

Hubble sees a star 'inflating' a giant bubble

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This is a Hubble Space Telescope photograph of an enormous, balloon-like bubble being blown into space by a super-hot, massive star. Astronomers trained

the iconic telescope on this colorful feature, called the Bubble Nebula, or NGC 7635. Credit: NASA, ESA, and the Hubble Heritage Team (STScI/AURA), F. Summers, G. Bacon, Z. Levay, and L. Frattare (Viz 3D Team, STScI)

For the 26th birthday of NASA's Hubble Space Telescope, astronomers are highlighting a Hubble image of an enormous bubble being blown into space by a super-hot, massive star. The Hubble image of the Bubble Nebula, or NGC 7635, was chosen to mark the 26th anniversary of the launch of Hubble into Earth orbit by the STS-31 space shuttle crew on April 24, 1990

"As Hubble makes its 26th revolution around our home star, the sun, we celebrate the event with a spectacular image of a dynamic and exciting interaction of a young star with its environment. The view of the Bubble Nebula, crafted from WFC-3 images, reminds us that Hubble gives us a front row seat to the awe inspiring Universe we live in," said John Grunsfeld, Hubble astronaut and associate administrator of NASA's Science Mission Directorate at NASA Headquarters, in Washington, D.C.

The Bubble Nebula is 7 light-years across—about one-and-a-half times the distance from our sun to its nearest stellar neighbor, Alpha Centauri, and resides 7,100 light-years from Earth in the constellation Cassiopeia.

The seething star forming this nebula is 45 times more massive than our sun. Gas on the star gets so hot that it escapes away into space as a "stellar wind" moving at over 4 million miles per hour. This outflow sweeps up the cold, 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.

As the surface of the bubble's shell expands outward, it slams into dense regions of cold gas on one side of the bubble. This asymmetry makes the star appear dramatically off-center from the bubble, with its location in the 10 o'clock position in the Hubble view.

Dense pillars of cool hydrogen gas laced with dust appear at the upper left of the picture, and more "fingers" can be seen nearly face-on, behind the translucent bubble.

The gases heated to varying temperatures emit different colors: oxygen is hot enough to emit blue light in the bubble near the star, while the cooler pillars are yellow from the combined light of hydrogen and nitrogen. The pillars are similar to the iconic columns in the "Pillars of Creation" Eagle Nebula. As seen with the structures in the Eagle Nebula, the Bubble Nebula pillars are being illuminated by the strong ultraviolet radiation from the brilliant star inside the bubble.

The Bubble Nebula was discovered in 1787 by William Herschel, a prominent British astronomer. It is being formed by a proto-typical Wolf-Rayet star, BD +60°2522, an extremely bright, massive, and short-lived star that has lost most of its outer hydrogen and is now fusing helium into heavier elements. The star is about 4 million years old, and in 10 million to 20 million years, it will likely detonate as a supernova.

Hubble's Wide Field Camera 3 imaged the nebula in visible light with unprecedented clarity in February 2016. The colors correspond to blue for oxygen, green for hydrogen, and red for nitrogen. This information will help astronomers understand the geometry and dynamics of this complex system.

The Bubble Nebula is one of only a handful of astronomical objects that have been observed with several different instruments onboard Hubble. Hubble also imaged it with the Wide Field Planetary Camera (WFPC) in

September of 1992, and with Wide Field Planetary Camera 2 (WFPC2) in April of 1999.

The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency. NASA's Goddard Space Flight Center in Greenbelt, Maryland, manages the telescope. The Space Telescope Science Institute (STScI) in Baltimore, Maryland, conducts Hubble science operations. STScI is operated for NASA by the Association of Universities for Research in Astronomy in Washington, D.C.

Provided by NASA's Goddard Space Flight Center

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