

New Scientist

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CHRISTMAS & NEW YEAR SPECIAL

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Astronomy

The year's best space images

Stargazers and space telescopes stunned us with a wealth of wonders

Leah Crane

THE James Webb Space Telescope (JWST) has helped make 2023 a year of astonishing cosmic images. But the groundbreaking telescope was far from the only source of visual wonderment, because a series of new missions sent back pictures from space (including India's Chandrayaan-3 project, see page 20), and the view from Earth wasn't bad either. Here are four of the images that dazzled us the most.

The star in the main picture, right, was caught by JWST getting ready to explode. It is called WR 124 and is about 30 times the mass of the sun.

When stars that big run out of hydrogen to burn in their core, they begin to fuse heavier elements instead. This fusion creates powerful blasts of energy, blowing out gusts of wind at velocities in the millions of kilometres per hour. When those powerful winds strip away the outer layers of the star, it becomes what is known as a Wolf-Rayet star.

Within a few million years of being stripped, it blows up in a supernova. The purplish blotches in this picture are the clouds of dust and gas that used to be WR 124's outer layers – it has already lost about 10 times the mass of the sun – and without those layers intact, it is now doomed to go supernova.

Next up, we have the tallest solar tornado ever recorded (bottom row, near right). The event occurred on 14 March, when the rotation of the sun's magnetic fields churned up the plasma near its north pole. This feature rose from the sun's surface until the giant flare reached 178,000 kilometres tall – that is nearly 14 times the diameter of Earth.

This image was the result of a painstaking collaboration between astrophotographers Jason Guenzel and Andrew McCarthy. They used a high-speed camera to record the

event, and took five days and 90,000 individual shots to create their picture. The sun looks furry in the image because it is covered in millions of churning geysers of plasma that last only a few minutes each.

The image to the right of the seething sun reveals a newborn star's incredible supersonic jets. These make it what is known as a Herbig-Haro object. The star itself is hidden in the dark cloud of gas from which it formed, but as the jets shoot out on either side of it, they slam into surrounding gas and dust, creating huge shock waves and lighting up.

This particular object, called Herbig-Haro 211, is about 1000 light years from Earth in the constellation Perseus. That makes it one of the nearest Herbig-Haro objects we know of, which is why JWST was able to capture the most detailed image of one ever taken. This revealed strange wiggles in the jets, which may indicate that Herbig-Haro 211 actually has a companion star.

Our final image (bottom row, far right) shows the comet Nishimura, seen from Earth as it streaked across the night sky.

Two rare green comets made dramatic appearances in the skies this year. First, in early February, the comet C/2022 E3 made its first close pass to Earth in 50,000 years. Then, in August, amateur astronomer Hideo Nishimura discovered another comet – now named after him – which remained visible for about two months. These comets appear green because the gas around their rocky nuclei contains diatomic carbon, which is a relatively rare substance made of pairs of bound carbon atoms.

Make the most of the image of Nishimura now because the comet takes about 437 years to orbit the sun, so won't be seen again until the 25th century. ■

Right: Wolf-Rayet star WR 124 as glimpsed by JWST

Bottom left: A solar tornado seen from Earth

Bottom middle: Newborn star Herbig-Haro 211, captured by JWST

Bottom right: An amateur astronomer's view of comet Nishimura

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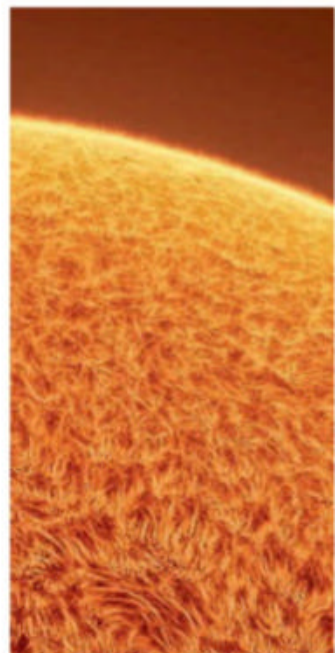
The height of the solar flare (near right) in kilometres

1000

Distance in light years to Herbig-Haro 211 (centre right)

437

Number of years comet Nishimura (far right) takes to orbit the sun





CLOCKWISE FROM TOP: NASA, ESA, CSA, STSCI AND ERO PRODUCTION TEAM; JAVIER ZAYAS/MOMENT RFIGE TTY IMAGES; NASA, ESA, CSA, TOM RAY (DUBLIN); ANDREW MCCARTHY AND JASON GUENZEL

