

# Our Visual Rainbow of Color in the Skies

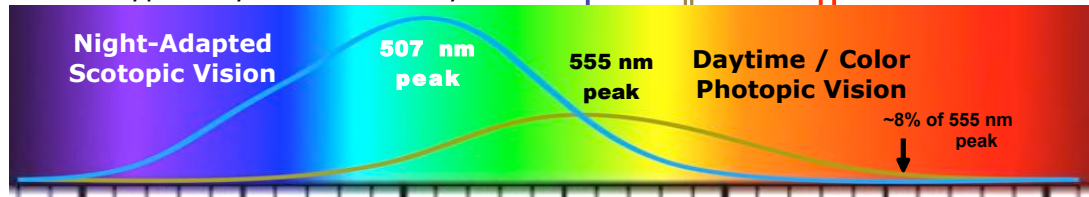
(nanometers)  
 660=Red  
 610=Orange  
 580=Yellow  
 530=Green  
 470=Blue  
 420=Violet



Skyglow (558 & 630 & 636 nm) (and ~589 nm) (plus multi-wavelength manmade light and various scattered light)

## Typical Eyeball Sensitivity

More  
 ↑  
 ↓  
 Less



H-delta 410 nm H-gamma 434 nm H-beta 486 nm (hydrogen makes up most of the universe) H-alpha 656 nm { Balmer Series of Hydrogen

ionization/excitation spectroscopic notation  
 I = neutral  
 II = singly  
 III = doubly

O-III 496 & 501 nm (prominent in planetary nebulae and supernova remnants) N-II ±656 nm S-II ±672 nm

## Filter Transmission

More  
 ↑  
 ↓  
 Less

### Filter Types:

#### Broadband Nebula Filter

typically 90%+  
 (Full-Width at Half-Maximum) FWHM Bandwidth (in nm) (typically 60 to 100 nm)

(typical brands: Lumicon DeepSky, Orion Skyglow, Astronomik CLS, Baader UHC-S, Thousand Oaks LP1 Broadband)

#### Narrowband Nebula Filter

(FWHM is typically 23 to 30 nm)  
 (smaller scopes may be better using a filter with 36 to 50 nm) eg: Astronomik UHC-e

(typical brands: Lumicon UHC, Orion Ultrablock, Televue Nebstar II, [includes red light] => Astronomik UHC, DGM NPB)

#### (O-III) Line Nebula Filter

(part of) Swan Bands for C<sub>2</sub>/diatomic carbon ~511/514 nm in the faint ion tail of some comets (FWHM is typically 12 to 16 nm)

Filter choice and use depends greatly on the selected object, AND:  
 telescope gear,  
 one's eyeballs,  
 magnification,  
 site darkness,  
 weather conditions,  
 viewing preferences,  
 observing experience.

#### (H-beta) Line Nebula Filter

(FWHM is typically 8 to 12 nm)

Filters cannot add detail.  
 Filters cannot add brightness.  
 Filters only remove something that may distract.

#### (mostly) No-Nebula Filter

Color Filter Wratten #15 (yellow-orange)



wavelengths very difficult to see with our eyes

### In general:

Nebula filters work for emission nebulae and their limited spectra (dark nebulae are dust clouds blocking light) (reflection nebulae [& galaxies] span many wavelengths, yet a Broadband Filter **may help a little** when viewing them).

**For medium/average telescopes, a Narrowband Nebula Filter often is the most useful.**

For very large (18-inch plus) telescopes, an O-III Line Nebula Filter **may** be the most useful.