Webb telescope captures colorful Cartwheel Galaxy

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This image of the Cartwheel and its companion galaxies is a composite from Webb's Near-Infrared Camera (NIRCam) and Mid-Infrared Instrument (MIRI), which reveals details that are difficult to see in the individual images alone. This galaxy formed as the result of a high-speed collision that occurred about 400 million years ago. The Cartwheel is composed of two rings, a bright inner ring and a colorful outer ring. Both rings expand outward from the center of the collision like shockwaves. However, despite the impact, much of the character of the large, spiral galaxy that existed before the collision remains, including its

rotating arms. This leads to the “spokes” that inspired the name of the Cartwheel Galaxy, which are the bright red streaks seen between the inner and outer rings. These brilliant red hues, located not only throughout the Cartwheel, but also the companion spiral galaxy at the top left, are caused by glowing, hydrocarbon-rich dust. In this near- and mid-infrared composite image, MIRI data are colored red while NIRCam data are colored blue, orange, and yellow. Amidst the red swirls of dust, there are many individual blue dots, which represent individual stars or pockets of star formation. NIRCam also defines the difference between the older star populations and dense dust in the core and the younger star populations outside of it. Credit: NASA, ESA, CSA, STScI, Webb ERO Production Team

The James Webb Space Telescope has peered through time and huge amounts of dust to capture a new image of the Cartwheel Galaxy, revealing the spinning ring of color in unprecedented clarity, NASA and the European Space Agency said Tuesday.

Located around 500 million light-years from Earth in the constellation Sculptor, the Cartwheel gained its shape during a spectacular head-on collision between two galaxies.

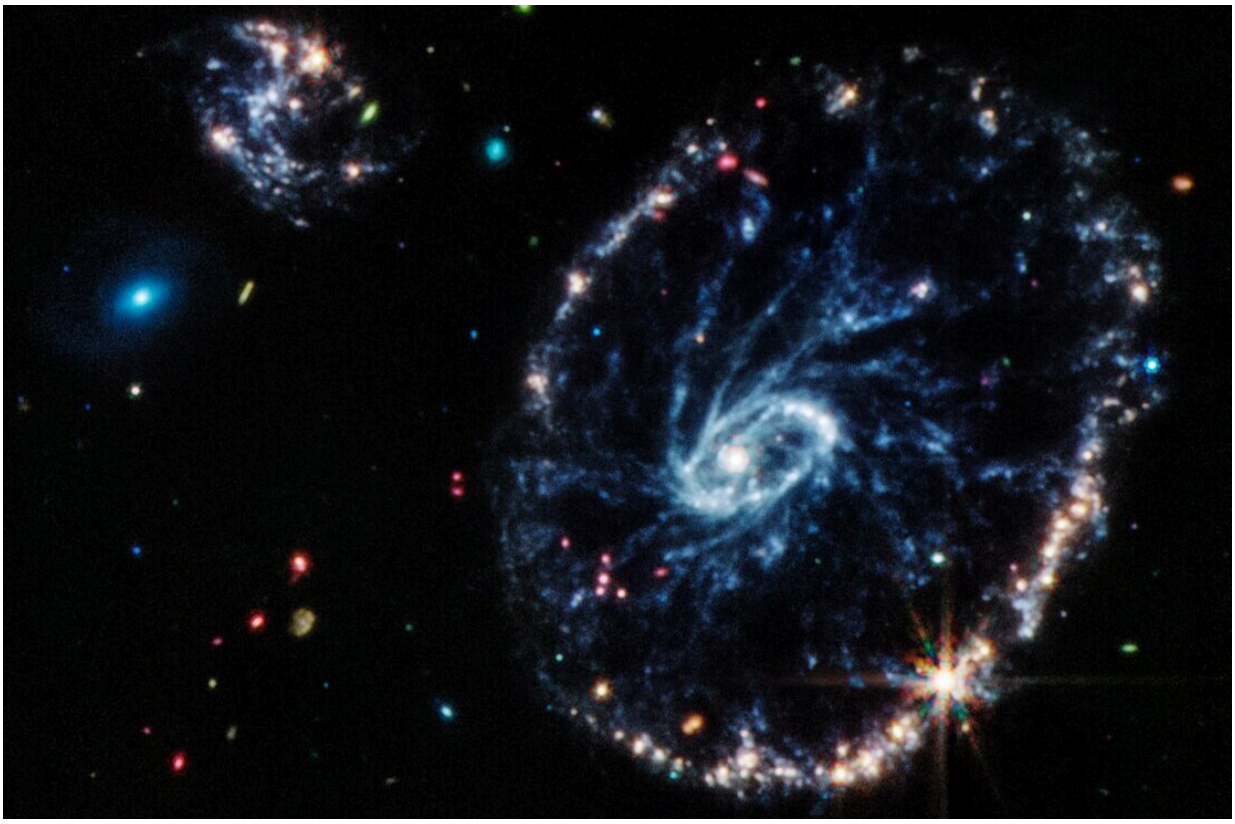
The impact sent two rings expanding from the galaxy's center, "like ripples in a pond after a stone is tossed into it", NASA and the ESA said in a joint statement.

A smaller white ring remains closer to the galaxy's center, while the outer ring, with its spokes of color, has been expanding into the universe for around 440 million years, the statement added.

As the outer ring expands it runs into gas, sparking the formation of new stars.

The Hubble telescope had previously captured images of the rare ring

galaxy, which is believed to have been a spiral galaxy like our own Milky Way before it was hit by a smaller intruder galaxy.



This image from Webb's Mid-Infrared Instrument (MIRI) shows a group of galaxies, including a large distorted ring-shaped galaxy known as the Cartwheel. The Cartwheel Galaxy, located 500 million light-years away in the Sculptor constellation, is composed of a bright inner ring and an active outer ring. While this outer ring has a lot of star formation, the dusty area in between reveals many stars and star clusters. Credit: NASA, ESA, CSA, STScI, Webb ERO Production Team

But the Webb telescope, which launched in December 2021 and revealed its first images to global fanfare last month, has a far greater

reach.

Webb's ability to detect infrared light allowed it to see through the "tremendous amount of hot dust" obscuring the view of the Cartwheel Galaxy, NASA and the ESA said.

This revealed new details about star formation in the galaxy, as well as the behavior of the supermassive black hole at its heart, they said.

It was also able to detect regions rich in hydrocarbons and other chemicals, as well as dust that is similar to dust on Earth.

Behind the Cartwheel, two smaller galaxies shine brightly, while even more galaxies can be seen behind them.

The observations show that the Cartwheel Galaxy is still in "very transitory stage", the space agencies said.

"While Webb gives us a snapshot of the current state of the Cartwheel, it also provides insight into what happened to this galaxy in the past and how it will evolve in the future."

More information: NASA: www.nasa.gov/feature/goddard/2 … the-cartwheel-galaxy