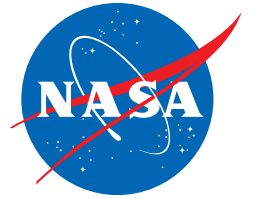


The Orion Nebula (M42)

National Aeronautics and
Space Administration



A Close-up View of Star Birth on a Grand Scale

This dramatic image from the Hubble Space Telescope offers a detailed view inside the vast Orion Nebula (M42) — a nearby, turbulent, star-forming region. More than 3,000 stars appear in this image alone.

The nebula is a picture book of star formation, allowing astronomers to study stars of all types and sizes in one location. The stars in this stellar nursery are all about 2 million years old, which may seem ancient on a human scale but is young on a cosmic one. They are sculpting a rugged dust-and-gas landscape of valleys, ridges, and plateaus that is reminiscent of the Grand Canyon.

The bright central area is home to four of the heftiest stars in the nebula. This grouping is called the Trapezium because the stars appear in a trapezoidal pattern. Ultraviolet light and strong stellar winds (streams of charged particles) released by these massive stars are carving out a cavity in the nebula's central region. Many medium-sized stars are surrounded by dark disks of dust and gas in which planetary systems can form. These large complexes are the building blocks of solar systems. Our very own solar system formed out of such a disk 4.5 billion years ago.

The image also reveals an abundance of much smaller bodies called brown dwarfs. These gaseous objects are larger than planets, but are not massive enough to sustain hydrogen fusion in their cores. Because the Orion Nebula is relatively close to Earth, astronomers can use Hubble to take a census of these faint, cool objects to determine how many of them develop in star-forming regions.

The bright glow at upper left is from M43, a small region being shaped and illuminated by a flood of ultraviolet light from a massive, young star.

The Orion Nebula represents a typical star-forming environment that is only 1,400 light-years away in our 100,000-light-year-wide Milky Way galaxy. This proximity makes it the perfect laboratory for astronomers to study how stars are born and develop over time.

Credit: NASA, ESA, M. Robberto (Space Telescope Science Institute/ESA) and the Hubble Space Telescope Orion Treasury Project Team

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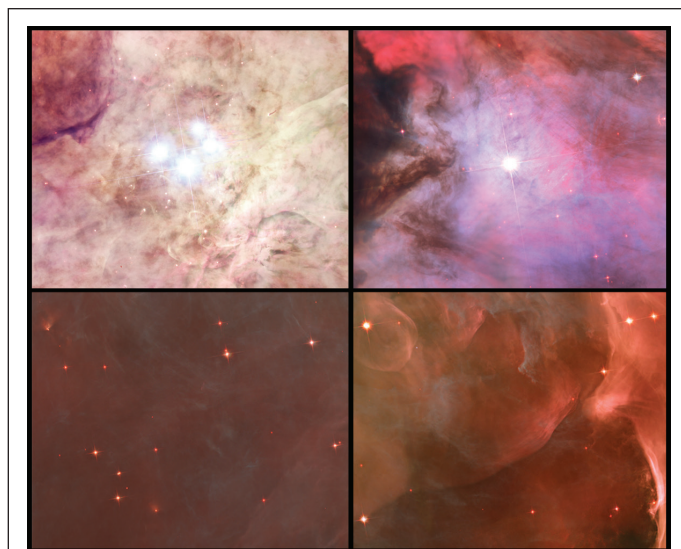
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These four close-up images of the Orion Nebula reveal some of the region's most interesting features.

[Top left] Packed into the center of this region are the bright lights of the Trapezium stars, four of the heftiest stars in the Orion Nebula. Ultraviolet light unleashed by these stars is carving a cavity in the nebula and may be disrupting the growth of hundreds of smaller stars.

[Top right] A massive star is illuminating this small region, called M43, and sculpting the landscape of dust and gas. Astronomers call the area a miniature Orion Nebula because of its small size and the single star that is shaping it. *[Lower left]* The faint red objects seen here are some of the many brown dwarfs that Hubble uncovered in the nebula. *[Lower right]* This glowing region reveals arcs and bubbles formed when stellar winds ejected by the Trapezium stars collide with surrounding gas and dust.

VOCABULARY

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

Brown dwarf: An object that is too massive and hot to be classified as a planet, but too small and cool to shine like a star.



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