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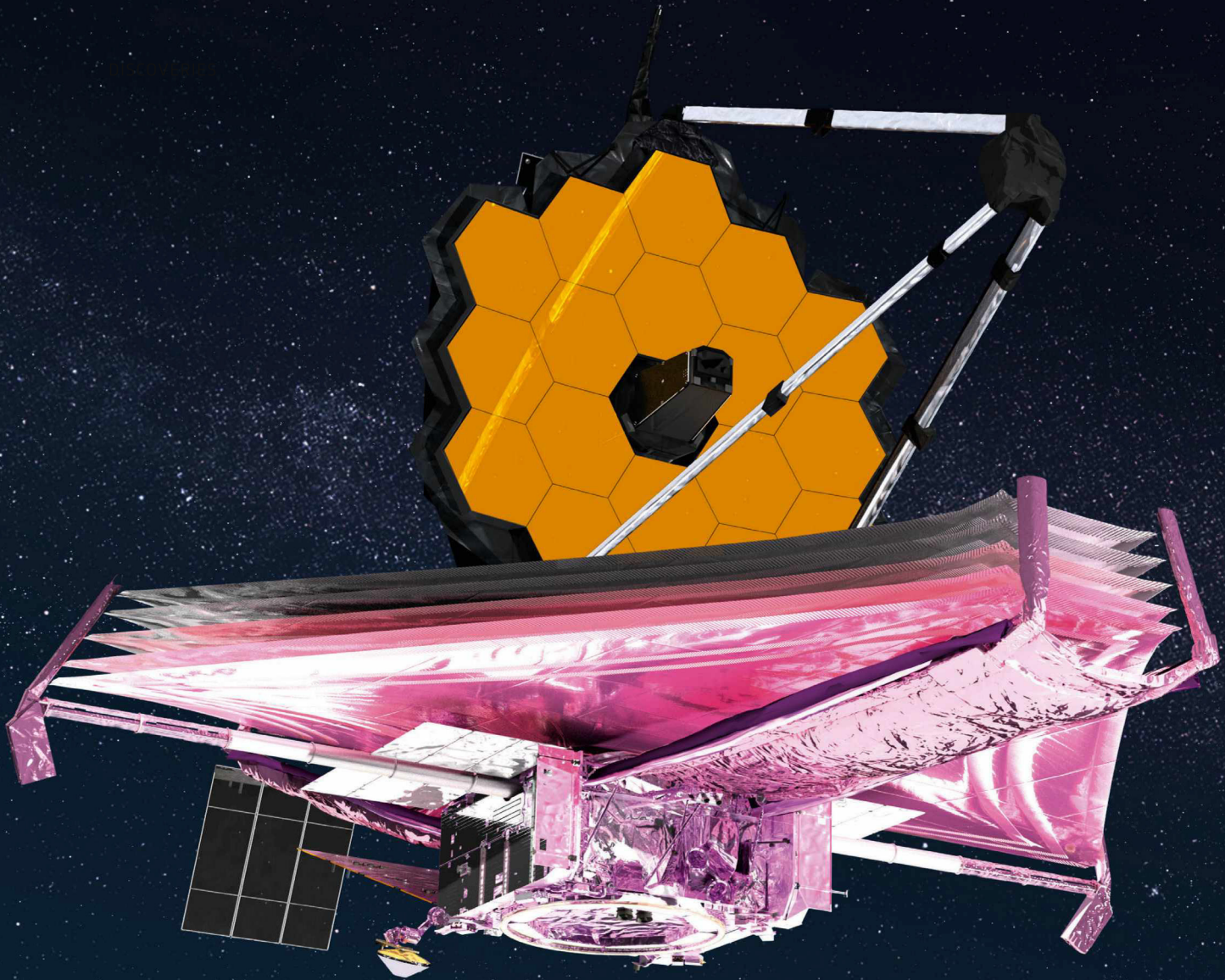
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SPACE

THE JWST HAS UNEARTHED EVIDENCE OF ANCIENT GALAXIES THAT SHOULDN'T EXIST

The presence of such massive galaxies lurking in the early Universe contradicts current cosmological models

An international team of astrophysicists have found six candidate galaxies hiding in data from the James Webb Space Telescope (JWST) that are so old and massive they can't be explained by current cosmological models.

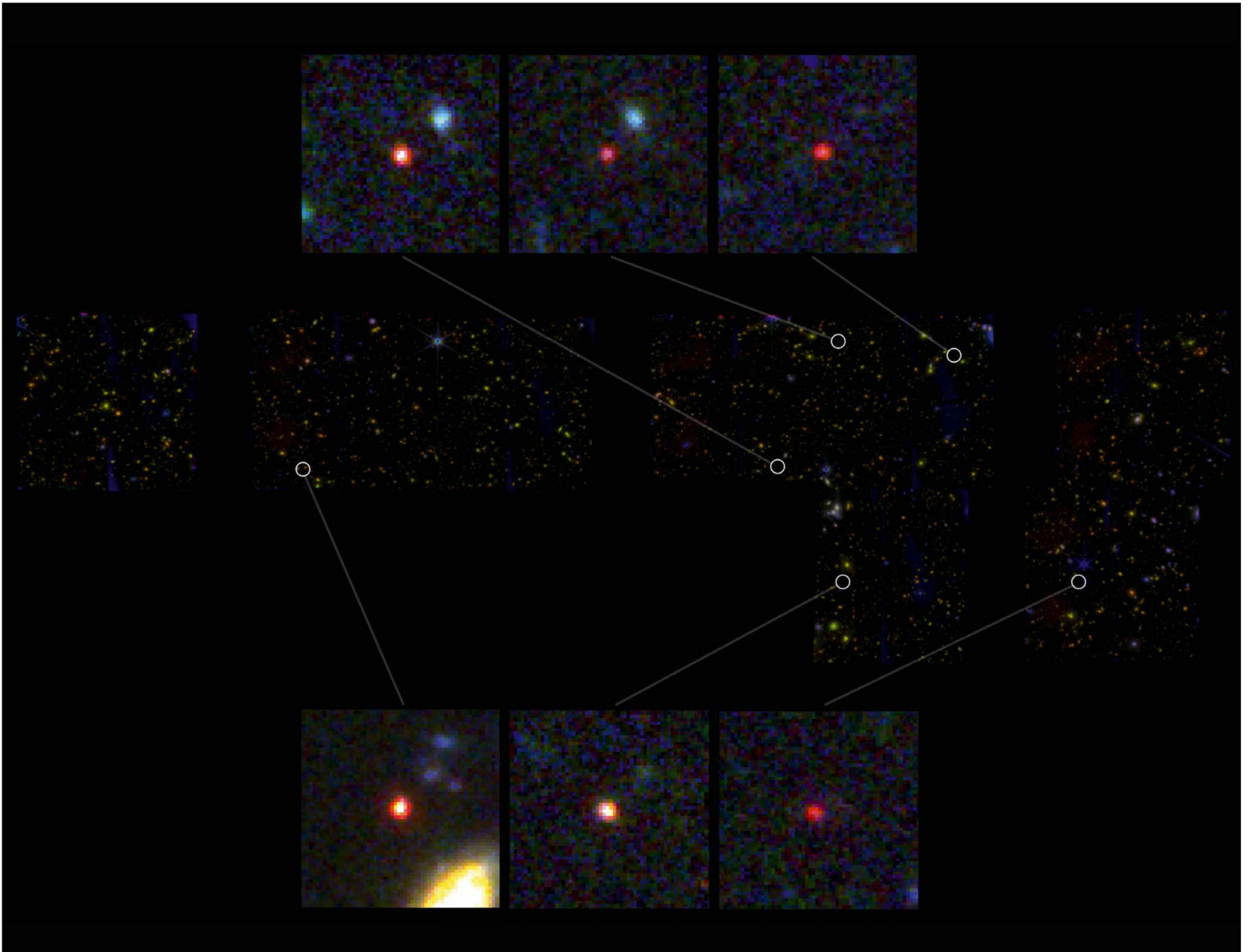
The galaxies are thought to date back to around 500 million years after the Big Bang, more than 13 billion years ago. According to current cosmological models, galaxies at this point in time should be in their infancy and be made up of only a few stars.

However, all six of the newly discovered candidate galaxies are gigantic and contain a similar number of stars to the modern-day Milky Way.

"It's bananas," said co-researcher Erica Nelson, assistant professor of astrophysics at the University of Colorado Boulder. "You just don't expect the early Universe to be able to organise itself that quickly. These galaxies should not have had time to form."

The team discovered the candidate galaxies among images released by the JWST's recent Cosmic Evolution

ABOVE The James Webb Space Telescope, as seen in this artist's impression, is studying objects too old, distant or faint for Hubble to detect



“It’s bananas. You don’t expect the early Universe to organise itself that quickly”

Early Release Science (CEERS) survey – one of the telescope’s initial run that saw it peering deep into a patch of sky near to the famous Plough asterism.

Nelson was poring over the images when a few unusual fuzzy dots caught her eye. The dots were red, an indication that they were from old sources of light. This is due to the expansion of the Universe stretching out the light emitted from celestial objects, increasing their wavelengths and making them appear more red.

ABOVE Images of the six candidate galaxies, seen 500-800 million years after the Big Bang. The one on the bottom left could contain as many stars as the Milky Way, but is 30 times more compact

After running a number of calculations, the researchers dated the candidate galaxies back to just over 13 billion years ago and determined that they were home to tens to hundreds of billions of Sun-sized stars’ worth of mass. This means that they would’ve had to form stars at an astonishing rate due to their short lives.

“The Milky Way forms about one to two new stars every year,” said Nelson. “Some of these galaxies would have to be forming hundreds of new stars a year for the entire history of the Universe.”

The researchers now intend to further study the mysterious cosmic objects using the JWST in order to confirm or disprove that they date so far back in time and contain as many stars as their preliminary observations suggest. However, these initial results offer a tantalising taste of how the JWST could already be rewriting astronomy textbooks, they say.

“If even one of these galaxies is real, it will push against the limits of our understanding of cosmology,” said Nelson.