



The Bubble Nebula (NGC 7635)

Hubble catches a star blowing a bubble

A super-hot, massive star is blowing an enormous bubble of material into space. In this colorful image, the Hubble Space Telescope has captured a view of the expanding shell at the core of the Bubble Nebula (NGC 7635). The image was released to mark the 26th anniversary of Hubble's launch into Earth orbit.

The star forming the bubble is 45 times more massive than our sun. The stellar powerhouse, called BD +602522, is the pinkish-white dot embedded in the bright blue bubble at its upper left in the Hubble image on the front. Gas in the outer atmosphere of the star gets so hot that it escapes away into space as a "stellar wind" moving at more than 4 million miles per hour. This outflow sweeps up the interstellar gas in front of it, forming the outer edge of the bubble much like a snowplow piles up snow in front of it as it moves forward. Astronomers calculate that the star was born with about 60 times the sun's mass and has shed one quarter of its material in this mass-loss wind.

As the surface of the bubble's shell expands outward, it pushes into denser and higher-pressure regions of gas on one side of the bubble. This imbalance makes the star appear dramatically off-center from the bubble, with its location in the 10 o'clock position in the Hubble view. Encounters with such variations in the surrounding gas also create the rippled appearance of the bubble's surface.

Dense pillars of cool hydrogen gas laced with dust appear at the upper left of the Hubble picture, and "fingers" of gas can be seen nearly face-on, behind the transparent bubble. These structures are part of the full Bubble Nebula, seen in the accompanying wider view.

The gases heated to varying temperatures are shown in different colors: blue in the image shows emission from hotter oxygen gas, while green and red combine into yellow to show the emission from warm hydrogen and nitrogen gases.

The Bubble Nebula is 7,100 light-years from Earth in the constellation Cassiopeia, and was discovered in 1787 by William Herschel, a prominent British astronomer. The signature central bubble is seven light-years wide. The star is about 4 million years old, and in 10 million to 20 million years it will likely detonate as a supernova.

Credit: NASA, ESA, and the Hubble Heritage Team (STScI/AURA)

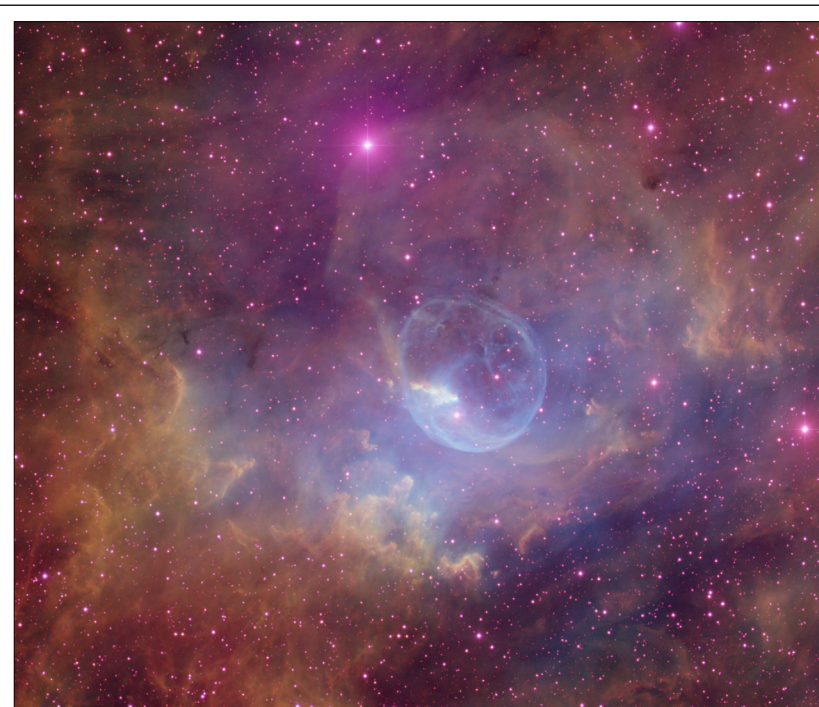
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A wide view of the nebula shows the signature bubble at the core, as well as the broad glowing region around it. Both structures derive from the bright star BD +602522. The bubble is created by a mass-loss wind, while the gas of the greater nebula is heated by the star's high-energy radiation. Gaseous pillars can be found along the wall of the nebula, and these structures point back toward the star that created them.

Credit: T.A. Rector/University of Alaska Anchorage, H. Schweiker/WIYN and NAO/AURA/NSF

VOCABULARY

Mass-loss wind: A strong stellar wind that carries away a significant amount of a star's material.

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



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