



Star Cluster Westerlund 2

Celestial Fireworks Celebrate Hubble's 25th Anniversary

The glittering tapestry of young stars flaring to life in this NASA Hubble Space Telescope image resembles an exploding aerial shell in a fireworks display. The vibrant image is being released to celebrate Hubble's 25 years of exploring the heavens.

The sparkling centerpiece of Hubble's silver anniversary fireworks is a giant cluster of about 3,000 stars called Westerlund 2. The cluster resides in a raucous stellar breeding ground known as Gum 29, located 20,000 light-years away in the constellation Carina.

The stellar nursery is difficult to observe, because it is enshrouded in dust. But Hubble's Wide Field Camera 3 peered through the dusty veil in near-infrared light, giving astronomers a clearer view of the nebula. Hubble's sharp vision resolves the dense concentration of stars in the central cluster, which measures about 6 to 13 light-years across.

The giant star cluster is only about 2 million years old and contains some of our galaxy's hottest, brightest, and most massive stars known. Some of the heftiest stars are carving deep cavities in the surrounding material by unleashing a torrent of ultraviolet light and gale-force stellar winds (streams of charged particles). These are etching away the enveloping hydrogen gas cloud in which the stars were born.

The image reveals a fantasy landscape of pillars, ridges, and valleys. The pillars, composed of dense gas, are resisting erosion from the fierce radiation and powerful winds. These gaseous monoliths are a few light-years tall and point to the central cluster. They may be incubators for new stars. Other dense regions surround the pillars, including reddish-brown filaments of dense gas and dust.

Besides sculpting the gaseous terrain, the brilliant stars can also help create a successive generation of offspring. When the stellar winds hit dense walls of gas, they create shocks, which may be generating a new wave of star birth along the wall of the cavity.

The red dots scattered throughout the landscape are a rich population of newly forming stars that are still wrapped in their gas-and-dust cocoons. These tiny, faint stars are between 1 million and 2 million years old and have not yet ignited the hydrogen in their cores to shine as stars. But Hubble's near-infrared vision allows astronomers to identify these fledgling stars. The brilliant blue stars seen throughout the image are mostly foreground stars.

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Thousands of bright, sparkling stars inhabit the recently formed star cluster Westerlund 2 at the center of the nebula.

Credits: NASA, ESA, the Hubble Heritage Team (STScI/AURA), A. Nota (ESA/STScI), and the Westerlund 2 Science Team

Because the cluster is very young, it has not had time to disperse, which occurs over time for these so-called open clusters. Astronomers can study this cluster within its star-birthing environment to gather information on how it formed.

Westerlund 2 is named for Swedish astronomer Bengt Westerlund, who discovered the grouping in the 1960s.

VOCABULARY

Star cluster: A group of stars born at almost the same time and place, capable of remaining together for billions of years because of their mutual gravitational attraction.

You can get images and other information about the Hubble Space Telescope on our website, <http://hubblesite.org/>

The corresponding classroom activity for this lithograph can be found at: <http://amazing-space.stsci.edu/eds/tools/type/pictures.php> or may be obtained by contacting the Office of Public Outreach at the Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218.

