Distant galaxy holds key ingredients for life, astronomers report

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Astronomers from Arecibo Observatory radio telescope in Arecibo, Puerto Rico, have detected for the first time the molecules methanimine and hydrogen cyanide -- two ingredients that build life-forming amino acids -- in a galaxy some 250 million light years away.

When combined with water, the molecules form glycene, the simplest amino acid and a building block of life on Earth.

The astronomy team, led by Arecibo astronomer Christopher Salter, announced the discovery Jan. 11 in a poster presented at the American Astronomical Society meeting in Austin, Texas.

The Arecibo astronomers focused on the distant galaxy Arp 220, an ultra-luminous starburst galaxy, because it forms new stars at a very high rate. They used the 305-meter, or 1,000-foot diameter, Arecibo radio telescope, the world's largest and most sensitive, to observe the galaxy at different frequencies. The observations, made in April 2007, were the first use of the 800 megahertz wide-band mode of the telescope's main spectrometer.

The molecules were found by searching for radio emission at specific frequencies. Each chemical substance has its own unique radio frequency, much like people have unique fingerprints.

"We weren't targeting any particular molecule, so we didn't know what we were going to find -- we just started searching, and what we found
was incredibly exciting," said Tapasi Ghosh, an Arecibo astronomer.

"The fact that we can observe these substances at such a vast distance means that there are huge amounts of them in Arp 220," said Emmanuel Momjian, a former Arecibo astronomer, now at the National Radio Astronomy Observatory in Socorro, N.M. "It is indeed very intriguing to find that the ingredients of life appear in large quantities where new stars and planets are born."

In addition to Salter, Momjian and Ghosh, the other researchers included Arecibo astronomers Robert Minchin and Mikael Lerner; Barbara Catinella, a former Arecibo astronomer now at the Max Plank Institute for Astrophysics in Germany; and Mayra Lebron, a former Arecibo astronomer now at the University of Puerto Rico.

Source: Cornell University

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