**Astronomers have found a galaxy far, far away and from very long time ago**

By Associated Press, adapted by Newsela staff

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WASHINGTON, D.C. — Astronomers say they have discovered a bright galaxy filled with stars. It is farther away and older than any galaxy seen before. A galaxy is a large group of stars. The just-discovered galaxy dates from a time when the universe was a mere toddler, only about 400 million years old.

The astronomers used the Hubble Space Telescope to find the galaxy, which they named GN-z11. The galaxy is about 13.4 billion light-years away, said a study published Thursday. A light-year is about 5.8 trillion miles. Since stars and galaxies are so far away, their distance is measured in light-years. To put it another way, it took 13.4 billion years for the light of this galaxy to reach us.

Astronomers thought it would be impossible to find such a distant galaxy with the Hubble.

**Long Before Buzz Lightyear-** The new galaxy shatters all records for distance and time. Until a new space telescope is launched, it may be the farthest galaxy that can be seen, the astronomers said.

Astronomers were able to capture a photo of this galaxy. It looks dark red and fuzzy. Actually, though, the galaxy is so hot it is colored bright blue. The light has traveled so long and far that it has stretched so it looks dark red. The fuzziness hides an incredibly high number of stars. New stars are forming in the galaxy 10 times faster than our Milky Way galaxy, said study co-author Gabriel Brammer. He is an astronomer at the Space Telescope Science Institute.

"It really is star-bursting," Brammer said. "We're getting closer and closer to when we think the first stars formed."

**Back Through Space And Time -** Brammer added, "There's not a lot of actual time between this galaxy and the Big Bang." The huge explosion that many scientists say created the universe is called the Big Bang. It took place about 13.8 billion years ago. GN-z11 was formed 400 million years after.

If we traveled back in time near this galaxy, we would see "blue, stunning, really bright young stars," said study co-author Garth Illingworth. He is with the University of California, Santa Cruz. All around us would be "very messy-looking objects," which would be new galaxies. Usually, galaxies look like neat spirals.

Light is made up of all the colors on the spectrum. Astronomers measure the distance of an object by calculating how much the light changes from blue to red. It is called redshift. The newly discovered galaxy has a redshift of 11.1. Until this galaxy was discovered, the highest redshift was 8.68. That galaxy was formed about 580 million years after the Big Bang. For a long time, astronomers were just trying to reach a redshift of 9, about 550 million years after the Big Bang. The new discovery blew all that out of the water and surprised the team that found it, said Pascal Oesch of Yale University. He was the leader of the study.

**Aren't You A Little Short For A Stormtrooper?-** Astronomer Richard Ellis is with the European Southern Observatory. He found what used to be the farthest galaxy. He has doubts about the new discovery. Oesch's team used a new method for measuring distance. Ellis said this new method is not exact and they may have gotten the new galaxy mixed up with other galaxies or stars. To be able to see GN-z11 so clearly, it would have to be three times brighter than other galaxies, he said.

Oesch said the team was as careful as possible.

Do not expect to find new galaxies any time soon, Oesch, Brammer and Illingworth said. Hubble has been pushed to its limit. Astronomers will be able to see a greater distance only when the next NASA space telescope is launched, probably in 2019. NASA is the United State's space agency.

Harvard University astronomer Dimitar Sasselov called the discovery exciting and interesting. "Seeing and understanding the first galaxies and the first stars" shows us how the world began, he said.