

10.2: Star Color

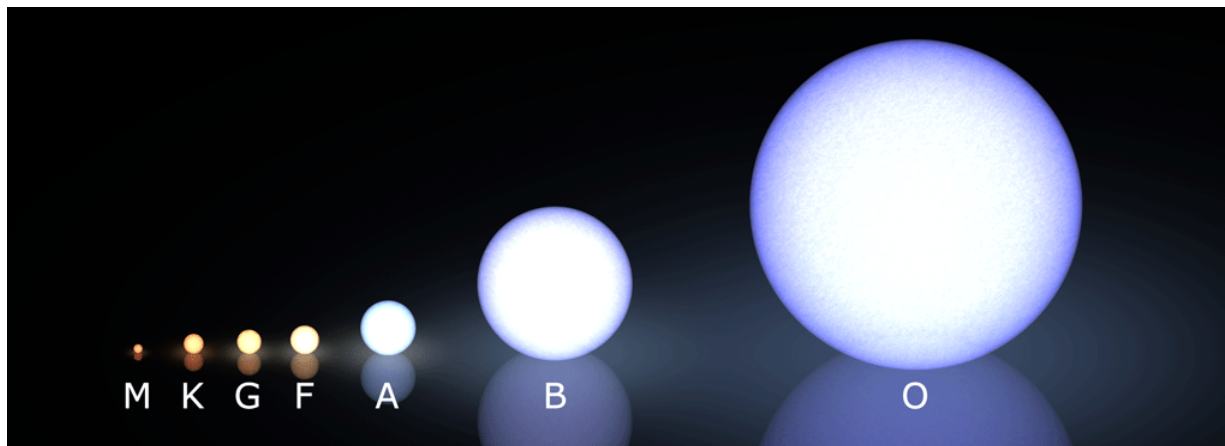
Stars in the Night Skies

As one looks at the stars in the night sky, a couple of things become obvious, especially if you are observing from a dark sky site. First, you will observe that the stars are of various brightnesses. This is due to two main factors: the distance to the star and the type of star. Second, you will see that not all stars are white in color. You will see red stars, orange stars, blue and blue-white stars. No, your eyes are not playing tricks on you. And, by the way, yellow stars, like the Sun, are a little harder for the human eye to see the star's yellow color. Yet, through a telescope, and for some in binoculars, the yellow color is visible. ⁽¹⁾

Star Color

Astronomers measure a star's surface temperature at its photosphere. Recall that the photosphere is the outer layer of the star from which light is radiated. The star's photosphere temperature dictates its color. Conversely, the color of a star at its photosphere shows its temperature. The hotter the star is, the more blue or blue-white it is. And, the cooler the star, the redder the star will appear in color.

Astronomers classify stars by their color and/or photosphere temperature, called a star's Spectral Type or Spectral Class. An astronomer, Annie Jump Cannon, sorted spectral data and designed the stellar spectral types we still use; O-B-A-F-G-K-M.

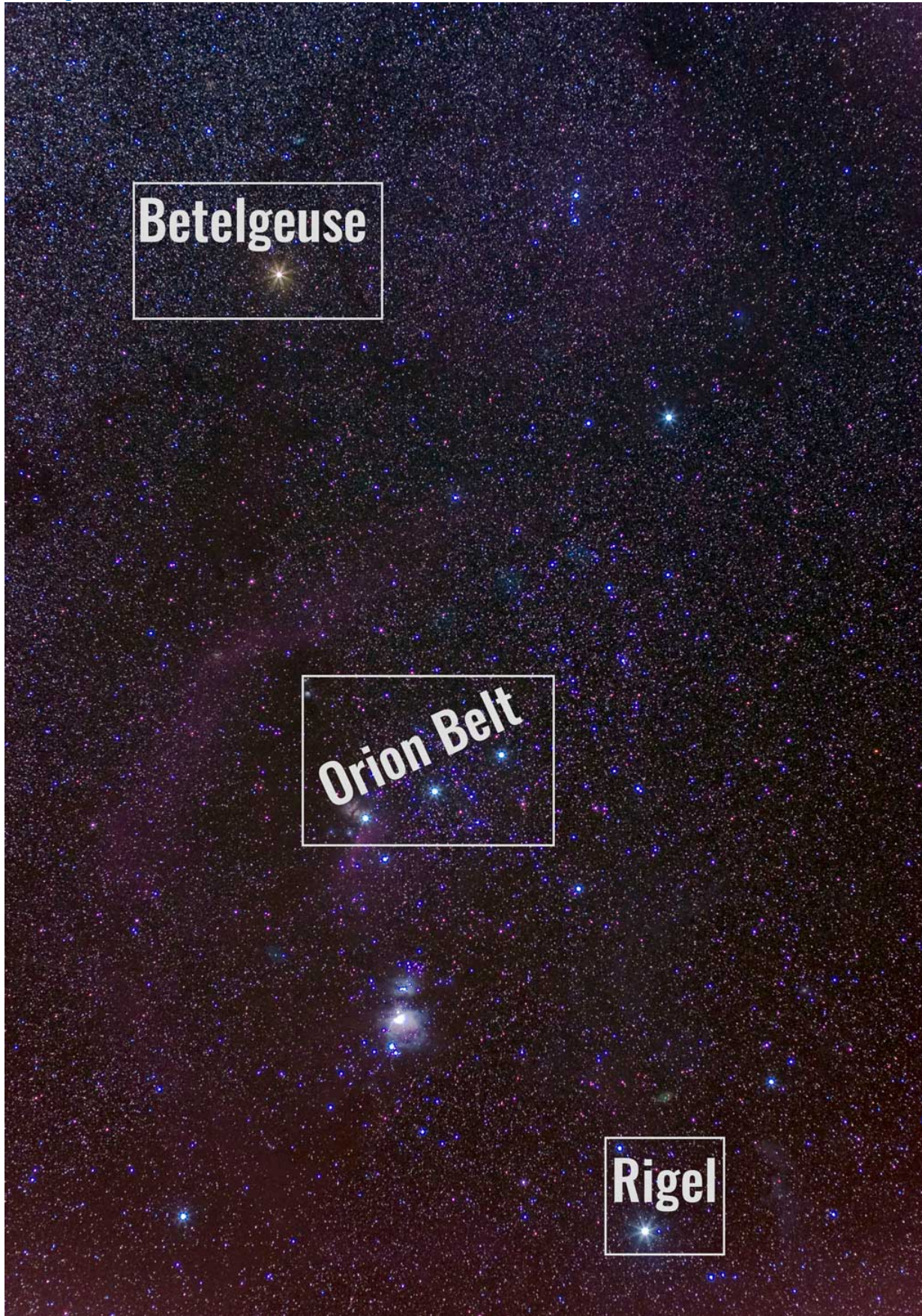


Stars – colors with spectral types. Not all of the star types are shown, such as the Red Supergiant stars. [Morgan-Keenan spectral classification](#) by LucasVB is licensed under [CC BY-SA 3.0](#)

A more-detailed form of Cannon's classification, the Morgan-Keenan classification, provides more information about each star by adding Roman numerals with the spectral types. See the table, below, for examples of stars, temperature, and color. ⁽¹⁾

Examples of Stars and Spectral Types

Spectral Type	Star Example	Temperature Range, K	Stellar Color
O	Orion Belt Stars	>30,000	Blue-Blue White
B	Rigel	10,000–30,000	Blue-White
A	Sirius	7,500–10,000	White
F	Polaris	6,000–7,500	Yellow
G	Sun	5,000–6,000	Deep Yellow
K	Arcturus	3,500–5,000	Orange
M	Betelgeuse	<3,500	Red





Orion the Hunter. Note several identified stars; Betelgeuse (red), Belt Stars (blue-blue white), and Rigel (blue-white). Orion 3008 by Florida State College at Jacksonville is licensed under [CC BY-SA 3.0](#) / A derivative from the original work

Perhaps the best constellation to view various star colors is Orion. This winter constellation includes the stars Rigel (Blue-White), Belt Stars (Blue-Blue White), and Betelgeuse (Red).

You can easily see the star colors without a telescope or binoculars, especially red Betelgeuse and the other blue stars. With a pair of binoculars, star colors become even-more obvious. Many have likened these colorful stars as celestial gems.

Albireo, also known as Beta Cygni, is a double star system in the constellation Cygnus the Swan. With the naked eye, Albireo looks like a single star. Through a small telescope or even binoculars, one can see two stars that astronomers call Albireo A and Albireo B. The obvious orange and blue stars are occasionally referred to as the “Gator Double.”



The orange and blue stars of Albireo NewAlbireo by Hewholooks is licensed under [CC BY-SA 3.0](#)

Polaris, the Pole Star in the constellation Ursa Minor (the little bear), is usually easy to find, unless you have too many streetlights around you or your horizon blocks your view to the north. Polaris is an F star, based on Annie Jump Cannon’s classification. It is a yellow star, and slightly hotter at its photosphere than our Sun. ⁽¹⁾



A star trail photograph. Polaris — a yellow star — is at the very center of the photo, indicated by the arrow. Star Trail above Beccles by Florida State College at Jacksonville is licensed under [CC BY-SA 4.0](#) / A derivative from the original work
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