What glows green in space?

March 18 2013, by Elizabeth Howell

The Wreath Nebula (Barnard 3) glows green in space in this Wide-field Infrared Survey Explorer (WISE) image. Credit: NASA/JPL-Caltech/UCLA

While a quest for green beer in space would be difficult, we're happy to report there are other ways you can celebrate Saint Patrick's Day while looking at the night sky. Just check out the nebulae and aurorae in these pictures!

A word of caution, these pictures are taken by cameras that expose light for a very long time, sometimes using different filters, to bring out the

colors. A nebula, for example, seen with our own eyes does not look quite as stunning.

The picture above shows the Wreath Nebula, which apparently is filled with warm dust bits that are about the same composition as smog.

RCW 120. Credit: NASA/JPL-Caltech

Here's a picture of a "Green Ring" Nebula; the NASA press release is worth a read for the hilarious Green Lantern references. But besides the science fiction, there is some neat science in action here: "The green color represents infrared light coming from tiny dust grains called polycyclic aromatic hydrocarbons," NASA writes. "These small grains have been destroyed inside the bubble. The red color inside the ring

shows slightly larger, hotter dust grains, heated by the massive stars."

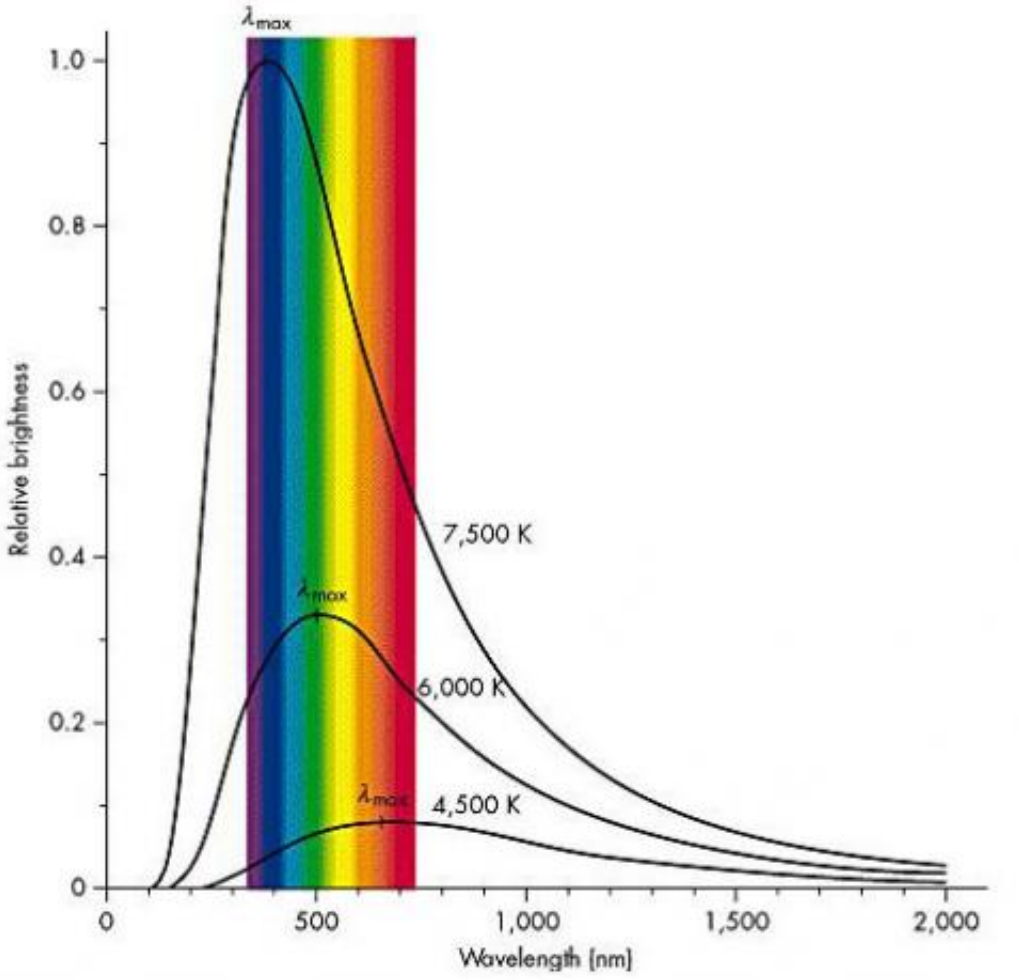
You can even see hints of green in the Lagoon Nebula picture above. Using a filter that picks up green (sulfur) emission, the astronomers ferreted out a bit of emerald.

A portion of the Lagoon nebula imaged by the Gemini South telescope with the Gemini Multi-Object Spectrograph. Credit: Julia I. Arias and Rodolfo H. Barbá Departamento de Física, Universidad de La Serena (Chile), and ICATE-CONICET (Argentina)

If you live far enough north or south, you occasionally get to see aurorae dancing across the sky. These events, sometimes known as the Northern Lights or Southern Lights, occur due to interactions between the sun's particles and the Earth's upper atmosphere. We had some green stunners in October 2012 after a solar flare pushed a bunch of these particles in Earth's direction. Most of the light you see in auroras comes from oxygen atoms being "excited" from the interaction with the sun's particles; green occurs at higher altitudes, and red at lower ones.

One object that can't glow green in space, however, is a star. Stellar colors depend on the surface of the star. Blue stars, the hottest ones, are

at about 12,000 Kelvin and red stars, the coolest ones, are less than 3,500 Kelvin. (The sun is about in the middle, at 6,800 Kelvin, as it emits white light.)



Light curve of different stars.

As Universe Today publisher Fraser Cain pointed out in a past post, the only way a green star could be possible is if the light curve peaks at green. That doesn't work, however: "If you make the star hotter, it just gets bluer," he wrote. "And if you make a star cooler, it just becomes

orange and then redder. There's no way to have a light curve that makes a star look green." Check out more details here.

Source: Universe Today