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Discovery.com NEWS

January 16, 2001 SEARCH



A Practice Take Off

Balloon Captures Space Microwaves

By Larry O'Hanlon, Discovery.com News

Jan. 16, 2001

—Scientists report that there is a balloon wearing a top hat sailing 38 kilometers over Antarctica and no, it's not an over-dressed UFO. The balloon is the latest and oddest-looking attempt by scientists to hone their measurements of the afterglow of the very early universe.

Unlike past balloon experiments that scanned the southern skies for the faint cosmic microwave background radiation from the universe's infancy, the TopHat experiment, as it is being called, has a spinning telescope mounted on top of the balloon instead of below.

The arrangement may look strange, but it's a far easier way to see the sky, says TopHat scientist Ed Cheng of NASA's Goddard Space Flight Center.

"All of the other balloon experiments used telescopes that hung underneath the balloon in the traditional gondola position," says Cheng. "With (those) configurations, the observation strategy is to look out 'sideways' with the telescope and scan distinct pieces of the sky."

That means they had to contend with stray light reflected off the balloon and the gondola supports. It took a lot of work to minimize these effects, he says.

TopHat avoids the problems altogether. One result is that scientists probably will be able to see finer details in the "clumpiness" of matter and energy in the early universe — a key to understanding the nature of the Big Bang, how much matter there is in the universe and how the universe is expanding.

The TopHat experiment is also the first chance to confirm or upset an earlier balloon experiment called Boomerang, which found there was matter enough in the early universe to make the universe "flat." That is, there was not so much matter that its gravity would cause the universe to collapse back in on itself in a Big Crunch.

The microwave measurements TopHat is collecting are from a time when the universe was just 300,000 years old, before stars or galaxies had a chance to form. The balloon experiments are each a step closer to the use

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of satellites to measure and accurately map the glow from the early universe, says University of Chicago cosmologist Michael Turner.

"We're all very excited every time there is a new experiment," he says

The TopHat balloon was launched from McMurdo Station, Antarctica, on Jan. 4 and is expected to circle the frozen continent for a couple of weeks. It will take about a year to analyze the data from the experiment.

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Picture: NASA |

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