

Imaging the Heavens
By
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If you join us at the observatory to view the wonders of the heavens, you will see lots of color when you look at planets as well as color on the brighter stars. However, when you look at the dimmer nebulae and galaxies in the visual telescope, what you generally see are dim gray objects. These objects are still very interesting to look at and when you find out how and when they were formed and how far away they are, the views fascinate. However, if you look at many of the astrophotos on the walls of the observatory or those seen in magazines (or imaged by the Hubble), you may wonder where all of the colors come from in these wonderful images.

When you visit the observatory and look up at objects in the night sky, you will typically look for only a few seconds (or tens of seconds). And, you use your eye. This is a wonderful instrument but not designed to detect color accurately under low light conditions. (If you go out and look at something in the dark, things will appear to be mostly black and white in the absence of external lights). On the other hand, when astrophotographers image objects in the sky, they will leave their camera's shutters open for tens of minutes to many hours. They also use special filters that only allow specific colors to enter the camera. For example, they may take 2 hours worth of exposures through a red filter, another two hours through a blue filter, and finally 2 more hours through a green filter. After getting all these data, computers are used to register the different colors and then to artificially generate a color image by putting the three (R, G, and B) data sets together into one color image. The beautiful Hubble images are made by a process similar to this.

In addition to these RGB images, amateur astronomers and scientists may also use special filters that allow only the light from special kinds of physical processes to come through into the camera. Colors will then be assigned to these physical processes (in a somewhat arbitrary fashion) and, again, color images will be generated. The Hubble space telescope has almost twenty different and very specific filters generally in the optical wavelength area(,) while a satellite such as NASA's Wide Field Infrared Survey Explorer has four filters but in the infrared portion of the spectrum.

The Sierra foothills, with their very dark skies and generally good weather, are home to several world renown amateur astronomers, and their astrophotos have been published in several magazines devoted to amateur astronomy as well as being used for serious scientific work. In fact, some of these astrophotographers volunteer at the Community Observatory itself. The Community Observatory is also in the process of obtaining a color camera that will be used in place of our current black and white camera to allow a better chance of viewing some of the heavenly objects in color.

If you are interested in viewing some images of the objects that can be seen in our night sky, you can visit websites at tas.astroshots.net or <http://www.imagingdeepsky.com/> to see images of objects that have been taken by Community Observatory docents.

If you are interested in viewing the heavens and learning more about astrophotography, we would like to invite you to join us at the Community Observatory, a gift of the Cameron Park Rotary Club. For more information about the observatory and driving directions go to www.communityobservatory.com .