Astronomers release spectacular survey of the distant Universe

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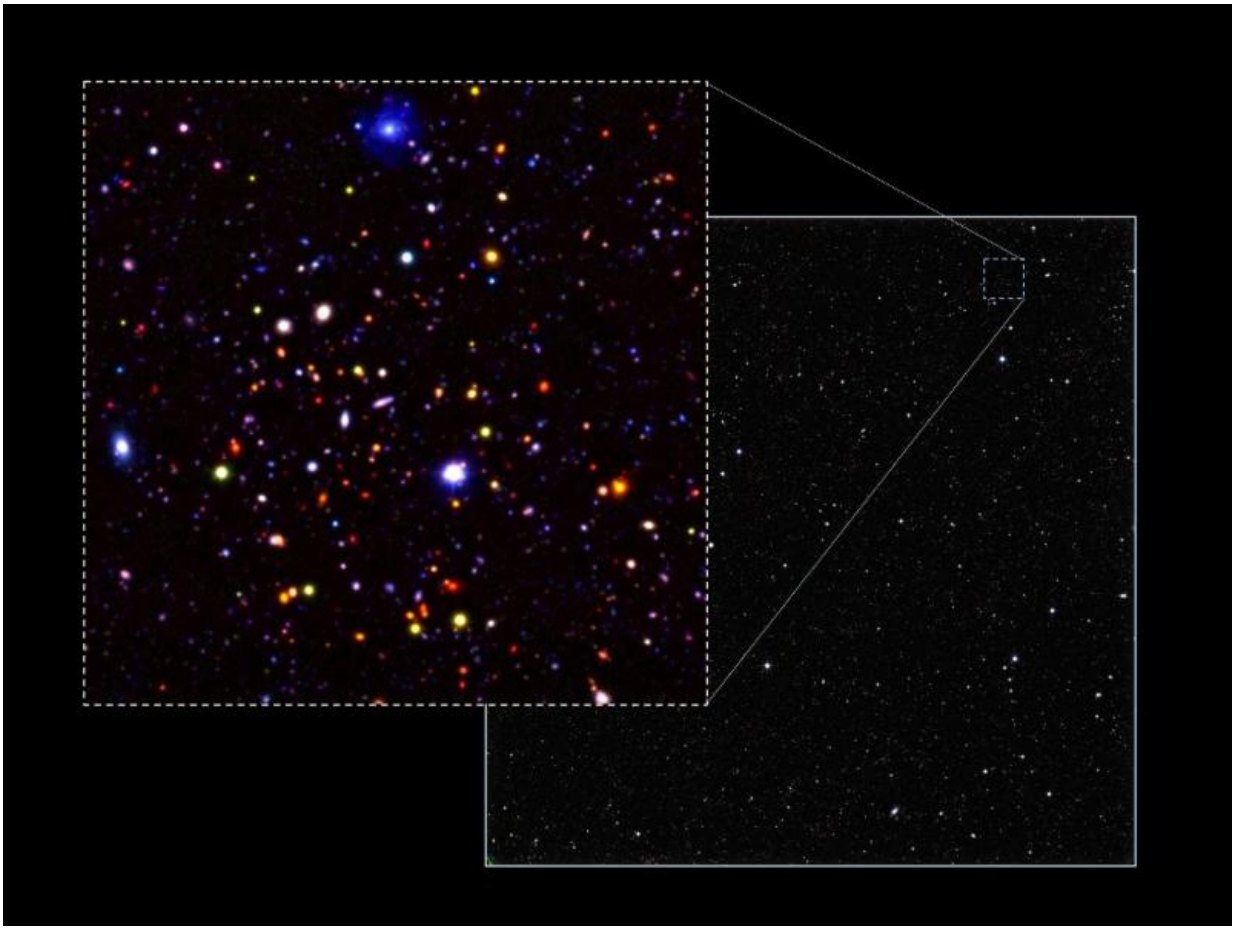

An image of a small section (0.4%) of the UDS field. Most of the objects in the image are very distant galaxies, observed as they were over 9 billion years ago. In the full image, 250,000 galaxies have been detected over an area of sky four times the size of the full Moon. Credit: Omar Almaini, University of Nottingham

Astronomers today (28 June) released spectacular new infrared images of the distant Universe, providing the deepest view ever obtained over a large area of sky. The team, led by Prof Omar Almaini, present their results at the National Astronomy Meeting at the University of Nottingham.

The final data release from the Ultra-Deep Survey (UDS) maps an area four times the size of the full Moon to unprecedented depth. Over 250,000 galaxies have been detected, including several hundred observed within the first billion years after the Big Bang. Astronomers around the world will use the new images to study the early stages of galaxy formation and evolution.

The release of the final UDS images represents the culmination of a project that began taking data in 2005. The scientists used the United Kingdom Infrared Telescope (UKIRT) on Hawaii to observe the same patch of sky repeatedly, building up more than 1000 hours of exposure time. Observing in the infrared is vital for studying very distant objects, as ordinary starlight is "redshifted" to longer wavelengths due to the cosmological expansion of the Universe.

Because of the finite speed of light, the most distant galaxies are also observed very far back in time.

"With the UDS we can study distant galaxies in large numbers, and observe how they evolved at different stages in the history of the Universe. We see most of the galaxies in our image as they were billions of years before the Earth was formed", said Almaini.

The UDS is the deepest of 5 projects, collectively known as the UKIRT Infrared Deep Sky Survey (UKIDSS).

Earlier releases of data from the UDS have already produced a wide

range of scientific advances, including studies of the earliest galaxies in the first billion years after the Big Bang, measurements of the build-up of galaxies through cosmic time, and studies of the large-scale distribution of galaxies to weigh the mysterious 'dark matter' that pervades the cosmos. The added depth from the new release is expected to produce many new breakthroughs.

"We are particularly keen to understand the dramatic transformation that many massive galaxies underwent around 10 billion years ago", said Dr William Hartley, a postdoctoral researcher at University College London. "At that time many galaxies appear to have abruptly stopped forming stars, and they also changed shape to form spheroidal-looking galaxies. We still don't fully understand why this happens. With our new UDS images we expect to find large numbers of these galaxies, caught in the act of transformation, so we can study them in detail to solve this important puzzle."

Provided by Royal Astronomical Society

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