared longpass filter.

Description:

The infrared filter (IR) passes wavelengths in the IR region (700nm and greater) and is generally used for high contrast imaging of the Moon and planets.

The IR filter gives excellent image steadiness especially when seeing is bad which makes the filter useful when planets are relatively low on the horizon. Turbulence is far less disruptive to red light than blue light, and near infra-red light (700nm-1000 nm) is even less susceptible to atmospheric effects.

Mercury

The IR filter will aid in reducing atmospheric effects due to the planets low position in the sky. Daytime imaging can also be accomplished. The sharpest details will be found using the IR filter (Figure 4).

Venus

Venus displays details in near infrared. Contrast is very low. The near infrared reveals deeper cloud layers, found some 10km lower than the UV clouds (60km altitude). IR images show details as well, Mostly dark bands weakly contrasted. Details are different than those seen in UV. Use in combination with RGB or UV data to provide false color image and highlight cloud detail (Figure 1).

Jupiter

The IR filter penetrates hazes and so the contrast of small details are enhanced (Figure 2).

Saturn

The IR filter gives better atmospheric penetration than red light. The IR filter enhances some dark spots (Figure 3).

Moon

Alongside superb planetary images from the IR filter, it is also possible to take exceptional lunar images even in the daytime and evening, The IR filter provides a dark background and good contrast of the lunar surface under these conditions.

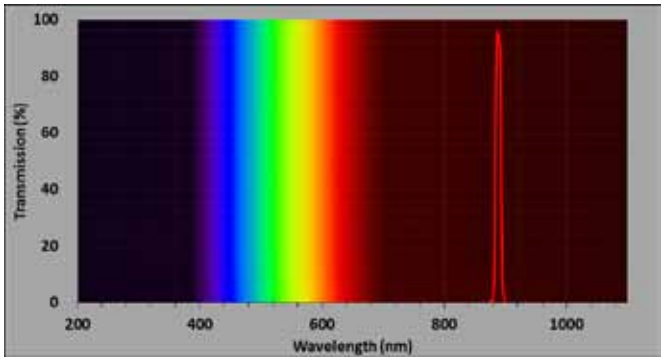
Mars

When imaging Mars the IR filter gives maximum contrast between dark and bright features. White clouds are not visible but dust clouds are bright. Polar caps are dull.

IR+RGB

A secret of good planetary imaging is to use the IR filter in place of a luminance filter to enhance contrast and improve image sharpness by reducing the effects of seeing. With an IRRGB image overall image sharpness is significantly enhanced. This is very useful when the seeing is poor.

Methane Filter (CH_4)



Specifications: 890nm centered, 10nm bandwidth, narrowband filter.

Description:

The methane filter (CH_4) is generally used for high contrast imaging of Jupiter and Saturn. Other gaseous planets such as Neptune and Uranus can also be imaged using this filter. High contrast solar imaging is also possible when used in combination with a full aperture solar filter.

Methane (CH_4) is found deep within the near Infrared (Near-IR) region of the spectrum Imaging in these wavelengths are less affected by poor seeing and will show finer details and higher contrast.

Because the filter is narrowband and darkens the methane absorption band, successful imaging requires longer exposures and larger telescope apertures in order to gather as much light as possible and reduce exposure times.

Use the binning mode of the camera to increase sensitivity.

Jupiter

Jupiter – Contains mostly Hydrogen and Helium. Smaller amounts of other types of gases exist such as methane. The CH_4 filter will monitor activity above the methane layer. The methane absorption reveals high features in the Jovian atmosphere as the lower lying atmosphere is blocked by methane absorption. Therefore the Great Red Spot, Equatorial Zone and the polar hoods are light, whereas the other belts and lower lying clouds are darker. The moons will also appear brighter compared to the dimmer Jupiter since they have no methane absorption. **(Figure 2).**

More methane = Darker, Lower.

No methane = Brighter, Higher.

Saturn

Similar to Jovian features. Rings will be bright. (Figure 3).

Solar

When used in conjunction with a full aperture solar filter, solar imagers can use the CH_4 filter to darken the methane absorption areas and improve image contrast on the solar disk.

Figure 1. Venus imaged using IR and UV filters. Green (G) channel average of IR and UV.

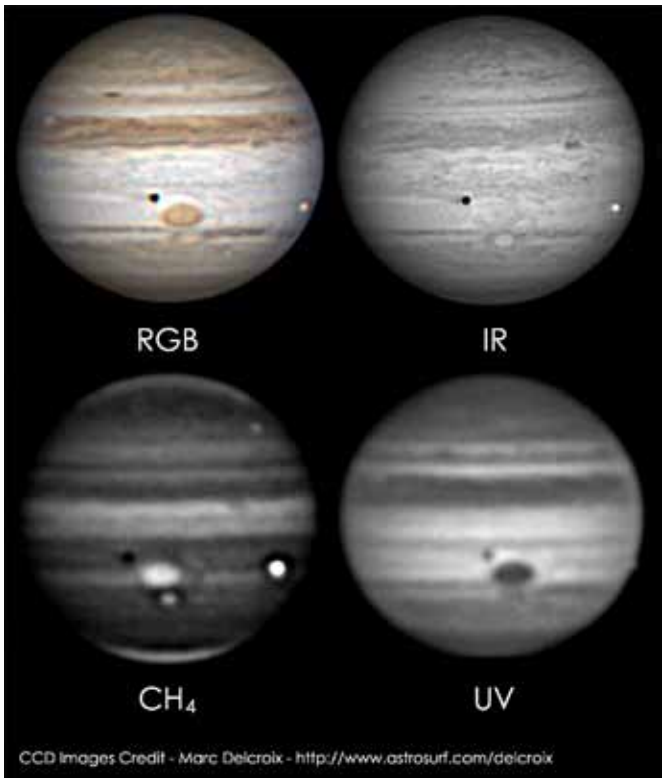


Figure 2. Jupiter imaged using RGB, IR, CH_4 and UV filters.

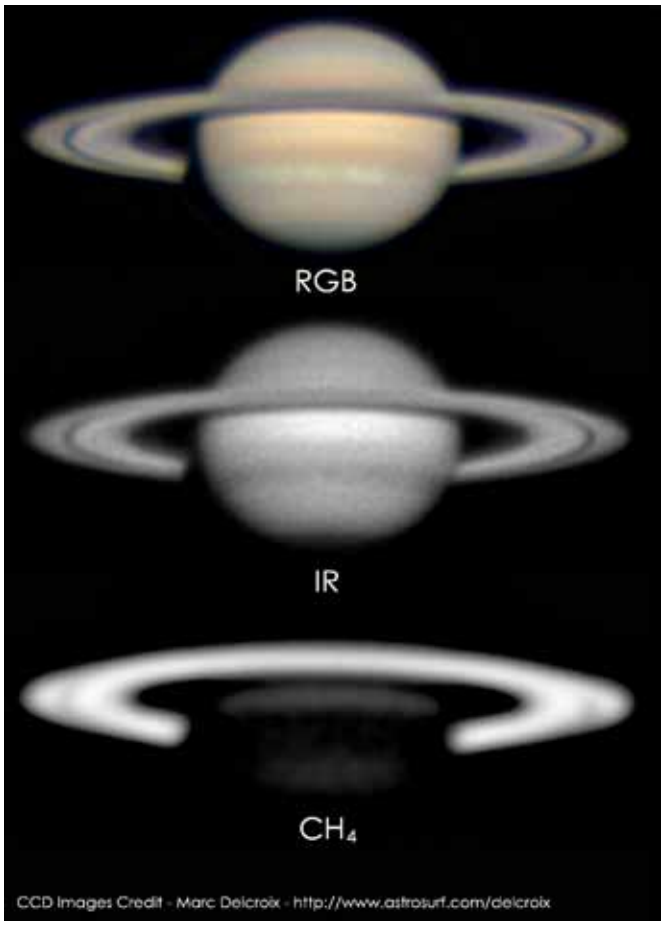


Figure 3. Saturn imaged using RGB, IR and CH_4 filters.

Figure 4. Mercury imaged using IR filter.

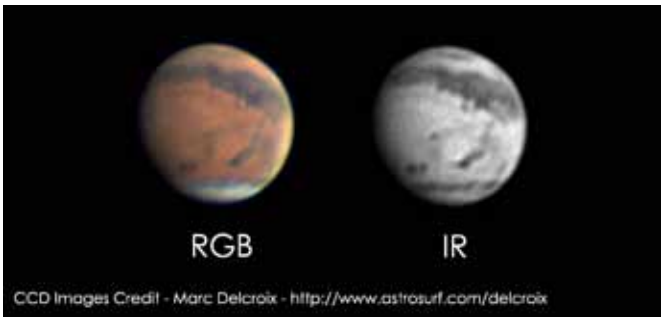


Figure 5. Mars imaged using RGB and IR filters.

Care and Storage

When not in use, your filters should be kept in their original foam-lined case. Given proper care and storage, the filters should last a lifetime. Should a filter need cleaning for any reason, use the following directions to clean the filter without damaging it.

Any quality optical lens cleaning tissue and optical lens cleaning fluid specifically designed for multi-coated optics can be used to clean the glass surfaces of the filter. Never use regular glass cleaner or cleaning fluid designed for eyeglasses.

Before cleaning with fluid and tissue, blow any loose particles off the surface with a blower bulb or compressed air. Then apply some cleaning fluid to the tissue, never directly on the optics. Wipe the lens gently in a circular motion then remove any excess fluid with a fresh lens tissue. Oily fingerprints and smudges may be removed using this method. Use caution: rubbing too hard may scratch the filter glass. Do not remove the filter glass from its housing for cleaning.

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