

Filter Performance Comparisons For Some Common Nebulae

By Dave Knisely

Light Pollution and various “nebula” filters have been around since the late 1970’s, and amateurs have been using them ever since to bring out detail (and even some objects) which were difficult to impossible to see before in modest apertures. When I started using them in the early 1980’s, specific information about which filter might work on a given object (or even whether certain filters were useful at all) was often hard to come by. Even those accounts that were available often had incomplete or inaccurate information. Getting some observational experience with the Lumicon line of filters helped, but there were still some unanswered questions. I wondered how the various filters would rank on-average against each other for a large number of objects, and whether there was a “best overall” filter. In particular, I also wondered if the much-maligned H-Beta filter was useful on more objects than the two or three targets most often mentioned in publications. In the summer of 1999, I decided to begin some more comprehensive observations to try and answer these questions and determine how to best use these filters overall. I formulated a basic survey covering a moderate number of emission and planetary nebulae to obtain some statistics on filter performance to try to address the following questions:

- 1. How do the various filter types compare as to what (on average) they show on a given nebula?*
- 2. Is there one overall “best” nebula filter which will work on the largest number of objects?*
- 3. Are there subsets of nebular objects which respond to specific filter types better than others?*
- 4. Is there an optimal power for the use of nebula filters?*
- 5. Is the H-Beta filter only useful on the Horsehead, Cocoon, and California Nebulae?*

I purchased a Lumicon Multi-filter Selector to help with faster comparisons and initially began observations in my 10 inch f/5.6 Newtonian. Because urban and suburban observing conditions varied so much, I decided to do the observations at a consistently dark sky site to see what filters could do under nearly optimal conditions. The first run was completed in December of that year with 55 initial object observations. The initial results were presented on January 5th, 2000 to the AMASTRO mailing list, as well as being archived on several Internet locations. As time went on, additional objects were added, and expanded observations with other wider-field instruments were done. The project continues to be an on-going one with periodic revisions or updates in the hopes that this article might serve as a something of rough guide to those who wish to use filters on various nebulae.

The following is a summary update (9/12/2007) report of visual observations of some diffuse emission and planetary nebulae comparing the performance of various filters intended for such objects. The

instruments and powers used were: **10 inch f/5.6 Newtonian** (52x, 71x, 104x, and 141x), **9.25 inch f/10 SCT** (59x, 98x), **8 inch f/5 Newtonian** (32x), **100mm f/6 refractor** (15x, 22x). Also, a few unaided-eye observations were made using the filters hand-held and looking up at the sky (for Rosette, North America, California Nebula, Lambda Orionis complex, and Barnard's Loop). The filters used were Lumicon's **DEEP-SKY** (broadband), **UHC** (narrow-band), **OIII** (line), and **H-BETA** (line), and were usually all mounted in a modified Lumicon Multi-filter Selector. This allowed rapid and repeated comparisons between filters, thus avoiding some of the judgment problems caused by the time needed to change filters or reports from single-filter observation non-comparative accounts. Observations were done only under clear dark and optimal sky conditions (naked-eye Zenith Limiting Magnitude 6.5 and fainter), so *these results do not represent how well these filters deal with moderate to high levels of light pollution*. Observing was done from several Nebraska *dark-sky* sites: Rockford Lake, Big Indian Lake (both with ZLM 6.5 to 7.0), and Merritt Reservoir (*Nebraska Star Party*: ZLM 7.2 to 7.6). The test objects were initially selected from those nebulae plotted on Becvar's **ATLAS OF THE HEAVENS 1950** (Skalnate-Pleso), and **SKY ATLAS 2000.0** (W. Tirion, 1st edition), which were verified as at least detectable with the UHC or Deep-Sky filter in the 10 inch Newtonian. The object list was later expanded to include some plotted on **URANOMETRIA 2000.0** (2nd edition), and the software atlas **MEGASTAR 5.0**. Additional objects will very probably be added in the future. For detailed descriptions of the objects, see any of the various observing handbooks. A number of objects were surveyed more than once, as initial observations made with the 10 inch (the primary instrument in the early phases of the survey) were sometimes inconclusive as to which filter was best, or were contradicted by observations in the newer wider-field instruments which later became available. However, only the initial set of Lumicon filters were used to maintain at least some consistency, even though other similar filters became available that may have been able to change the outcomes.

Two methods were used for indicating roughly how well each filter worked on a given object. In the first method, each filter was given a 0-5 point "Score" performance ranking behind it or each object observed; Example: OIII (4) means the OIII gave a large improvement in the view over non-filter use and contributes 4 points to its overall score total. Items such as overall surface brightness, area of nebulosity observed, and contrast of detail were used to judge how well a filter improved the view. **However, since this visual judgment contains some of the personal preferences of the observer, the specific results for each object may be a bit subjective in the long run.** Different observers might have somewhat different judgment of various filters on various objects, so these results should not be considered to be rigidly definitive. Still, the scoring should on average give a rough idea of which filters might prove useful on a given object.

"Scoring" Legend

(5): Very Large Improvement over no filter.

(4): Large Improvement over no filter.

3: Moderate Improvement over no filter.

(2): Mild Improvement over no filter.

(1): Little or no Improvement over no filter.

(0): Much Worse than no filter (object marginal or not visible).

***** SCORING TOTALS FOR NEBULAE SO FAR SURVEYED *****

(95 objects as of September 12th, 2007)

UHC..... 334 points, average rating 3.52

OIII..... 302 points, average rating 3.18

DEEP-SKY. 207 points, average rating 2.18

H-BETA... 143 points, average rating 1.51

The second method is a personal recommendation for the best filter to use on the given object, based mainly on a overall visual judgment, and thus is even more a matter of opinion and taste. The nebular brightness, total area shown, contrast of details, and overall view were considered together to give an opinion of which filter might be appropriate for which object. Other observers would doubtless have somewhat differing views on recommendations for the specific objects which were observed. When objects were best seen in two filters (i.e.: nearly equal or beneficial performance), both filters would be given the recommendation for the object, with the one yielding the better overall view being listed first and the “close second” best listed next to it.

RECOMMENDATION RANKING SUMMARY

UHC best on 41 nebulae, close second best on 47 nebulae.

TOTAL 1st and 2nd RECOMMENDATIONS for UHC: 88 objects.

OIII best on 34 nebulae (biased by the inclusion of some planetary nebulae),

close second best on 22 nebulae. *NOT* recommended on 6 nebulae.

TOTAL 1st and 2nd RECOMMENDATIONS for OIII: 56 objects.

H-BETA best on 16 nebulae, second best on 2 nebulae.

NOT recommended on 39 nebulae!

TOTAL 1st and 2nd RECOMMENDATIONS for H-Beta: 18 objects.

DEEP-SKY best on 7 nebulae, second best on 3 nebulae.

*Provided at least some slight improvement for *all* nebulae surveyed.

TOTAL 1st and 2nd RECOMMENDATIONS for DEEP-SKY: 10 objects.

GENERAL TRENDS IN RESULTS

So far (with a few notable exceptions), the numbers show the UHC and OIII are the filters of choice for viewing nebulae, and to some degree supports the general recommendation that **if only one filter can be purchased, it should be the UHC or a similar narrow-band filter**. By using a variety of powers, it was discovered that in general, the narrow-band and line filters tend to perform best at from about 3.6x per inch of aperture (7mm exit pupil) to around 9.9x per inch of aperture (2.6mm exit pupil) with slightly better overall performance often seen in the lower half of this range (especially for the OIII and H-Beta filters). This range should *not* be considered an absolute however, as there are some specific situations where each of these filters can be successfully used at powers considerably higher than those cited above. However, in general, lower power tended to be somewhat better, especially for the larger and more diffuse objects.

In relative performance characteristics, *the UHC filter tends to reveal a slightly larger and/or brighter area of nebulosity with many emission nebulae than the OIII does, while the OIII filter will often yield somewhat more contrast and dark detail on a given object*. Indeed, there are a few nebular objects which seem to show a particularly high boost in contrast with the OIII, making it the “filter of choice” at times. However, for some of these “OIII objects”, a few people may still prefer a narrow-band filter over the OIII for the somewhat brighter image it may yield, particularly at powers in the upper half of the 3.5x-9.9x per inch range). Thus, the choice between the two filters (narrow-band vs. OIII) can sometimes be more a personal preference (i.e. brightness vs. contrast) than some objective standard. Overall, the greatest improvement in the view of nebulae was seen in the faintest details, so proper full dark adaptation and the use of averted vision proved essential in getting the most out of these filters.

The OIII tended to be a bit better for locating small planetary nebulae in rich starfields using the “blinking” technique than the UHC was. However, the H-beta filter often hurt the view of many planetaries with only a few exceptions. The inclusion of some planetary nebulae may have slightly inflated the overall score of the OIII filter, since in general, the OIII often does a bit better on those objects. The OIII also tends to require a slightly lower magnification range for best results than the UHC did. Thus, with longer focal length telescopes that have difficulty getting to really low powers, the UHC might sometimes be the better choice. However, the OIII filter was successfully used in the survey for a number of emission nebulae in both 80mm and 100mm RFT apertures, so the “myth” that it is not useful in apertures smaller than 8 inches is simply not true. A recent “newcomer” filter, the DGM Optics NPB (narrow-band “UHC-like” filter) was not used in the survey, but occasionally has been shown to provide nearly as much contrast on some objects as the OIII or even the H-Beta

filter. Thus, use of this filter in place of the UHC would undoubtedly change some of the ratings shown below.

The H-Beta tended to be most useful on a more limited number of objects (about 17% of the 95 objects surveyed) than either the UHC or the OIII filters. This may be due at least in part to the fact that many of the so-called “H-beta objects”, are low excitation very faint nebulae, and thus are near or beyond the visual limits of my ten inch. Indeed, larger apertures would probably change some of the ratings while adding to the number of objects which respond to the various filters. The broadband Deep-Sky filter almost always produced at least some gain in contrast for nearly every object observed (especially when some skyglow was present), but rarely produced a spectacular improvement of the view. However, for “mixed” nebulae i.e.: reflection and emission objects), the Deep-Sky can be the filter of choice. The broadband Deep-sky filter tended to have the widest range of applicable power, being used as high as 22x per inch (1.2 mm exit pupil). Filter ratings of (3) and above should indicate that a filter is definitely worth using on a given object even if that filter didn’t get a “first” recommendation. Filter comparison results for each of the objects observed are shown below, but others are encouraged to experiment a little and not let these results overly influence their own choice of which filter to try.

SPECIFIC OBJECT RESULTS

Each object is listed with the instrument(s) used , the magnifications used, and the various filters. Each filter’s numerical score (0, 1, 2, 3, 4, 5; see earlier comments) is given in parenthesis, followed by comments. The overall filter recommendation for the specific object is then stated. In the RECOMMENDATIONS portion, a “/” between the two filters named indicates that *both* filters will work well on the object, with the one on the left side of the slash possibly being a slightly better choice: ie: “UHC/OIII” means the UHC may be slightly better overall, but the OIII will be quite useful as well.

M1 CRAB NEBULA (SNR in Taurus)

(10 inch f/5.6, 52x, 71x, 141x.)

DEEP-SKY: (3) Improves the contrast and brings out the wispy arc-like cusp on the eastern end.

UHC: (4) Darkens the background and reveals little hints of tattered detail on the edges with the eastern “cusp” now more visible.

OIII: (3) Much darker than in UHC, and appears slightly smaller and somewhat rounder, but with hints of filamentary detail on the edges and across the nebula at 141x.

H-BETA: (0) barely visible.

RECOMMENDATION FOR M1: UHC/DEEP-SKY (H-beta *not* recommended).

M8 LAGOON NEBULA (diffuse Nebula in Sagittarius)

(10 inch f/5.6, 52x).

DEEP-SKY: (3) Some increase in contrast, with a bit more nebulosity visible than without a filter.

UHC: (5) Large boost in contrast and visibility of outer nebulosity. Nebula appears much larger (nearly a degree wide) with some detail enhancement, especially in the outer regions.

OIII: (5) Slightly fainter than in the UHC, but shows slightly more contrast and dark detail than UHC does. Some of the outermost nebulosity fades, but detail in inner regions is remarkable. May be the better filter under light polluted conditions.

H-BETA: (2) Dims the nebula considerably, with only the circular ball of haze around the Hourglass nebula and the external arc being easy to see.

RECOMMENDATION FOR M8: UHC/OIII

M16 EAGLE NEBULA (diffuse nebula in Serpens)

(10 inch f/5.6, 52x).

DEEP SKY: (2) Faint diffuse nebulosity is slightly easier to see than without a filter. Not a great deal of detail visible in nebula.

UHC: (4) Large increase in visible nebulosity, showing wide diffuse fan of light in the shape of a broad "T". Small darker inclusion becomes visible along the northern side.

OIII: (4) Slightly fainter than with UHC, with slightly less faint outer nebulosity, but shows more contrast and dark detail in the interior, including faint narrow "fingers" from south side into the center of the nebula with averted vision.

H-BETA: (2) Dims the nebula significantly, but "T" shape still vaguely visible.

RECOMMENDATION FOR M16: UHC/OIII, but H-BETA hurts the view.

M17 SWAN (OMEGA) NEBULA (diffuse nebula in Sagittarius)

(10 inch f/5.6, 52x).

DEEP-SKY: (3) Some improvement in contrast and detail, with the fainter loop of nebulosity to the northeast just becoming visible to form the omega shape.

UHC: (4) Noticeable improvement in contrast and detail, with much of the faint nebulosity on the outer regions and along the "omega" loop becoming quite easy to see.

OIII: (5) Slightly fainter than UHC, but contrast is also higher, with a rather striking dark area becoming noticeable along the west side of the swan's neck. Dark detail in interior of main bar is better

defined than with UHC.

H-BETA: (1) Object is noticeably dimmed compared to the other filters, making the filter a poor choice for use on M17.

RECOMMENDATION FOR M17: OIII/UHC (H-BETA not recommended).

M20 TRIFID NEBULA (diffuse emission/reflection nebula in Sagittarius)

(10 inch f/5.6, 52x, 71x)

DEEP-SKY: (2) Small difference between filtered and unfiltered views with a slight gain in contrast with the filter, but with any light pollution, the filter may be of greater use.

UHC: (4) Nebula is slightly fainter than with DEEP-SKY filter, with a slight gain in contrast over the DEEP-SKY and more contrast gain over unfiltered views.

OIII: (3) Nebula is fainter than with UHC or DEEP-SKY, and main trifold section appears slightly smaller (hurts the northern reflection nebulosity), but dark detail in the inner “lanes” shows up slightly better.

H-BETA: (4) Nebula is somewhat fainter than in UHC, but trifold section shows a bit larger area of nebulosity than the UHC does. It kills the reflection nebula and reduces the brightness of the detail right around the central star.

RECOMMENDATION FOR M20: UHC/H-BETA.

M27 DUMBELL NEBULA (planetary nebula in Vulpecula)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (3) Some improvement in visibility of outer haze off the sides of the dumbbell, but the object is also slightly fainter.

UHC: (5) Large improvement in contrast and outer detail, with large “wings” of light off the Dumbell’s sides becoming easy to see. Interior seems brighter and bigger, with interesting greenish glow.

OIII: (4) Dimmer than with UHC, but interior shows more dark detail and contrast. “Wings” off the sides not as extensive, as in UHC but still visible.

H-BETA: (1) Nebula is dimmed greatly by the filter, extinguishing the fine outer detail and only showing the inner dumbbell-shape.

RECOMMENDATIONS FOR M27: UHC (OIII also useful in showing some inner detail, but H-BETA is NOT recommended).

M42 GREAT ORION NEBULA (diffuse nebula)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (3) A moderate boost in contrast can be seen, and much more outlying nebulosity is visible. This is a good filter for the general public, since it still will show the stars while enhancing the nebula.

UHC: (5) Large boost in contrast over no filter is noted. Outer nebulosity is quite easy to see, with southward loop being easily seen with averted vision. Bluish and greenish colors are quite easy to note with direct vision.

OIII: (4) A few of the outermost nebulosity areas are dimmed, but there is more contrast, with considerable improvement in light and dark detail, especially in the inner regions. M43 is somewhat fainter than in the UHC filter, but narrow bandwidth of OIII may make it the filter of choice with light pollution.

H-BETA: (3) Much of the fainter outer areas of the nebula vanish, but fan-like main portion and M43 remain, with interesting contrast and changes in detail visible, including a brighter linear arc in the western part of the fan. Some reddish hints are also visible in the Lumicon H-beta.

RECOMMENDATION FOR M42: UHC/OIII (near-tie)*

M43 (north part of Great Orion Nebula)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (3) higher contrast than without filter, but not much detail enhancement except when there is some light pollution.

UHC: (3) somewhat more contrast than with the Deep-Sky with overall “comma” shape now easily seen.

OIII: (2) dims the nebula, but overall shape is still easily visible.

H-BETA: (4) Really makes M43 stand out, with high contrast and some irregular dark detail in the overall comma-shaped nebula.

RECOMMENDATION FOR M43: H-BETA (UHC and Deep-Sky also help).

M57 RING NEBULA (planetary nebula in Lyra)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) Darkens the background slightly, and brings out hints of very faint nebulosity off the ends of the oval, but otherwise doesn't help much.

UHC: (4) Really darkens the background and stars, and begins to show a more prominent glow in the

interior of the ring, with hints of faint outer nebulosity around the outer edges of the ring.

OIII: (4) Darkens the nebula and the background still further, but slight increase in contrast noted. Outer shell just visible with averted vision.

H-BETA: (0) Really kills things, with the nebula now being very dim.

RECOMMENDATIONS FOR M57: UHC/OIII. Nebula is bright and small enough not to really benefit enormously from filter use, but UHC does improve it to a degree (H-BETA is NOT recommended!).

M76 “MINI-DUMBELL” or BUTTERFLY NEBULA (planetary nebula in Perseus)

(10 inch f/5.6, 52x, 104x)

DEEP-SKY: (2) Some improvement over no filter, with hints of nebulosity off the sides of the dumbell.

UHC: (4) Much more nebulosity visible, including faint patches or loop-like “wings” off each side of the dumbell, along with some interior detail.

OIII: (3) Nebula is somewhat fainter, but shows more contrast, with some dark detail being seen near each lobe of the dumbell. The patches off to the sides of the dumbell look like partial loops.

H-BETA: (0) Dims the nebula almost to extinction at moderate powers.

RECOMMENDATION FOR M76: UHC/OIII (H-BETA NOT recommended!).

M97 “OWL NEBULA” (planetary nebula in Ursa Major)

(10 inch f/5.6, 52x, 104x).

DEEP-SKY: (2) Slight improvement over non-filter use (hints of the “eyes”).

UHC: (4) Much higher contrast than with Deep-Sky filter. One eye and hints of the other are seen.

OIII: (5) Increase in contrast over UHC. Both eyes visible with hints of irregular outer edge structure.

H-BETA: (0) Nearly obliterates the nebula.

RECOMMENDATION FOR M97: OIII/UHC (H-beta *not* recommended).

NGC 40 (Planetary Nebula in Cepheus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (3) Slight increase in contrast and detail (brighter opposing sides), but object does not really require a filter.

UHC: (3) Slightly fainter than in Deep-sky, but shows a bit more contrast.

OIII: (2) Somewhat fainter than in UHC, but disk still quite visible.

H-BETA: (2) Somewhat fainter than in UHC, but very slightly brighter than with the OIII filter (a “near” H-beta object).

RECOMMENDATION FOR NGC 40: DEEP-SKY/UHC (near tie).

NGC 246 (Planetary in Cetus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) defines it a bit better than without a filter, but still mainly a diffuse roughly circular glow around a few stars.

UHC: (3) Higher contrast, with nebula now a fairly well-defined moderate-sized dim disk with hints of brightness variations in the interior.

OIII: (4) Increase in contrast over the UHC. Shows several dark spots in the interior and hints of sharp filament-like outer edge of the disk.

H-BETA: (0) Really kills the nebula (barely visible).

RECOMMENDATION FOR NGC 246: OIII/UHC. (H-Beta *not* recommended).

NGC 281 (Diffuse emission nebula, Cassiopeia)

(10 inch f/5.6, 52x).

DEEP-SKY: (3) Nebula is somewhat easier to see (barely visible without filters), with the edges being more defined.

UHC: (4) Noticable improvement in contrast and detail, appearing larger than with Deep-Sky filter, and containing some dark detail.

OIII: (4) Nebula is dimmer, but interior dark lane-like detail becomes more noticeable, and the overall nebula shape is better defined than in UHC.

H-BETA: (2) Dims the nebula much more than OIII, with no more detail than is seen with the Deep-Sky filter (dim).

RECOMMENDATIONS FOR NGC 281: UHC/OIII.

NGC 604 (HII region in galaxy M33 in Triangulum)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) slight increase in contrast over unfiltered view, but easy to see without filters.

UHC: (3) Much easier to see than in Deep-sky, standing out well as an oval puff, with much of the detail in the galaxy remaining visible.

OIII: (4) Considerable increase in contrast, almost “blinking” over UHC and unfiltered views. Galaxy is much fainter, but nebula really stands out.

H-BETA: (2) Much dimmer than in the other filters, but nebula is still seen.

RECOMMENDATION FOR NGC 604: OIII/UHC.

NGC 896/IC 1795 (“Heart” nebula in Cassiopeia)

(10 inch f/5.6, 52x).

DEEP-SKY: (3) noticeable increase in visibility, with nebula being only a glow without the filter. Two areas of dim diffuse nebulosity seen, one large (IC 1795) and the other smaller (NGC 896).

UHC: (4) Much more prominent, with better definition and a little dark detail, along with a wispy outer arc curving around from south part of IC 1795.

OIII: (4) Dimmer than in UHC, but more dark detail visible with faint outer loop-like structure visible arcing south, almost connecting the two patches.

H-BETA: (1) Barely visible.

RECOMMENDATION FOR NGC 896/IC 1795: UHC/OIII (H-beta *not* recommended).

NGC 1360 (large Planetary Nebula in Fornax)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) slight increase in contrast with nebula easier to see than without a filter (but still visible without a filter).

UHC: (4) Significant improvement in contrast, with nebula appearing larger and noticeably oval. Some irregular interior detail and central star noted.

OIII: (4) Even more contrast than UHC, with clear interior arc-like detail, but central star much fainter. Nice dark background

H-BETA: (0) Kills the nebulosity with only the central star and a small hint of haze around the star being visible.

RECOMMENDATION FOR NGC 1360: OIII/UHC (H-beta *not* recommended).

NGC 1491 (diffuse Nebula in Perseus)(10 inch f/5.6, 52x, 71x)

DEEP-SKY: (3) moderate increase in contrast over non-filtered view.

UHC: (5): larger, with faint irregular outer nebulosity seen and bar-like inner feature now very obvious.

OIII: (4): Higher contrast in inner regions (especially the bar), but outer-most nebulosity dimmed.

H-BETA: (0), kills most of the nebulosity other than a hint of it.

RECOMMENDATION FOR NGC 1491: UHC/OIII (H-Beta **not** recommended).

NGC 1499 CALIFORNIA NEBULA (diffuse Nebula in Perseus)

(100mm f/6 refractor, 22x, 9.25 inch SCT, 59x)

DEEP-SKY: (2) A slight increase in contrast was noted, but otherwise, the view was similar to that without a filter.

UHC: (2) Slight increase in contrast over the Deep-Sky filter, making the edges of the nebula slightly easier to see, but nebula is still somewhat difficult. Hints of vague brightness variations across the object are noted.

OIII: (1) Nebulosity is quite dim in a very dark field.

H-BETA: (4) Dramatic increase in contrast noted, making the object fairly easy to notice, with well-defined borders. Some faint filamentary detail is also noted, especially in 9.25 inch SCT at 59x. California Nebula is visible to unaided eye at a dark sky site when H-beta is held up to the eye.

RECOMMENDATION FOR CALIFORNIA NEBULA: H-BETA.

NGC 1514 "CRYSTAL-BALL NEBULA" (planetary nebula in Taurus)

(10 inch f/5.6, 52x, 71x)

DEEP-SKY: (2) Nice faint round puff around a faint star, easier to see than without a filter.

UHC: (4) Significant improvement in contrast, well-defined hazy ball with hints of dark detail in the interior of the nebula.

OIII: (4) More contrast than in UHC, with dark detail and arc-like forms in the main shell. Dimmer than in UHC but a bit better overall.

H-BETA: (0) Almost wipes out the nebula.

RECOMMENDATION FOR NGC 1514: OIII/UHC (H-Beta NOT recommended).

NGC 1999 (diffuse nebula in Orion)

(10 inch f/5.6, 52x, 71x)

DEEP-SKY: (2) slight enhancement over no filter, and easy without one.

UHC: (1) fainter than Deep-Sky or no filter.

OIII: (1) fainter than UHC or Deep-Sky.

H-Beta: (1) fainter than Deep-Sky, UHC, or no filter.

RECOMMENDATION FOR NGC 1999: DEEP-SKY

NGC 2022 (planetary nebula in Orion)

(10 inch f/5.6, 52x, 71x)

DEEP-SKY: (3) visible without a filter, but stands out better with Deep-sky (small fuzzy disk).

UHC: (4) Noticably improves the contrast, with an almost annular form visible at higher magnifications.

OIII: (5) Much higher contrast and darker background than in UHC, but UHC or no filter may be bit better for high power observations of details.

H-BETA: (0) Almost wipes it out (barely visible).

RECOMMENDATION FOR NGC 2022: OIII/UHC (H-Beta NOT recommended).

NGC 2024 "FLAME NEBULA" (diffuse emission/reflection nebula in Orion)

(10 inch f/5.6, 52x)

DEEP-SKY: (3) Noticeably improves the contrast with the dark lane-like detail visible.

UHC: (3) Darker than in Deep-sky but with only a slight increase in contrast.

OIII: (2) Darker than in UHC, with less detail than in UHC.

H-BETA: (1) Darkest of all three filters, but the nebula remains visible with detail similar to that of OIII.

RECOMMENDATION FOR NGC 2024: DEEP-SKY/UHC (near tie).

NGC 2174 (diffuse nebula in northern Orion)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) very faint glow around a single star with hints of detail (much easier to see than without a filter).

UHC: (4) Large increase in contrast over Deep-Sky filter, showing a large circular area of haze with

vague irregular interior dark detail.

OIII: (4) Dimmer than in UHC, but has more contrast, showing some dim lane-like structure.

H-BETA: (0) Dims the nebula almost to extinction, showing less than the Deep-Sky.

RECOMMENDATION FOR NGC 2174: UHC/OIII (near tie) (H-Beta NOT recommended).

NGC 2327 (diffuse nebula in Monoceros)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) Very faint diffuse roughly circular haze around 7th mag. star.

UHC: (3): Object is larger with slightly better definition than in Deep-sky.

OIII: (2): nebula is now very faint, with only the area round the star visible.

H-BETA: (4): object is not quite as bright as in UHC but is *much* better defined, showing a dark inclusion from the northeast and a brighter arc-like western edge.

RECOMMENDATION FOR NGC 2327: H-BETA/UHC

NGC 2237-9 "ROSETTE NEBULA" (diffuse nebula in Monoceros).

(100mm f/6, 22x)

DEEP-SKY: (2) Some increase in contrast, but nebula is still more of a diffuse haze around the central star cluster with hints of irregularity.

UHC: (5) Noticeable increase in contrast, with more outer nebulosity visible and some irregular light and dark structure being visible. Nebula was visible when UHC was held up to unaided eye!

OIII: (5) Higher contrast than with UHC, with more dark irregular detail throughout the region (especially in the 10 inch), but not quite as much nebulosity visible as in UHC.

H-BETA: (1) Very faint glow around the star cluster, not much better than without a filter (but much dimmer).

RECOMMENDATION FOR ROSETTE NEBULA: UHC/OIII.

NGC 2264, "CONE NEBULA" near S Monocerotis

(10 inch f/5.6, 52x).

DEEP-SKY: (2) slight increase in contrast, with dim diffuse haze now visible and brightest spot W.S.W. of S Mon.

UHC: (3) Faint nebulosity now visible over entire field, nearly a degree wide, but only the area W.S.W.

of S Mon was very bright. Dark southern inclusion “Cone” faintly visible in southern part of nebula.

OIII: (2) Dimmer than in UHC, but somewhat higher contrast. The “Cone” was hinted at, but only the area southwest of S Mon was all that bright.

H-BETA: (1) Only a dim glow southwest of S Mon was prominent (“Cone” questionable).

RECOMMENDATION FOR CONE NEBULA: UHC (other filters may be more useful in larger apertures).

NGC 2359 THOR’S HELMET (diffuse nebula in Canis Major)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) Better defined than without a filter but still low in contrast.

UHC: (4) Higher contrast than in Deep-sky, with arc like detail off of a central oval ring-like mass.

OIII: (5) even more contrast than in UHC with oval mass now looking like a loop with tendrils off each end.

H-BETA: (0) Dims most of the nebulosity.

RECOMMENDATION FOR NGC 2359: OIII/UHC (H-Beta *not* recommended).

NGC 2346 (Planetary nebula in Monoceros)

(10 inch f/5.6, 52x, 104x)

DEEP-SKY (2): slightly easier to see than without a filter.

UHC: (3) some increase in contrast, with hints of flarings north and south.

OIII: (3) some increase in contrast, slightly fainter than in UHC.

H-BETA: (0) nearly extinguished.

RECOMMENDATION FOR NGC 2346: UHC/OIII (near tie) (H-beta *not* recommended).

NGC 2438 (planetary nebula in Puppis)

(10 inch f/5.6, 52x, 104x).

DEEP-SKY:(2) noticeably easier to see than without a filter. Hints of annularity.

UHC: (3) notable increase in contrast, easier to see than in Deep-sky with annular form more noticable.

OIII: (4) much higher in contrast with annular form now fairly obvious.

H-BETA: (0) nearly kills it completely.

RECOMMENDATION FOR NGC 2438: OIII (H-Beta *not* recommended).

NGC 2371-2 (planetary nebula in Gemini)

(10 inch f/5.6, 52x, 71x, 104x).

DEEP-SKY: (2) Two adjacent faint spots, helped somewhat over non-filter use.

UHC: (4) enhanced over Deep-Sky, with the two lobes showing hints of contact.

OIII: (4) Slightly higher contrast than UHC. Hints of faint outer wings.

H-BETA: (0) Kills the nebulosity.

RECOMMENDATION FOR NGC 2371-2: OIII/UHC (near tie) (H-Beta *not* recommended)

NGC 2392 “ESKIMO NEBULA” (planetary nebula in Gemini)

(10 inch f/5.6, 52x, 141x)

DEEP-SKY: (2) enhanced slightly over non-filter use (easier to see the outer of the two shells).

UHC: (4) Darkens the sky background and enhances the nebula, making both shells quite easy to see.

OIII: (4) Jet-black sky background with higher contrast than UHC, but the two shells almost seem to merge (tones down the central star).

H-BETA: (0) Only the inner shell is visible, much fainter than in UHC, OIII, or Deep-Sky.

RECOMMENDATION FOR NGC 2392: OIII/UHC. (H-Beta *not* recommended).

NGC 2440 (planetary nebula in Puppis)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) small fairly bright fuzzy oval (visible without filters).

UHC: (4) nice increase in contrast, but still easy without a filter.

OIII: (4) darker background but still quite bright.

H-BETA: (0) inner shell barely visible.

RECOMMENDATION FOR NGC 2440: UHC/OIII (near tie) (H-Beta not recommended).

NGC 3242 “GHOST OF JUPITER” (planetary in Hydra)

(10 inch f/5.6, 52x, 71x, 141x).

DEEP-SKY: (2) slightly enhanced over non-filter use (easy without filters).

UHC: (4): much higher contrast with faint circular outer halo-like shell beyond the two inner shells now visible.

OIII: (4): much darker background but the two inner shells really blaze out.

H-BETA: (1): much fainter (only the innermost shell is easily seen).

RECOMMENDATION FOR NGC 3242: UHC/OIII (near tie) (H-Beta not recommended).

NGC 4361 (planetary nebula in Corvus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) somewhat higher contrast than without a filter.

UHC: (4) Large increase in contrast with faint diffuse outer extensions seen.

OIII: (4) Higher contrast, a bit sharper than in UHC but nebula appears slightly smaller.

H-BETA: (0): nearly killed by the filter.

RECOMMENDATION FOR NGC 4361: UHC/OIII (near tie), (H-Beta *not* recommended).

NGC 6210 (planetary nebula in Hercules)

(10 inch f/5.6, 52x, 71x, 141x).

DEEP-SKY: (2) stands out a bit better, but filters are not needed.

UHC: (4) increase in contrast with faint hints of close outer shell north and south of main disk.

OIII: (4) darkens the background and also shows hints of the outer shell.

H-BETA: (1) dims the nebula, showing only the brighter inner core.

RECOMMENDATION FOR NGC 6210: OIII/UHC (H-Beta *not* recommended).

NGC 6302 "BUG NEBULA" (planetary nebula in Scorpius)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) somewhat more contrast than without a filter.

UHC: (3) noticeable improvement in contrast with central core region now seeming much brighter and outer E-W flarings much easier to see.

OIII: (3) makes the core region really stand out, although the nebula is not quite as bright as in the UHC.

H-BETA: (0).

RECOMMENDATION FOR NGC 6302: OIII/UHC (H-Beta *not* recommended).

NGC 6334 (diffuse nebula in Scorpius)

(10 inch f/5.6, 52x).

DEEP-SKY: (2) nebula is a large very faint glow which is brightest around one star near the south end.

UHC: (4) two separated patches around two stars near the south end, plus fainter patches and dark spots visible in a dim diffuse haze to the north.

OIII: (3) fainter than in UHC, but still visible.

H-BETA: (3) similar to OIII view but slightly fainter.

RECOMMENDATION FOR NGC 6334: UHC (OIII and H-beta also useful).

NGC 6445 (Planetary Nebula in Sagittarius)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) makes it stand out better.

UHC: (4) noticeably improves the contrast over Deep-Sky.

OIII: (3) darker more contrasting field, but slightly fainter than UHC.

H-BETA: (0) kills the nebula almost completely.

RECOMMENDATION FOR NGC 6445: UHC/OIII (H-beta *not* recommended).

NGC 6357 (diffuse nebula in Scorpius)

(10 inch f/5.6, 52x).

DEEP-SKY: (2) not easy to see without a filter, as Deep-Sky just barely brings it out.

UHC: (3) Noticeable boost in contrast, showing some irregularity and a brighter portion around a tiny group of stars.

OIII: (4) More contrast than UHC, with the patch around the tiny star group greatly enhanced.

H-BETA: (1) almost kills the nebulosity.

RECOMMENDATION FOR NGC 6537: OIII/UHC (H-Beta *not* recommended).

NGC 6543 "CAT'S EYE" (planetary nebula in Draco)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) makes it stand out a bit better.

UHC: (4) noticeable contrast improvement with faint diffuse outer halo visible. Faint patch west of main nebula barely visible (IC 4677).

OIII: (4) really darkens the background and boosts the visibility of the outer halo. IC 4677 now slightly easier to see.

H-BETA: (1) really dims it but is still visible.

RECOMMENDATION FOR NGC 6543: OIII/UHC (H-Beta *not* recommended).

NGC 6559 (diffuse nebula in Sagittarius)

(10 inch f/5.6, 52x).

DEEP-SKY: (2) not visible without filters, glow around one star with hints of extensions north and northwest.

UHC: (4), noticeably enhanced with some light and dark structure.

OIII: (2) still visible but much fainter than in UHC.

H-BETA: (2) visible with slight structure.

RECOMMENDATION FOR NGC 6559: UHC

NGC 6781 (planetary in Aquila)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (3) easy without a filter but shows more contrast with hints of annularity even at low power.

UHC: (4) noticeable boost in contrast with strong annular form and glowing interior (notable brightening along south side).

OIII: (4) really darkens field and enhances the annularity.

H-BETA: (0) kills the nebula completely.

RECOMMENDATION FOR NGC 6781: OIII/UHC (H-beta *not* recommended).

NGC 6804 (Planetary nebula in Aquila)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) slightly easier to see than without a filter.

UHC: (3) brings the nebula out well.

OIII: (4) nice high contrast a bit better than UHC.

H-BETA: (0), nearly wipes it out.

RECOMMENDATION FOR NGC 6804: OIII/UHC (H-beta *not* recommended).

CRESCENT NEBULA (NGC 6888) (diffuse nebula in Cygnus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) slight improvement over no filter, with the brightest segment of the crescent going through a star along the northern end of the nebula fairly easy to see.

UHC: (4) Nebula is now much easier to see, appearing as a large nearly complete oval ring of dim nebulosity with brightness variations and a dimly glowing interior.

OIII: (5) Complete oval ring with glowing interior and slightly higher contrast than with UHC, but overall nebulosity is fainter than with UHC.

H-BETA: (1) Very dim, with only the brightest arc portion which was seen in the Deep-Sky filter visible at all in a very dark field. Nebula almost gone.

RECOMMENDATION FOR NGC 6888: OIII/UHC (near tie). H-beta *not* recommended!)

NGC 6905 ("the Blue Flash" planetary Nebula in Delphinus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (3) noticeable improvement over no filter.

UHC: (4) increased contrast (best of the filters)

OIII: (4) still helps but not quite as much as the UHC

H-Beta: (1), dims the object but does not extinguish it.

RECOMMENDATION FOR NGC 6905: UHC (H-beta *not* recommended).

VEIL NEBULA NGC 6960-95 (SNR in Cygnus)

(10 inch f/5.6, 52x).

DEEP-SKY: (3) Nebula is easier to see than without a filter, with both sides of the loop being visible,

including the section through 52 Cygni.

UHC: (4) Large increase in detail and contrast! Nebula really stands out with some filamentary detail. Hints of other strands in the interior of the loop.

OIII: (5) ENORMOUS INCREASE IN CONTRAST AND DETAIL with wonderful fine filaments and strands visible even between the two main arcs, making the entire complex closely resemble its photograph. OIII is the filter of choice here.

H-BETA: (1) Very dim, but still visible (forget it!).

RECOMMENDATIONS FOR VEIL: OIII/UHC (OIII is somewhat better but H-BETA is NOT recommended).

NORTH AMERICAN NEBULA NGC 7000 (diffuse nebula in Cygnus)

(100mm f/6, 22x).

DEEP-SKY: (2) Nebular overall form is easier to see than without a filter, but only slightly.

UHC: (4) Very noticeable improvement in contrast over the DEEP-SKY filter, with both “Florida” and “Mexico” now quite easy to see.

OIII: (4) Higher contrast and slightly more sharpness than in the UHC, with brighter “spine” on east side of “Mexico” and some faint dark detail being easy to see, but nebula is somewhat fainter than in UHC.

H-BETA: (3) Detail is similar to OIII, but nebulosity is fainter than OIII.

RECOMMENDATIONS FOR NGC 7000: OIII/UHC (near tie) but both H-BETA and DEEP-SKY are useful on the object.

NGC 7008 (planetary nebula in Cygnus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2), slight increase in contrast, showing the irregular form.

UHC: (4): real boost in contrast with detail now visible.

OIII: (4): slightly higher contrast than UHC but a bit fainter.

H-BETA: (0): nearly obliterates the object.

RECOMMENDATION FOR NGC 7008: OIII/UHC (H-Beta *not* recommended!).

NGC 7009 SATURN NEBULA (planetary nebula in Aquarius)

(10 inch f/5.6, 52x, 71x, 141x).

DEEP-SKY: (2) does show the ansae on each end of the planetary a bit better, in the form of two small puffs.

UHC: (4) Anses become more spike-like, with noticeable increase in contrast.

OIII: (4) Nebula is dimmer, but contrast is a bit higher, especially in the interior, where inner shell detail can be seen.

H-BETA: (1) Nebula is noticeably dimmer, appearing as just a disk.

RECOMMENDATION FOR NGC 7009: Filters are not needed, but OIII/UHC will help bring out the fainter detail (H-BETA not recommended).

NGC 7023 Emission/reflection Nebula in Cepheus

(10 inch f/5.6, 52x).

DEEP-SKY: (3) Noticeable boost in contrast with nebular glow expanded over no filter. Darker areas noted on east and west sides.

UHC: (2) dimmer than in Deep-sky and slightly smaller, but nebula still shows up better than without a filter.

OIII: (2) dimmer than in UHC but still shows some hints of detail.

H-Beta: (1) dimmer than UHC and OIII. Only central area around the star remains visible.

RECOMMENDATION FOR NGC 7023: DEEP-SKY.

NGC 7026 (Planetary nebula in Cygnus)

(10 inch f/5.6, 52x, 71x)

DEEP-SKY: (2) Slight boost in contrast.

UHC: (3) slightly better than in Deep-sky filter (irregular detail).

OIII: (3) slightly darker sky background but not much better than UHC.

H-BETA: (0) much fainter than without a filter.

RECOMMENDATION FOR NGC 7026: OIII/UHC *near tie* (H-Beta *not* recommended).

NGC 7027 (Planetary nebula in Cygnus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) easy without filter, but Deep-Sky makes it stand out a little better as a small bluish-green oval.

UHC: (4) really makes the nebula almost blaze out and hints at large faint irregular outer shell. High power reveals off-center central star and an interior arc southeast of the central star.

OIII: (4) Core slightly dimmer than in UHC, but outer shell is easier to see with hints of detail in the outer shell.

H-BETA: (0) Really dims the nebula!

RECOMMENDATION FOR NGC 7027: OIII/UHC *near tie* (H-BETA not recommended!).

NGC 7048 (Planetary nebula in Cygnus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) faint but a bit more contrast than without a filter.

UHC: (3) much higher contrast showing a faint glowing oval.

OIII: (4) more contrast than UHC showing darker center and annularity.

H-BETA: (0): nearly kills it.

RECOMMENDATION FOR NGC 7048: OIII/UHC (H-Beta *not* recommended!).

NGC 7129-33 (Diffuse Emission/reflection Nebula in Cepheus)

(10 inch f/5.6, 52x, 71x)

DEEP-SKY: (2) slight increase in contrast, with a faint haze visible around a central group of 4 to 6 stars.

UHC: (3) Haze now easier to see with more contrast, but still rather diffuse with some faint detail which is brightest in the northern portion. Two other faint patches visible slightly away from the north one.

OIII: (3) Brings out a little more detail (dark inclusion in one side?).

H-BETA: (1) dims the nebula significantly, although it is still there.

RECOMMENDATIONS FOR NGC 7129-33: UHC/OIII

NGC 7139 (faint planetary nebula in Cepheus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) increased contrast over non-filter use.

UHC: (3): Still faint, but much easier to see.

OIII: (4): More contrast than UHC.

H-BETA: (0): nebula not visible.

RECOMMENDATION FOR NGC 7139: OIII/UHC (H-Beta **not** recommended).

NGC 7293 GIANT HELICAL NEBULA (planetary nebula in Aquarius)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) large dim roughly circular fuzzy patch with slightly darker middle, easier to see than without a filter, but does not have a lot of contrast.

UHC: (4) Noticeable increase in contrast, showing a clear fat slightly diffuse ring with a glowing center and hints of structure. Nebula is now quite easy.

OIII: (5) Somewhat more contrast than the UHC, with hints of helical nature and indications of outer filamentary nebulosity. Noticeably dimmer than in UHC, but stands out a bit better than in the UHC, especially at lower powers.

H-BETA: (0) Barely visible in this filter (almost kills the nebulosity).

RECOMMENDATION FOR NGC 7293: OIII/UHC (H-beta NOT recommended).

NGC 7538 (Diffuse nebula in Cepheus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (3) boosts the contrast making it easier to see than without a filter.

UHC: (4) darkens the background and brings out the nebulosity more than Deep-Sky.

OIII: (4) dimmer, but contrast is a bit higher.

H-BETA: (0) Dims it nearly to extinction.

RECOMMENDATION FOR NGC 7538: UHC/OIII (H-beta NOT recommended).

NGC 7635 BUBBLE NEBULA (diffuse nebula in Cassiopeia)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) Vague diffuse oval fuzzy area around a bright star.

UHC. (4) Oval area of nebulosity noted around the star running roughly east-west with large very dim diffuse extensions noted to the northwest and southeast. A dim "Y"-shaped patch can also be seen just north of the central star.

OIII: (4) Higher contrast, with the “Y”-shaped patch now much more definite.

H-BETA: (3) Not as good as OIII, but nebula is still visible.

RECOMMENDATION FOR NGC 7635: OIII/UHC.

NGC 7662 BLUE SNOWBALL (planetary nebula in Andromeda)

(10 inch f/5.6, 52x, 71x, 141x).

DEEP-SKY: (2). Deep-sky filter does darken the background somewhat.

UHC: (3) Really darkens the background, but adds only a little nebulosity.

OIII: (3) Dims the nebula slightly, giving a jet black sky background and a bit more interior contrast (but not much more detail).

H-BETA: (1) Significantly dims the nebula over the OIII.

RECOMMENDATIONS FOR NGC 7662: Filters are not really needed, but UHC/OIII may help with locating it at low power via “blinking” (H-BETA is not recommended).

NGC 7822 (faint diffuse nebula in Cepheus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) Very faint large elongated (east-west) glow around a few stars.

UHC: (3) Glow is noticeably enhanced over Deep-sky, shows some irregularity.

OIII: (2) Fainter than UHC, but still visible.

H-BETA: (2) fainter than the UHC, but shows about as much detail as UHC.

RECOMMENDATION FOR NGC 7822: UHC (H-Beta and OIII also useful).

IC 405 FLAMING STAR NEBULA (diffuse emission/reflection nebula in Auriga)

(100mm f/6, 15x, 22x).

DEEP-SKY: (2) Nebula visible as a very faint diffuse glow with irregularities around and to the east of AE Aur. Not clearly visible without filters.

UHC: (3) Slight increase in contrast showing patch just north-east of AE. Hints of other nebulosity.

OIII: (2) Only hints of nebulosity.

H-BETA: (4) Small arc and one other faint patch north of AE with a bit more contrast, and large fainter diffuse extension to the east and south. 9.25 inch SCT at 59x shows triangular arc east of AE with 2nd

fainter patch north.

RECOMMENDATION FOR IC 405: H-BETA.

IC 410 (Nebula assoc. with NGC 1893 in Auriga)

(10 inch f/5.6, 52x, 71x)

DEEP-SKY: (2) faint glow running E-W through the “Y”-shaped cluster NGC 1893 with southward extension off east end.

UHC: (4) detailed arc-like irregular nebulosity running east-west and then curving south with darker inclusion along southwest side.

OIII: (4) Brings out more dark detail along the east and south sides, but nebula is dimmer. Really stands out, as nebula follows the form of the cluster.

H-BETA: (0) Nebula is almost wiped out.

RECOMMENDATION FOR IC 410: OIII/UHC. (H-beta *not* recommended).

IC 417 (diffuse Nebula in Auriga)

(10 inch f/5.6, 52x, 71x)

DEEP-SKY: (2) Nebula is now barely visible around cluster Stock 8

UHC: (3) increase in contrast over DS filter.

OIII: (3) darker background

H-BETA: (4) more contrast and a bit more nebulosity visible.

RECOMMENDATION FOR IC 417: H-BETA/UHC

IC 434 HORSEHEAD NEBULA (diffuse nebula in Orion)

(10 inch f/5.6, 52x, 71x, 104x).

DEEP-SKY: (2) Little change is seen from viewing without a filter. When visible, it appears as a weak dark gap in the dim north-south nebulosity, and the shape is hard to see. Nebula is difficult, unless viewed under very dark and clear conditions.

UHC: (3) Horsehead now stands out weakly from dim glow, showing some of the horsehead shape with averted vision, a definite improvement over no filter or the DEEP-SKY.

OIII: (0) No Horsehead seen. IC-434 nebulosity not seen for certain.

H-BETA: (4) Nebula still dim, but Horsehead shape now fairly easy to see, showing up with more

contrast than with the UHC filter. East edge of IC 434 seems brighter than the rest of the nebula with the H-beta.

RECOMMENDATION FOR HORSEHEAD: Lumicon H-BETA (UHC also helps, but OIII not recommended).

IC 443 (supernova remnant in Gemini)

(9.25 inch SCT, 59x)

DEEP-SKY: (1) object only suggested and not clearly seen.

UHC: (4) faint but definite arc with hints of detail.

OIII: (3) sharper but not as bright or easy to see.

H-Beta (2) hinted at in brightest section only.

RECOMMENDATION FOR IC 443: UHC

IC 1283 (diffuse nebula in Sagittarius)

(10 inch f/5.6, 52x, 71x)

DEEP-SKY: (2) slight boost in contrast over no filter.

UHC: (3) definite increase in size but still faint.

OIII: (3) a bit more contrast, but fainter and smaller than UHC.

H-Beta: (4) Largest area of nebulosity seen with higher contrast.

RECOMMENDATION FOR IC 1283: H-Beta

IC 1318 GAMMA CYGNI NEBULA (diffuse nebula in Cygnus)

(100mm f/6, 15x, 8 inch f/5 Newtonian at 32x).

DEEP-SKY: (2) Brings out a large faint diffuse nebulosity in two elongated segments with a darker area between them east of Gamma Cygni. Larger area well northwest of Gamma also visible.

UHC: (3) Increase in contrast noted over Deep-sky filter, with dark gap between the patches east of Gamma Cygni now much more notable.

OIII: (1) Filter almost extinguishes the nebulae (very faint).

H-BETA: (4) Nebula has similar brightness to UHC but higher contrast with a very dark sky background.

RECOMMENDATION FOR IC 1318. H-BETA/UHC (OIII *not* recommended)

IC 1396 (nebula S.W. of Mu Cephei)

(10 inch f/5.6, 52x, 9.25 inch SCT, 59x).

DEEP-SKY: (2) Diffuse haze around a weak open star cluster, quite large with some vague brightness irregularities and a possible dark inclusion in the south side (B161).

UHC: (4) Nebulosity more visible and dark inclusion is much more definite, but the glow is still faint. Some variations in brightness are noted, but the object is still somewhat diffuse.

OIII: (3) Dimmer than in UHC, with outermost nebulosity gone, but some more contrast and dark detail are noticable (better than in Deep-Sky filter).

H-BETA: (1) Nebulosity is visible, but is *extremely* dim in a dark background.

RECOMMENDATION FOR IC 1396: UHC.

IC 1848: (“The Baby Nebula”, Cassiopeia)

(8 inch f/5, 32x, 10 inch f/5.6, 52x, 9.25 inch SCT, 59x).

DEEP-SKY: (2) some increase in contrast with nebula appearing as an elongated faint haze going through a sparse cluster.

UHC: (4) Much easier to see, with nebula now elongated E-W, brighter on northern side and darker notch towards the east end (“the neck”).

OIII: (4) noticeably darker than UHC, but a little higher contrast.

H-BETA: (1) Very dim.

RECOMMENDATION FOR IC 1848: UHC (H-beta *not* recommended)

IC 2177: (“Seagull Nebula” diffuse Nebula, Monoceros)

(10 inch f/5.6, 52x, 100mm f/6, 22x).

DEEP-SKY: (2) long faint irregular diffuse band of haze not easily seen without filters. Extends southward from open cluster NGC 2235.

UHC: (3) Easier to see, with somewhat more contrast. Narrower slightly sinuous core filament imbedded in more diffuse haze visible for nearly 2 degrees.

OIII: (2) Nebula barely visible (mostly just the core filament) with much of outlying nebulosity gone.

H-BETA: (3) Core filament is fainter than UHC, but considerably more contrast.

RECOMMENDATION FOR IC 2177: H-BETA/UHC.

IC 4628 (diffuse nebula in Scorpius)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) faint diffuse irregular glow not visible without filters.

UHC: (4): Noticeable improvement, with nebula now easy to see and rather detailed, with some irregular lane-like detail.

OIII: (2): much fainter than in UHC, but still visible.

H-BETA: (3): shows some interesting filamentary detail, but not as bright or as detailed as in UHC.

RECOMMENDATION FOR IC 4628: UHC.

IC 5067-70 PELICAN NEBULA (diffuse nebula in Cygnus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) Nebular overall form is easier to see than without filters, with some hints of detail and the overall form.

UHC: (4) Very noticeable improvement in contrast over the DEEP-SKY filter, with both the “beak” and the “body” now fairly easy to see.

OIII: (4) Improvement in contrast and detail, but nebula is dimmer than UHC.

H-BETA: (3) Nebulosity is visible but is fairly faint.

RECOMMENDATIONS FOR IC 5067: UHC/OIII, Deep-sky also useful on the object (UHC was brighter, but OIII shows more detail).

IC 5076 (diffuse nebula inside cluster NGC 6991 in Cygnus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) Very slight increase in contrast over no filter.

UHC: (2) Slightly better than Deep-Sky, but still marginal glow.

OIII: (2) Darker background not quite as good as UHC.

H-Beta: (3) larger area of nebulosity than the other filters with darker background and additional nebulosity away from small sub-cluster.

RECOMMENDATION FOR IC 5076: H-Beta

IC 5146 THE COCCOON NEBULA (diffuse nebula in Cygnus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) A bit better than no filter, but object is still easily seen as a dim roughly circular irregular patch in some stars without a filter.

UHC: (3) Slightly higher contrast with more irregular interior dark detail.

OIII: (1) Fainter and slightly smaller than in UHC (OIII hurts it).

H-beta: (3) dimmer than UHC but shows larger area of outer nebulosity and slightly better defined dark detail in the form of irregular lane like features.

RECOMMENDATIONS FOR IC 5146: H-BETA/UHC *near tie* (OIII not recommended).

PK64+5.1 "CAMPBELL'S HYDROGEN STAR" Cygnus (Henize 2-438, PNG 64.7+5.0)

(10 inch f/5.6, 52x, 71x)

DEEP-SKY: (2) only slight increase in contrast (small nearly stellar disk, slightly reddish in color).

UHC:(3): Slight increase in contrast with faint outer shell hinted at.

OIII: (2) dimmer than UHC, but slightly more contrast than without filters.

H-BETA: (4) Noticeable increase in contrast with very faint outer shell.

RECOMMENDATIONS FOR PK64+5.1: H-BETA (UHC also useful).

PK205+14.1 "MEDUSA NEBULA" (large planetary nebula in Gemini)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) Slight increase in contrast but nebula is still just a very faint diffuse hazy area.

UHC: (3) noticeable increase in contrast with vague "C" shaped arc now visible.

OIII: (4) dimmer than in UHC, but slightly more contrast, with hints of filaments in the dark part (looks almost annular).

H-BETA: (0) Completely kills the nebula.

RECOMMENDATION FOR PK204+14.1: OIII/UHC *near tie* (H-beta *not* recommended).

PK164+31.1 "HEADPHONE NEBULA" (large planetary nebula in Lynx)

(10 inch f/5.6, 52x).

DEEP-SKY: (2) Very slight increase in contrast over non-filtered view.

UHC: (3) noticeably easier to see as two spots connected by a vague annulus.

OIII: (3) much easier to see the spots, but the annulus fades somewhat.

H-BETA: (0) Completely kills the nebula.

RECOMMENDATION FOR PK164+31.1: UHC/OIII *near tie* (H-beta *not* recommended).

Sh2-13 (Diffuse nebula in Scorpius)

(10 inch f/5.6, 52x).

DEEP-SKY: (2) dimly visible as a very faint glow but not without the filter.

UHC: (4) boost in contrast, becoming very patchy but still dim.

OIII: (2) fainter but still visible.

H-BETA: (2) similar to OIII.

RECOMMENDATION FOR SH2-13: UHC

Sh2-54 (Diffuse nebula in Serpens)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) dim diffuse glow not visible without filters.

UHC: (4) noticeable contrast gain, with considerable light and dark detail.

OIII: (2) much fainter than in UHC but still visible.

H-BETA: (3) better than in OIII with a little detail.

RECOMMENDATION FOR Sh2-54: UHC

Sh2-84 (Diffuse nebula in Sagitta)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (1): only hint of nebula.

UHC: (3): faint diffuse "L"-shaped patch with irregular edges.

OIII: (1): dark field with just a hint of nebulosity.

H-BETA: (2): fainter than in UHC.

RECOMMENDATION FOR Sh2-85: UHC.

Sh2-101 (Diffuse Nebula in Cygnus):

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) Very faint moderate-sized diffuse haze in two segments around 3 stars (2 stars on the west and one on the east).

UHC: (3) Higher contrast but still faint. Two definite patches visible with hazy arc-like extensions. One on the west appears larger.

OIII: (2) Very dim but still visible.

H-BETA: (3) Almost as much nebulosity visible as in UHC, but dimmer.

RECOMMENDATION FOR Sh2-101: UHC/H-BETA.

Sh2-112 (Diffuse Nebula in Cygnus N.W. of Deneb)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (3) faint star with very faint small diffuse patch of nebulosity to its immediate south. Much easier to see than without a filter.

UHC: (4) Almost fan-like diffuse patch extending from the faint star to its south. More nebulosity visible than in Deep-Sky, but still somewhat small.

OIII: (4) Fainter than UHC, but the nebula now envelopes the star in a diffuse faint haze. Darker inclusion from the northeast now visible.

H-beta: (1) Really dims it!

RECOMMENDATION FOR Sh-2-112: OIII/UHC (H-beta not recommended).

Sh2-132 (Diffuse Nebula in Cepheus)

(10 inch f/5.6, 52x, 71x)

DEEP-SKY: (2) better than without filters as without filters the object is only hinted at. Just a very faint diffuse irregular glow around several stars roughly elongated east-west.

UHC: (4) Makes a patch on south edge easier to see and hints of other detail.

OIII: (4) Increases contrast with an arc across the northern side and a patch in the middle. Higher contrast but dimmer than UHC.

H-BETA: (3) Dims it more than OIII, but nebula remains visible.

RECOMMENDATIONS FOR Sh-2-132: OIII/UHC (near tie)

Sh2-142 (Diffuse Nebula in Cepheus around open cluster NGC 7380)

(10 inch f/5.6, 52x, 71x)

DEEP-SKY: (2) hint of a glow across fairly rich star cluster.

UHC: (4) big fat triangular area, faint arc-like appendages.

OIII: (4) fainter, but more dark detail, with “Y” shape to the nebula..

H-Beta: (3) fainter than OIII, but still visible (better than Deep-Sky).

RECOMMENDATIONS FOR Sh-2-142: OIII/UHC.

Sh2-155 (Diffuse nebula in Cepheus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) very faint diffuse area of haze around two widely-spaced stars (better contrast than without a filter).

UHC: (1) Only hint of nebulosity visible.

OIII: (1) little if any nebulosity visible.

H-BETA: (0) no nebulosity visible.

RECOMMENDATION FOR Sh-2-155: DEEP-SKY (probable reflection nebula).

Sh2-157 (“fingers” diffuse nebula in Cassiopeia)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) not easily seen except as a vague elongated brightening in a rich star background.

UHC: (3) Elongated large diffuse and dim oval feature with two dim northward-pointing arcs.

OIII: (3) Nebula is fainter than in UHC, but still visible with increased contrast, especially in the two “finger” patches.

H-BETA: (2) Fainter than in OIII, but nebula is still visible.

RECOMMENDATION FOR Sh-2-157: UHC/OIII

Sh2-170 (faint diffuse nebula in Cepheus)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) not easy to see without filters. Round very faint very diffuse patch of haze around a group of 6 or 7 faint stars.

UHC: (3) Somewhat easier to see than in Deep-Sky, with a bit more contrast.

OIII: (2) Still visible, but fainter than in UHC.

H-BETA: (2) Still visible but fainter than in OIII or UHC.

RECOMMENDATION FOR Sh-2-170: UHC

Sh2-171 (very faint large diffuse nebula in Cepheus)

(10 inch f/5.6, 52x).

DEEP-SKY: (2) Plainly visible over non-filter, but still faint and diffuse.

UHC: (3) Slight enhancement over Deep-Sky with some light and dark areas.

OIII: (2) Fainter but shows more enhancement in several dark lane-like structures.

H-BETA: (2) Nebula remains visible, but just a bit fainter than in the OIII.

RECOMMENDATION FOR Sh-2-171: UHC (Deep-Sky and OIII filters also useful).

Sh2-235 (diffuse nebula in Auriga)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (3) diffuse oval faint fuzzy patch, slight southern extension.

UHC: (3): slightly more contrast than Deep-Sky, but fainter.

OIII: (2): fainter than UHC or Deep-Sky.

H-BETA: (4): Faint, but two patches are now seen with brighter one on the north. More contrast than Deep-Sky or UHC.

RECOMMENDATION FOR Sh2-235: H-BETA/DEEP-SKY (UHC also helps.).

Sh2-261 (diffuse nebula in Orion)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) slight increase in contrast making the nebula faintly visible and easier than without a filter.

UHC: (3) nebula now clearly visible but still faint.

OIII: (3) nebula visible, but fainter than UHC with a bit more contrast.

H-BETA: (2), nebula is still visible, but not quite as good as in UHC/OIII.

RECOMMENDATION FOR Sh-2-261: UHC/OIII (near tie).

Sh2-276 "BARNARD'S LOOP" (diffuse nebula in Orion)

(100mm f/6, 15x *and* Naked-eye observations with filter over unaided eye).

DEEP-SKY: (1) hint of a glow in telescope, but not visible naked eye.

UHC: (2) Faint arc like glow visible under good conditions over Orion's Belt, continuing southward east of the belt. Detectable in 100mm f/6.

OIII: (0) No nebulosity seen.

H-BETA: (3) Faint narrow glow visible both over the belt and curving down southeast along Orion's southeastern side. Very faint, but noticeably easier to see than in UHC filter. Fairly easy in 100mm f/6 scope with some vague detail although not bright.

RECOMMENDATION FOR Sh2-276: H-BETA/UHC. (OIII not recommended)

Sh2-254-5-6-7-8 (dim nebular complex in northern Orion: IC 2162)

(10 inch f/5.6, 52x).

DEEP-SKY: (2) three dim diffuse patches in a line.

UHC: (3): Increased contrast (Sh2-257 now brightest of the three large ones).

OIII: (2): fainter than in UHC and Sh2-255 now not as large.

H-BETA: (3): more contrast than UHC but a bit dimmer.

RECOMMENDATIONS FOR Sh2-254 complex: H-BETA/UHC (near tie).

Sh2-311 (nebulous open cluster NGC 2467 in Puppis)

(10 inch f/5.6, 52x, 71x).

Visible without a filter as circular patch in rich starfield.

DEEP-SKY: (3) larger than without a filter and with hints of outer detail.

UHC: (4) boosted contrast and brought out outer nebulosity better.

OIII: (3) darker background and more contrast, but Deep-Sky filter better.

H-BETA: (0) very dim but still visible.

RECOMMENDATIONS FOR Sh2-311: UHC/Deep-Sky (H-Beta not recommended)

vdB93 (Gum-1) (diffuse nebula in Monoceros near IC 2177)

(10 inch f/5.6, 52x, 71x).

DEEP-SKY: (2) Slight boost in contrast, showing more nebulosity than without a filter.

UHC: (3) More contrast and nebulosity visible, but still faint.

OIII: (1) Fainter than in UHC, with only hint of a glow around the central star.

H-BETA: (4) Better defined than any of the other filters, with more light and dark detail. Fainter than in UHC, but shows better contrast and detail.

RECOMMENDATION FOR vdB93: H-BETA/UHC (OIII not recommended).