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Nobel-winning scientists explain Big Bang theory at Museum of the Rockies

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By GAIL SCHONTZLER, Chronicle Staff Writer | 19 comments

Super-star scientists gathered Sunday night in Bozeman at the Museum of the Rockies, where four Nobel laureates talked about what physicists have figured out about the Big Bang creation of the universe and the mysteries still waiting to be solved.

A starry-eyed audience of about 250 listened intently if not always comprehendingly to a two-hour panel discussion between Nobel Prize winners Bob Wilson, Murray Gell-Mann, Dick Taylor and Sheldon Glashow.

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They were introduced by Jack Horner, the museum's famed paleontologist, who brought the scientists to Bozeman in conjunction with Adventures of the Mind, an annual summer event that brings about 150 bright high school students to meet inspiring high-achievers.

"I dig around in dirt" to study dinosaurs, Horner said, while the four panelists study things that are "incomprehensively big, incomprehensively old."

in 1965 when they were trying to set up a new antenna for Bell Labs in New Jersey. They kept getting background noise they couldn't get rid of or explain. Trying to eliminate the noise, they even cleaned pigeon droppings off the antenna.

Finally they figured out it must be cosmic microwave background radiation, something the Big Bang theory predicted would be left over after a giant explosion created the



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universe nearly 14 billion years ago. Their work provided evidence that the Big Bang theory was right, said panel moderate Lisa Randall, a Harvard physicist.

A lot has changed since 1915, when Albert Einstein thought the universe was static and infinite, Wilson said. But Einstein realized his blunder after Edwin Hubble, an astronomer working in Pasadena, Calif., discovered in the 1920s not only that the universe is made up of many galaxies besides our own Milky Way, but also that the galaxies are moving away from us. That meant the universe is expanding.

The idea that the universe has been expanding since a giant, super-hot explosion billions of years ago was derisively called the Big Bang theory. The name stuck, Wilson said.

As scientists measured the expanding universe, they were surprised to find that instead of being slowed by gravity, the expansion rate is increasing.

Scientists can't really explain why yet. They've come up with new theories - that most of the universe is made up of stuff we can't see or measure, called dark matter and dark energy. Now scientists are working on experiments to solve those mysteries, Randall said.

Taylor talked about really small things. He said he grew up in the small Canadian town of Medicine Hat, Alberta, where everyone's ideas of the origin of the universe came from Genesis. But at Stanford University, he helped build a linear accelerator and experimented with shooting particles at atoms at super high speeds. That produced evidence supporting the theory that protons and neutrons are made of smaller things called quarks, Gell-Mann said.

Glashow said scientists now are trying to find a theory that explains everything - from the very big to the very small, from galaxies to the tiniest particles.

As for the future of the universe, Glashow said it looks pretty boring. In billions of years, long after our sun has exploded and eaten the Earth and mankind is gone, the universe will expand to the point that "there would be no stars," Glashow said. "All the distant galaxies would have expanded away and gone so far away, it would be a very boring universe."

The audience applauded the panelists, and Horner said the experience had been "great."

"Where can you get four Nobel laureates," Horner said, "to talk about the biggest questions in our universe?"

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