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HUGE CLUSTER OF GALAXIES SUGGESTED BY U-2 EXPERIMENTS

Using data obtained from high-flying NASA aircraft, scientists believe they may have discovered the largest cluster of galaxies -- groups of hundreds of millions of stars -- ever known.

And if the indirect evidence is correct, the existence of the suspected supercluster goes back to the beginning of the universe.

This evidence for the supercluster comes from analysis of measurements from NASA U-2 aircraft of the cosmic microwave background radiation left over from the Big Bang*.

*The primordial explosion which many scientists believe began our universe.

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In 1978, a NASA-University of California at Berkeley team used the instrumented aircraft operated by NASA's Ames Research Center, Mountain View, Calif., to survey remnants of such radiation in the entire Northern Hemisphere sky. A similar survey of the Southern Hemisphere has just been completed.

The University of California scientists used this U-2 data to conclude that the Milky Way Galaxy -- of which we are a part -- is hurtling toward the constellation Virgo at more than a million miles an hour. This speed, which is much faster than expected, is attributed to the pull of the supercluster around Virgo.

Astronomers believe the supercluster contains 30 to 40 percent more galaxies than normally found in the same volume of space, and that it may stretch across some 2 billion light years of space.

When compared to the 10 billion-light-year-diameter of the observable universe, the supercluster would encompass 1 percent of the volume of it.

Dr. George Smoot of the University of California noted that not enough time has passed since the Big Bang for such a supercluster to have formed. This means that such a gigantic concentration of mass could go back to the beginning of the universe.

The surveys by NASA aircraft suggest that the event which started the universe about 15 billion years ago was extremely regular; that is, a powerful but tightly controlled expansion with matter moving outward in all directions at an equal rate.

Now comes the possibility of the supercluster and, "if we have one such huge concentration of matter," says Smoot, "there are probably others."

This implies that at the time of its formation, the universe was "lumpy" -- that the primordial fireball itself was lumpy instead of being extremely smooth as measurements by the same researchers and others such as Ranier Weiss of the Massachusetts Institute of Technology and David Wilkinson of Princeton University had previously suggested.

The work of other astronomers has contributed to the suspicion of "something unusual in this part of the sky," Smoot said. X-ray astronomy studies by A.C. Fabian, Cambridge University, and R.S. Warwick, University of Leicester, have found indications of a large-scale structure in the direction of Virgo. J.A. Tyson and J.F. Jarvis of Bell Laboratories have made automated counts of faint galaxies on long-exposure photographic plates and have found evidence of a northern supercluster of galaxies -- far more than in any other part of the sky surveyed.

- 4 -

Scientists are surprised at the evidence for a cluster billions of light years in diameter. Said Smoot: "It boggles the mind that such a structure could exist -- a big fraction of the observable universe."

Apparently there is only one such collection of mass relatively close to us. Others, however, may be found at great distances. Despite the possible existence of the average, to be evenly distributed.

Smoot is somewhat disappointed that the finding could disrupt the pattern of a completely uniform Big Bang because a uniform universe history fits very well with recent work on subatomic particles.

"It is a paradox," he said, "that the universe is so uniform, but yet it appears to contain non-uniform structures on very close to the largest possible scale."

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Note To Editors: This report is also being released by the University of California.