

# New Galaxy proves there is More to The Universe than meets the EMF Eye Is there a limit or is there INFINITY



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IS ALL THAT THERE IS.**



All scientific instruments tend to have limits beyond which if pushed do not deliver required results. The Hubble Space Telescope has one such limit, the Nature of Light. The speed of light is 10 to the 10<sup>th</sup> power meters per second. So the light we see from this new galaxy was made over 13.5 billion years ago. This is more than any before.

## **But it is a mistake to assume that all we can see is all that there is.**

Recently, astronomers decided to push the space telescope right to the edge of its limits and little beyond and this eventually helped them measure distance to the farthest galaxy yet. GN-z11 is the galaxy in question whose distance Hubble has measured and according to authors of the study it is at 13.5 billions years from us and one of the earliest known galaxies which was born some 400 million years after the Big Bang. But there is no proof that beyond this proposed galaxy there is nothing.

## **It is a mistake to assume that all we can see is all that there is.**

According to authors of the study published in the Astrophysical Journal, Hubble's Wide Field Camera 3 was used to calculate the distance at which the galaxy is from us. The distance was measured spectroscopically by splitting the light into its component colors and because of the technique used, they are pretty confident about the accuracy of their measurements.

This is not the earliest time that the distance of GN-z11 has been measured. Prior to this study its distance from us was calculated by analyzing the colors of the galaxy in images taken by both the Hubble Space Telescope and the Spitzer Space Telescope. At the time, astronomers said that the galaxy was nearer. However, the spectroscopic observations in the latest study reveal that's not the case and in fact the galaxy is much farther away – right at the limit of Hubble's capabilities.

The study authors remark that even though GN-z11 is faint, it is unusually bright for a cosmic object at this distance. The findings of the study and the distance measured have been packed as a major step back in time and have measured distance to a galaxy when the Universe was just three per cent of its current age.

### **The Red Shift**

Measuring cosmic distances involve measuring the redshift of the object in question and it is based on the Doppler effect. The phenomenon is a result of the expansion of the Universe;

every distant object in the Universe appears to be retreating from us and as a result its light is stretched to longer, redder wavelengths.

Before astronomers determined the distance to GN-z11, the most distant measured galaxy, EGSY8p7, had a redshift of 8.68. Now, the team has confirmed GN-z11's distance to be at a redshift of 11.1, which corresponds to 400 million years after the Big Bang.

"The previous record-holder was seen in the middle of the epoch when starlight from primordial galaxies was beginning to heat and lift a fog of cold, hydrogen gas," explains co-author Rychard Bouwens from the University of Leiden, the Netherlands. "This transitional period is known as the re-ionization era. GN-z11 is observed 150 million years earlier, near the very beginning of this transition in the evolution of the Universe."

The combination of observations taken by Hubble and Spitzer revealed that the infant galaxy is 25 times smaller than the Milky Way and has just one percent of our galaxy's mass in stars. However, the number of stars in the newborn GN-z11 is growing fast: The galaxy is forming stars at a rate about 20 times greater than the Milky Way does today. This high star formation rate makes the remote galaxy bright enough for Hubble to see and to perform detailed observations.

However, the discovery also raises many new questions as the existence of such a bright and large galaxy is not predicted by theory. "It's amazing that a galaxy so massive existed only 200 million to 300 million years after the very first stars started to form. It takes really fast growth, producing stars at a huge rate, to have formed a galaxy that is a billion solar masses so soon," explains Garth Illingworth of the University of California, Santa Cruz.

Marijn Franx, a member of the team from the University of Leiden highlights: "The discovery of GN-z11 was a great surprise to us, as our earlier work had suggested that such bright galaxies should not exist so early in the Universe." His colleague Ivo Labbe adds: "The discovery of GN-z11 showed us that our knowledge about the early Universe is still very restricted. How GN-z11 was created remains somewhat of a mystery for now. Probably we are seeing the first generations of stars forming around black holes?"

These findings provide a tantalizing preview of the observations that the James Webb Space Telescope will perform. "This new discovery shows that JWST will surely find many such young galaxies reaching back to when the first galaxies were forming," concludes Illingworth.

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**Perhaps this new discovery will make scientists wake up and set infinity as the default setting for the universe.**

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