



**Eta Carinae**

# Eta Carinae's Vibrant Fireworks Show

In the 1840s, astronomers saw a star flare up to become the second brightest star in the sky for more than a decade. The star, named Eta Carinae, was so bright that mariners sailing the southern seas used it for navigation.

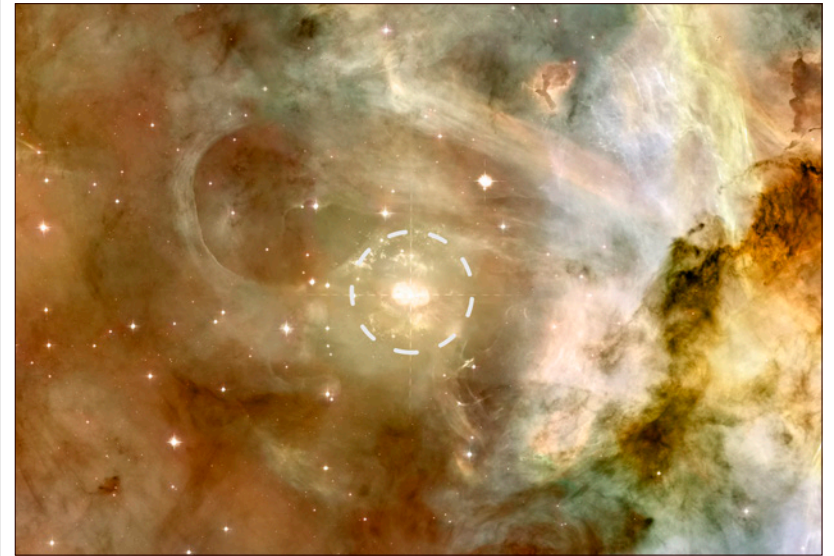
Astronomers now know that the suddenly luminous star is actually a pair of stars with a combined mass of more than 100 times that of our Sun. The brightening during the mid-1800s was a signal that the system's most massive star had undergone a titanic outburst, which astronomers call the "Great Eruption." During this violent event, the giant star ejected material into space at 1.5 million miles per hour, creating an expanding cloud of gas and dust. Some of the material formed twin bubbles of gas on opposite sides of the hefty stars.

Although Eta Carinae has faded since the Great Eruption, it is still the brightest star system in the Carina Nebula. Observations by ground- and space-based telescopes, including the Hubble Space Telescope, reveal that the stellar fireworks aren't over yet.

The Hubble image on the front of this lithograph shows Eta Carinae's hot, expanding, twin bubbles of glowing gas. The image is a blend of visible and ultraviolet light. The outer nitrogen-rich filaments are red. The blue color is the ultraviolet glow of magnesium within warm gas. The gas inside and between the twin bubbles appears white, showing that the material radiates strongly at ultraviolet and visible wavelengths. Silhouetted against the glowing lobes are filaments of dust. A cocoon of dust shrouds the system's massive star and companion from view.

The Eta Carinae system offers astronomers a unique chance to study the death throes of hefty stars because it is relatively nearby, roughly 7,500 light-years from Earth. Eta Carinae is on the brink of total destruction. While the petulant system's outbursts are powerful, its future holds something even bigger. It is destined to end its life in an even more powerful supernova explosion.

*Credit: NASA, ESA, N. Smith (University of Arizona), and J. Morse (BoldlyGo Institute)*



This image of the heart of the Carina Nebula shows the location of the massive double-star system Eta Carinae — the bright object marked by a circle. The image depicts a turbulent landscape where star birth is taking place. Young, massive stars are sculpting the nebula's gaseous clouds by unleashing powerful stellar winds (streams of charged particles) and scorching ultraviolet radiation. This mosaic image combines dozens of Hubble exposures with color information from the Cerro Tololo Inter-American Observatory in Chile.

*Hubble Image: NASA, ESA, N. Smith (University of California, Berkeley), and the Hubble Heritage Team (STScI/AURA); CTIO Image: N. Smith (University of California, Berkeley) and NOAO/AURA/NSF*

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## VOCABULARY

**Ultraviolet (UV) Light:** Electromagnetic radiation with shorter wavelengths, higher energies, and higher frequencies than visible light. UV light is lower in energy than X-rays.

**Nebula:** A cloud of gas and dust located between stars and/or surrounding stars. Nebulas are often places where stars form.

**Supernova(s):** The explosive death of a star that ejects the star's outer layers into surrounding space at high velocities.



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