

New Scientist

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OUR UNDERSTANDING
OF THE UNIVERSE**

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JWST spots cosmic cartwheel...

Stunning galaxy has ripples made of stars and gas

Leah Crane

ONE of the strangest galaxies in the universe has been captured by the James Webb Space Telescope. The details of the Cartwheel galaxy are obscured by dust, but the new images peer through to reveal it in more detail than ever before.

The Cartwheel galaxy is about 500 million light years away and measures about 150,000 light years across. Researchers believe that it was a spiral galaxy similar to the Milky Way before one of its companion galaxies crashed through, sending waves of stars and gas rippling out from the centre, creating its nested ring shapes.

The inner ring is made mostly of hot, bright dust, along with some huge clusters of young stars. The outer ring is just as dynamic if not even more so – as it expands outward, it smashes through the gas surrounding the galaxy and triggers bursts of star formation, which light up the surrounding dust. ■



NASA, ESA, CSA, STSCI, WEBBERO PRODUCTION TEAM

...and two galaxies smashing together

THE James Webb Space Telescope (JWST) has also caught two galaxies colliding. In the midst of this cosmic clash, researchers have found something unexpected – there doesn't seem to be an active supermassive black hole in either galaxy.

The pair of galaxies, called IC 1623 or VV 114, is about 275 million light years away in the direction of the constellation Cetus. Lee Armus at the California Institute of Technology and his colleagues observed them with JWST as part of a campaign to spot four relatively nearby, bright galaxy mergers and figure out how they work.

“A merger brings dramatic

changes to the galaxy's shape and content and pretty much everything, so we really have to understand this process to figure out how galaxies evolve,” says Vivian U at the University of California, Irvine, part of the team conducting this research.

As two galaxies orbit one another and collide, they rip huge streams of material off one another and create massive shock waves that pass through both galaxies. Both of these processes are occurring in the red splotches in this image, right, which are star-forming regions shrouded in dust. They were most likely spurred into activity by the shock waves.

Nearly every massive galaxy has a supermassive black hole at its centre, and researchers expect the black holes in merging galaxies to be relatively active, devouring gas

IC 1623 is a pair of galaxies 275 million light years away



NASA/ESA/CSA/STSCI/R. COLOMBARI

from their surroundings and emitting huge amounts of radiation in the process. But when U and her colleagues began analysing the data from IC 1623, they found no sign of active black holes.

“These mergers typically rile things up and cause these black holes to get a lot of gas and then they're excited and things get interesting, but we don't see that here,” says Armus. “It may be that we have to look a little harder – they don't always stand up and wave.” A supermassive black hole or two may simply be unexpectedly inactive or hidden deep within the colliding galaxies. ■

Leah Crane