

by Todd Carlson



TAKING THE FRINGE OUT Filters specially designed to reduce the effects of chromatic aberration in achromatic telescopes thread into a diagonal or into the base of an eyepiece (right). The six filters we tested are, clockwise from upper left, Celestron-Baader, Lumicon, Baader, Orion, William Optics and Sirius Optics.

Planetary (and lunar) filters for achromatic refractors

Can a filter make your achromatic refractor perform like an apochromat for planetary viewing? We tested six filters to find out.

UNTIL THE 1980S, THERE WAS ONLY ONE type of refractor telescope available to backyard astronomers: the *achromatic* refractor. Although this instrument produces pleasing images, it suffers from chromatic aberration—the inability to bring all visible colours to a sharp focus. The resulting blue-violet fringes seen at the edges of bright objects, particularly the Moon, Jupiter and Mars, reduce contrast and the potential to see fine details.

In achromatic refractors under 100mm aperture, the effects of chromatic aberration are subdued and are often regarded as a minor annoyance offset by the comparative ease of use of these instruments and the aesthetically pleasing images they provide. In short, most users of small achromatic refractors are happy with them. And for observers who can afford them, there are *apochromatic* refractors made with expensive high-index glass that essentially eliminates chromatic aberration. (Apochromatic refractors typically cost four to eight times as much as their achromatic cousins.)

But in recent years, achromatic refractors in the 100mm-to-150mm range, complete with equatorial mounts, have become available at lower prices. In particular, the popular 120mm achromatic refractor offered by Sky-Watcher, among others (see review in Jan./Feb. 2000 *SkyNews*), is especially attractive for budding planetary observers on a budget who simply cannot move up to an apochromat.

Now, a viable option for achromatic telescopes is a specially designed filter that lowers the amount of chromatic aberration. Generically known as a planetary filter, or “fringe killer,” it is designed to enhance planetary and lunar viewing *only* and offers a relatively inexpensive solution to the reduction of contrast and loss of detail caused by chromatic aberration. *SkyNews* recently tested six planetary filters to see what level of improvement, if any, can be gained.

All six filters are similar in physical appearance. The Orion V-Block, Sirius Optics PC1, Celestron-Baader Contrast

Booster, Baader Planetarium Fringe Killer and William Optics VR1 filters have dielectric coatings, which appear as a primarily purple-blue tint, while the Lumicon Minus Violet filter has a mostly transparent hard-oxide antireflective coating with a slight yellow-green tinge.

Two achromatic refractors were used for the tests: a 120mm f/8.3 Sky-Watcher and a 150mm f/8 Sky-Watcher. With the 120mm refractor at 143x magnification and no filter, on a night of better-than-average seeing and excellent transparency, Jupiter was awash in a violet halo. Although the Great Red Spot was approaching the meridian, it was just on the threshold of vision.

Chromatic aberration was reduced by about 75 percent when using the Lumicon. A very small amount was visible in the Orion V-Block, William Optics VR1 and Celestron-Baader filters, while next to none could be seen in the Sirius Optics PC1 and Baader Fringe Killer filters. A noticeable yellow tint was added to the image with all but the Lumicon filter, which added a barely perceptible light yellow.

The Lumicon filter presented the brightest and most detailed image of Jupiter. Although chromatic aberration was still present, the Red Spot and other surface details were more easily observed. The Orion and William Optics filters slightly enhanced the visibility of the spot, but it could hardly be seen in the Sirius Optics and Baader Fringe Killer filters and was not visible at all in the Celestron-Baader. The latter three filters significantly reduced the brightness of the image, making them less suited for planetary observing using achromats 120mm or less in aperture.

Similar results were achieved with the 150mm achromat on another night of above-average seeing. At 150x, subtle details in Jupiter’s equatorial bands and polar regions, not visible without a filter, jumped out when using the Lumicon, Orion and William Optics filters. The Lumicon filter revealed the most detail and kept Jupiter in a relatively natural hue, although there was still some chromatic aberration. The Orion and William Optics filters showed only slightly less detail than the Lumicon. Both added an unobtrusive yellowish tinge and reduced the amount of chromatic aberration to an almost imperceptible level. The Baader Fringe Killer, while still yielding an improved view as compared with no filter, did not reveal as much detail as the previous three filters and introduced a

little more yellow. The Sirius Optics and Celestron-Baader filters added a distracting amount of deep yellow. Although they provided more detail as opposed to the nonfiltered image, they lagged significantly behind the Lumicon, Orion and William Optics filters. When a #15 yellow filter was used, slightly more detail was visible than with either the Sirius Optics or the Celestron-Baader filter, presumably because the brighter image allows more light to pass through.

While all the filters reduced the overall brightness of the Moon, some chromatic aberration remained. If lunar observing is your primary interest, there is a more cost-effective way to obtain a better view: Both a lunar filter and a #15 yellow filter provided a pleasing image at less than half the price of any of the tested filters. When observing the Sun through the 120mm with a Baader Astrosolar filter, no detectable improvement in contrast or detail was seen using any of the filters.

Since planetary observing inevitably requires frequent eyepiece changes, being able to thread the filter directly to the diagonal, if possible, makes this an easier task. Although the Lumicon Minus Violet filter was the clear winner in both telescopes in our test, it is available only in a 2-inch format—a definite drawback. (Lumicon reports that a 1.25-inch model is in the works.) The Orion V-Block and William Optics VR1 filters are highly recommended for instruments with a 1.25-inch diagonal. While these filters won't turn your telescope into an apochromat, they do offer significant improvement at an affordable price. ■

PRICES FOR PLANETARY FILTERS TESTED: Lumicon Minus Violet, \$99 (currently available only in 2-inch format); Orion V-Block, \$70 (1.25-inch and 2-inch); William Optics VR1, \$83 (1.25-inch and 2-inch); Baader Planetarium Fringe Killer, \$88 (1.25-inch and 2-inch); Sirius Optics PC1, \$92 (1.25-inch and 2-inch); Celestron-Baader Contrast Booster, \$57 (available only in 1.25-inch). These prices vary depending on the current value of the dollar. Contact your favourite Canadian telescope dealer for product availability.

SkyNews would like to thank Perceptor (877-452-1610), O'Neil Photo & Optical (519-679-8840) and readers Bob MacPhail and Bob Chapman for providing filters and telescopes.