Satellite Searches for Big Bang

by Heidi Kriz

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Is the Big Bang theory really a dud? Scientists will soon launch a new tool to help determine the origins of the universe -- a satellite telescope.

On 20 May, a team of scientists at Johns Hopkins University will launch a new telescope-enabled satellite named FUSE (Far Ultraviolet Spectroscopic Explorer) from Cape Canaveral, Florida.

The beckoning brightness of far-flung stars and planets has always teased cosmologists, looking for answers to the galaxy's beginnings. Analyses of celestial bodies led to the Big Bang theory over 70 years ago, still considered the primary hypothesis for explaining the birth of the universe.

"There are some big questions that we are trying to answer," said Kenneth Sembach, a research scientist working on the project. "Are our current assumptions about how the origins of the universe correct? And how did galaxies evolve?"

The FUSE telescope earns its name from its ability to dramatically extend astronomy?s observational reach into the study of ultraviolet wavelengths. By doing so, scientists hope to test the basic models of cosmic construction and try to answer some of the questions at the heart of the theory.

Scientists hope the telescope's refined technology will enable them to engage in the equivalent of an archeological dig at the first few minutes of creation.

In this case, the "fossil" they will be looking for is the presence of a hydrogen isotope -- deuterium -- believed to have been produced in huge amounts primarily during the early moments of the Big Bang.

"We believe that stars, in the course of their

creation, destroy deuterium when hydrogen converts to helium," said William Blair, an astronomer at Johns Hopkins who is also working on the project. "So the amount of deuterium that exists in the galaxy, and the universe, has been steadily diminishing since the beginning of time.

"We plan to look at hundreds of stars and look for a pattern in the level of deuterium abundance in different regions of the Milky Way." That way, said Blair, they hope to be able to "look back" into time and imagine the Big Bang.

With this new tool, scientists hope to contribute to one of the three biggest pieces of the puzzle believed to form an accurate picture of the Big Bang: the relative abundance of simple elements and isotopes in the universe; the measurement of the temperature of the cosmic microwave background; and the expansion rate of the universe.

The FUSE project almost didn?t happen. In 1994, after having already spent US$20 million dollars funding the Johns Hopkins project, NASA underwent a series of seismic budget cuts, and announced they were defusing FUSE.

But project leader Warren Moos -- in a true expression of NASA head Dan Goldin?s "better, faster, cheaper," space projects -- approached NASA with a counteroffer: They could carry on and complete the project for a third of the original budget.

And complete it they did, at a cost of $100 million dollars, instead of $350 million.

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