Stunning Webb Images Show Clearest Look at Cosmos Ever

By: Sarah Gleim | Jul 12, 2022

This side-by-side comparison shows observations of the Southern Ring Nebula in near-infrared light, at left, and mid-infrared light, at right, from NASA's Webb Telescope. SPACE TELESCOPE SCIENCE INSTITUTE/NASA, ESA, CSA, STSCI, WEBB ERO

On Dec. 25, 2021, the James Webb Space Telescope launched into space. The telescope spent about a month working on critical engineering tasks before its 21-foot (6.5-meter) gold-coated primary mirror successfully unfolded. That was the final stage of all the major duties before it could prepare for its science operations. Now finally, after months of anticipation, eager astronomers, space geeks and just about anyone who has

an interest in humankind is finally getting a glimpse of what all the buildup has been about. And it's been well worth the wait.

In an early morning news conference July 12, NASA released the first images in their full-color, extraordinary glory. And, as expected, they provide an unprecedented, detailed look at the universe.

Hold your breath. The stunning images are below.

Editor's note: HowStuffWorks did not crop the photos that follow to our usual site dimensions.

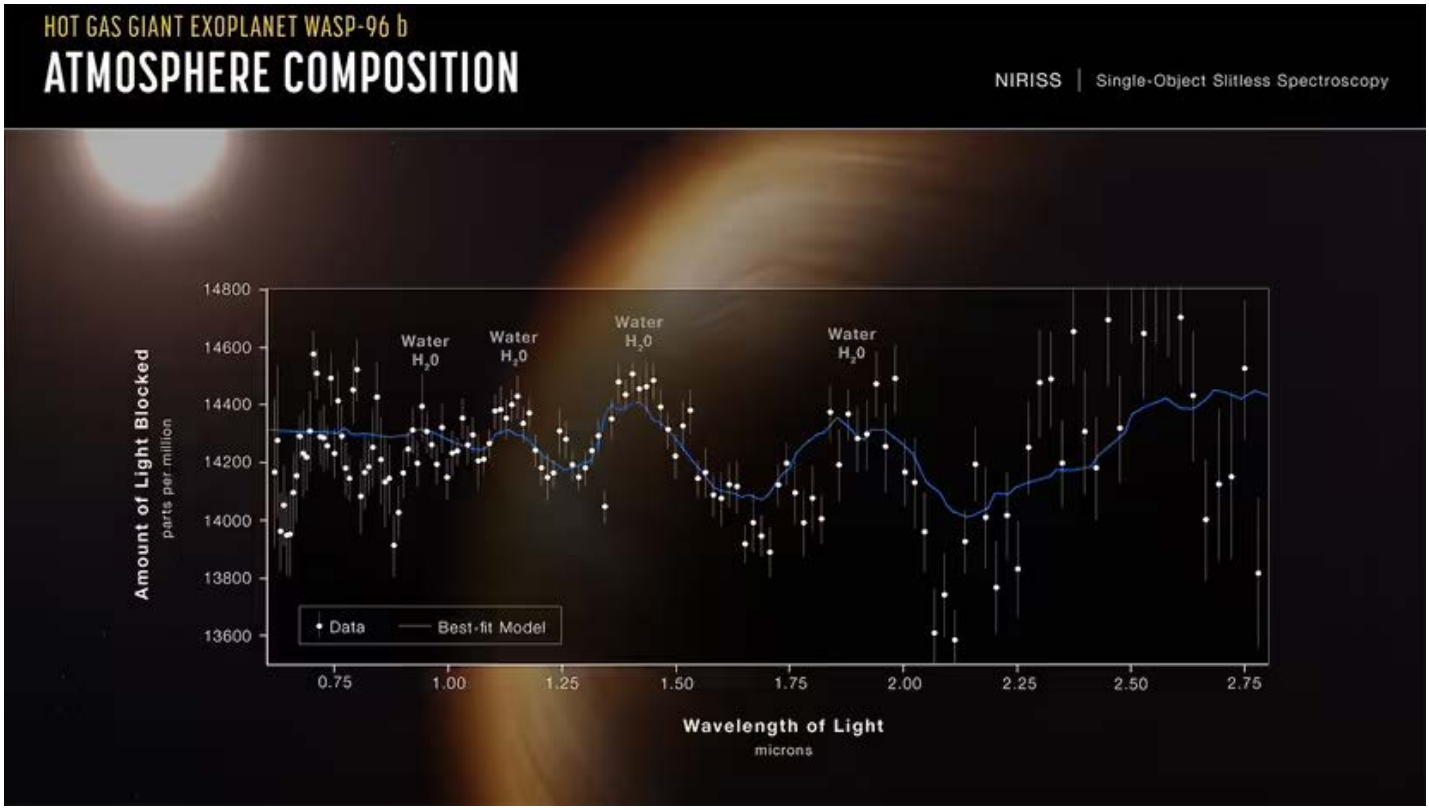
Carina Nebula

The Carina Nebula is located approximately 7,600 light-years away in the southern constellation Carina. It was first photographed by NASA's Hubble Space Telescope in July 2009, and has been photographed by Hubble several times, including in infrared. Nebulae are stellar nurseries where stars form, and the Carina Nebula is home to many massive stars, several times larger than the sun.

The "Cosmic Cliffs" seen here showcase Webb's capabilities to peer through obscuring dust and shed new light on how stars form. This landscape of "mountains" and "valleys" is actually the edge of a nearby stellar nursery called NGC 3324 at the northwest corner of the Carina Nebula.
SPACE TELESCOPE SCIENCE INSTITUTE/NASA, ESA, CSA, STSCI, WEBB ERO

WASP-96 b (Spectrum)

One of the tasks of Webb is to photograph exoplanets, or those outside of our solar system. WASP-96 b is one those. It's a gas giant exoplanet outside of the Milky Way solar system that was discovered in 2014. It's about 1,150 light-years from Earth and it orbits its star every 3.4 days. It's about half the mass of Jupiter, and this illustration of WASP-96 b and its star is based on new understanding of the planet gleaned from both NIRISS spectroscopy and previous ground- and space-based observations.



A transmission spectrum made from a single observation using Webb's Near-Infrared Imager and Slitless Spectrograph (NIRISS) reveals atmospheric characteristics of the hot gas giant exoplanet WASP-96 b.
NASA, ESA, CSA, STSCI

Southern Ring Nebula

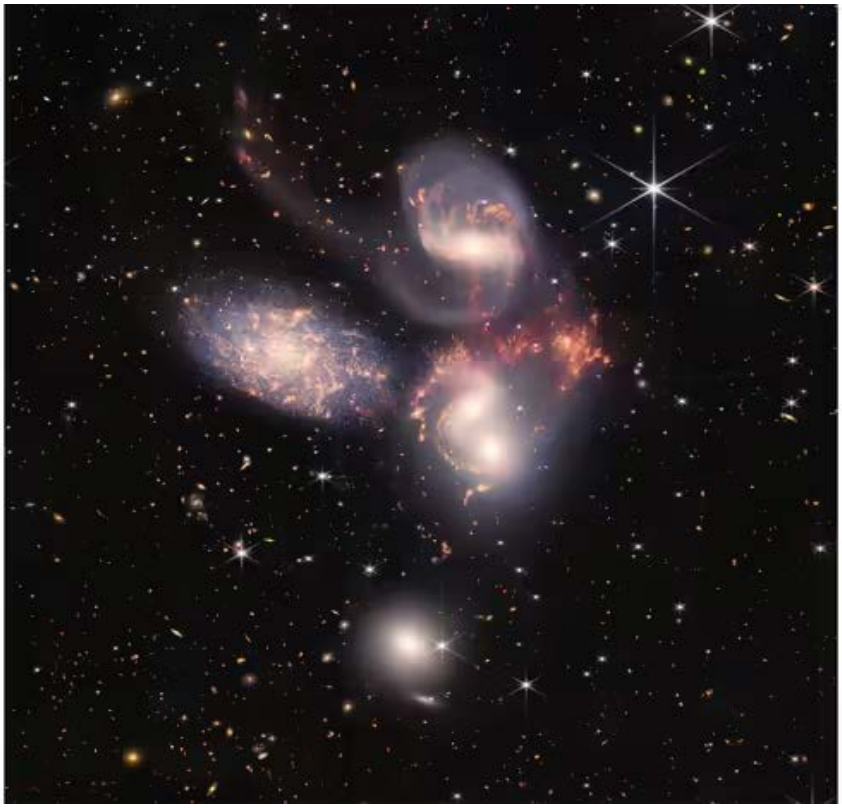
The "Southern Ring," or "Eight-Burst" nebula, was first photographed by Hubble in 1998. It's a stunning look at a binary star that is dying. The bright central star changed the shape of this planetary nebula's rings with turbulence. There are actually two stars locked in a tight orbit, which causes the dimmer star to eject material in many directions as they orbit one another, resulting in these jagged rings. This nebula is huge — it's nearly half a light-year in diameter and is located about 2,000 light-years away from Earth. Look closely at the upper left of the image for a bright angled line and you'll see a galaxy edge-on, or from the side.

The bright star at the center of this image is NGC 3132. It plays a supporting role in sculpting the surrounding nebula. A second star, barely visible at the lower left, is the nebula's source. It has ejected at least eight layers of gas and dust over thousands of years.
SPACE TELESCOPE SCIENCE INSTITUTE/NASA, ESA, CSA, STSCI, WEBB ERO

Stephan's Quintet

Webb also has been tasked to look much farther into the distance. Stephan's Quintet is far from Earth — very far. It's located in the constellation Pegasus about 290 million light-years away. So what is it exactly? It's a grouping of five massive galaxies first seen by French astronomer Édouard Jean-Marie Stephan in 1877. It is the first compact group of

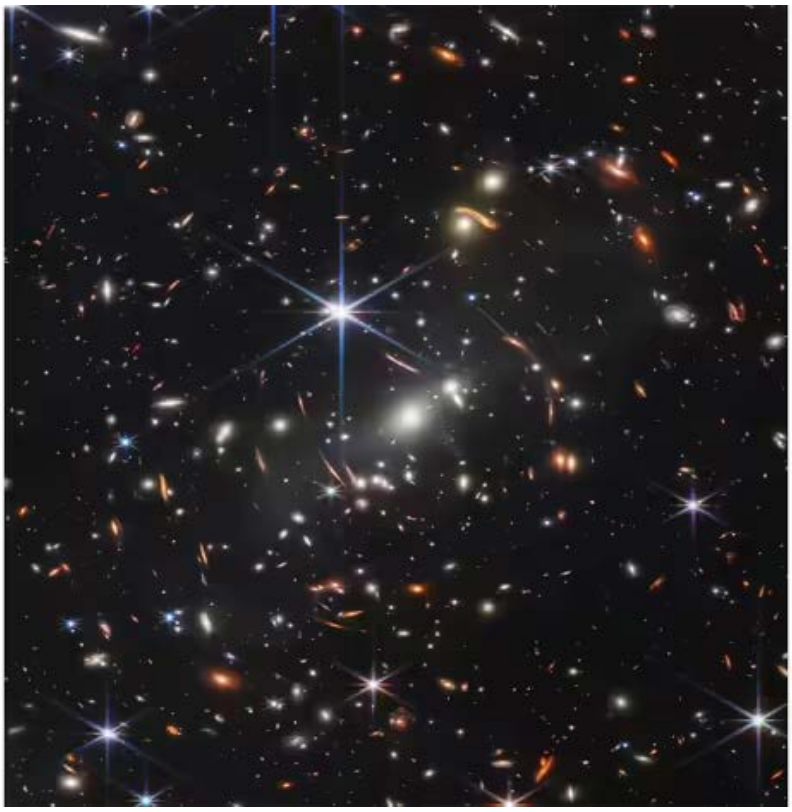
galaxies ever found. Scientists rarely see interacting galaxies like these in so much detail. These images will help them learn how galaxies trigger star formation in each other, and how the gas in these galaxies is being disturbed.



Webb's image of Stephan's Quintet shows never-before-seen details of the galaxy group. The image shows outflows driven by a supermassive black hole in one of the group's galaxies. Tight galaxy groups like this may have been more common in the early universe when superheated, infalling material may have fueled very energetic black holes.
SPACE TELESCOPE SCIENCE INSTITUTE/NASA, ESA, CSA, STSCI, WEBB ERO

SMACS 0723

This image is of the galaxy cluster SMACS 0723 as it appeared 4.6 billion years ago. It's known as Webb's first deep field image and includes the faintest objects ever seen in space. It covers an area of space about the size of a grain of sand, though it includes thousands of galaxies. Webb achieved this deep field image using its Near-Infrared Camera (NIRCam), which took composites of images at different wavelengths over 12.5 hours and created one photo. Two of Webb's instruments also gathered spectra — data that reveal objects' physical and chemical properties. The data revealed light from one galaxy that traveled for 13.1 billion years before Webb's mirrors captured it.



Galaxy cluster SMACS 0723 includes a group of galaxies bending and warping the light from more distant galaxies. Webb's near- and mid-infrared imaging will allow future researchers to finely catalog the precise compositions of galaxies in the early universe, which may ultimately reshape our understanding of how galaxies changed and evolved over billions of years.
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Now That's Cool

If you want to track exactly where the James Webb Telescope is, NASA has a Where Is Webb page online that gives its exact coordinates in space. It also includes links to the most recent images and what and where Webb is targeting to photograph next.