

BBC THE TOP NIGHT-SKY SIGHTS TO SEE IN 2024



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Sky at Night

THE UK'S BEST-SELLING ASTRONOMY MAGAZINE

Crash of the TITANS

Galaxy collisions wreak colossal carnage – so why does life in the Universe depend on them?

**COMET
KUSHIDA**

When to get the best
telescope views of
this celestial
visitor

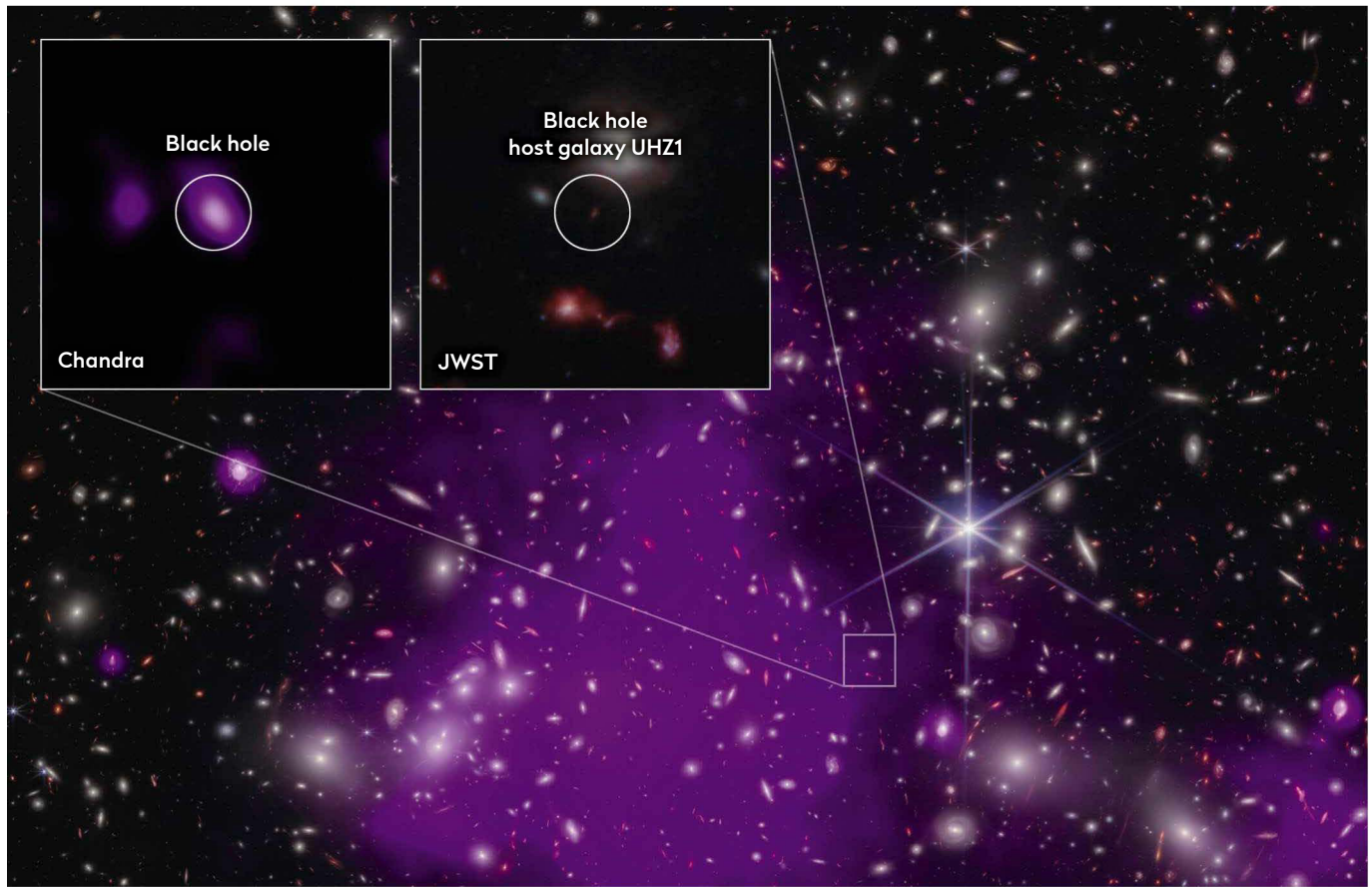
**A BEGINNER'S GUIDE
TO ASTRO CAMERAS**

**SPACE SCIENCE & CREWED
MISSION LAUNCHES IN 2024**

**AMATEUR ASTRONOMER
FINDS LOST SUPERNOVA**

**THE DEMON STAR: THE MYTH
OF ALGOL EXPLAINED**

**ASKAR'S 2-IN-1 IMAGING
TELESCOPE TESTED**



▲ Galaxy UHZ1's black hole is a giant for one 13.2 billion lightyears away, when the Universe was only 3 per cent of its current age

Record-breaking black hole discovered

As the earliest black hole seen in X-rays, it could reveal how these mammoths grow so large

NASA's Chandra X-ray Observatory and the James Webb Space Telescope (JWST) have revealed the most distant black hole ever seen with X-rays. Dating from just 470 million years after the Big Bang, the find gives strong weight to the theory that supermassive black holes start their lives large in size, rather than growing over time.

The black hole, located in the galaxy UHZ1, was initially found in the infrared by JWST, with later observations from Chandra finding strong X-ray emissions.

"We needed Webb to find this remarkably distant galaxy and Chandra to find its supermassive black hole," says Akos Bogdan from the Center for Astrophysics, Harvard and Smithsonian, who led the study. "We also took advantage of a cosmic magnifying glass that boosted the amount of light we detected."

This magnification was an effect known as gravitational lensing. The light from UHZ1 was bent by the gravity of a galaxy cluster closer to Earth. This magnifies the image, similar to if the light had passed through a lens, and allowed Chandra to detect the galaxy's X-ray emission. This showed the presence of superheated gas – a tell-tale sign that a supermassive black hole lies at the centre.

Such early black holes are a boon for those seeking to answer one of cosmology's biggest questions: how did supermassive black holes grow so large? The two leading theories are that they either began as small black holes, 10 to 100 times the size of our Sun, or they were born already weighing 10,000 to 100,000 solar masses.

UHZ1's black hole seems to be 10 to 100

million solar masses, around the same mass as all the stars in the galaxy where it lives, combined. For comparison, nearby supermassive black holes are only 0.1 per cent the mass of their host galaxy's stars.

UHZ1 could be an example of an 'Outsize Black Hole', an idea first proposed by Priyamvada Natarajan from Yale University in 2017, whereby supermassive black holes form directly from the collapse of a huge cloud of gas.

"We think that this is the first detection of an 'Outsize Black Hole' and the best evidence yet obtained that some black holes form from massive clouds of gas," says Natarajan. "For the first time we are seeing a brief stage where a supermassive black hole weighs about as much as the stars in its galaxy, before it falls behind."

chandra.si.edu