

Offered Title: Big Bad Bright Wolf

They're big, massive, extremely luminous, a little scary. They are called Wolf – Rayet stars (WR).

Wolf – Rayet stars are also peculiar, well their spectra are peculiar when compared with a normal star, yeah, like the Sun. It's great to be orbiting a nice, normal star.

To refresh, a spectrum is the range of light frequencies from infrared, red, orange, yellow, green, blue, indigo, violet and ultraviolet. All but infrared and ultraviolet are made visible via refraction methods such as a prism. Most stars will have some dark lines in their spectra that represent elements in their atmospheres absorbing wavelengths of light. They might also have bright lines or bands that represent energy emission from elements. Scientists use spectra to determine the composition of a star's atmosphere.

Charles Wolf and Gorges Rayet were observing stellar spectra at the Paris Observatory in 1867 when they came upon several stars with unusual spectra. The spectra were unusual in that they had only broad, bright bands. The bands were in an area of the spectrum they could not identify with any specific element. It took about 30 years for the mysterious element to be identified. Turned out to be helium, which had been discovered in 1868!

Without going into technical talk, a star's spectrum as seen from Earth is affected by things like the star's speed and direction, if it is part of a binary or multiple star system, and if it is within a surrounding nebula. Taking these into account usually helps astronomers interpret a star's spectrum. With WR stars there's an added twist.

Now we think we have a better grip on what a Wolf – Rayet star is...sort of. They are young massive stars that have evolved rapidly, possibly from type OB stars. Some have type O companions and some of their mass could have come from the companion star. Some are associated with a planetary nebula, produced as a result of the stars fusion energy and gravitational push-pull gyrations. Each successive gyration kicks off a bunch of star material that drifts away and forms a nebula shell around the star. WR stars are extremely hot at their surface, 6-20 times the Sun's 5778 Kelvin, and their intense ultraviolet radiation causes elements like helium, nitrogen, even oxygen in the photosphere to fluoresce, causing the bright and broad emission lines. This can also interfere with the presence of absorption lines.

Wolf – Rayet stars are found throughout our galaxy and elsewhere. There are Wolf – Rayet galaxies, galaxies with so many WR stars that the galaxy presents a WR spectrum.

Funny thing about Wolf – Rayet stars, even though they are thousands of times more luminous than the Sun they are not super bright visually, because their light is mostly ultraviolet and invisible to our eyes.

What's in the Sky?

September 4-7; after sunset; south-southwest: Watch the waxing Moon each night as it travels from Scorpius into Sagittarius, meeting up with Jupiter and Saturn.