

## Science of the Universe

Director of IPMU

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We had a pleasure of having a very distinguished visitor at IPMU as one of our members in February. George Smoot is known as a man who saved the Big Bang, and received the 2006 Nobel Prize in Physics. He stayed with us for a month, gave several talks for us and our scientific neighbors, and was very active at our daily tea time leading discussions and inspiring our young members. He really liked IPMU, and wants to come back. You can read about his conversation with our PI Naoshi Sugiyama in this volume.

Back in the 80's and early 90's, cosmology was said to be in "crisis." There was even a report in Time Magazine titled "*Bang! A Big Theory May Be Shot.*" The Universe now is lumpy, with stars, galaxies and clusters of galaxies. But we can also directly see the baby Universe because there is still light called CMB (cosmic microwave background) that came from the Big Bang. The problem was that the CMB looked exactly the same everywhere. How come that everywhere was the same in the baby Universe, but it became so lumpy today? The observed structure did not agree with the Big Bang theory.

George set out on a long journey to show that the baby Universe had seeds for structure. He used spy planes. He lost a balloon in a jungle. He convinced NASA to fly his apparatus on a satellite called COBE. And he found them after two decades of search. The seeds were unimaginably small: like a millimeter-size ripple on a 100-meter deep ocean. But they were

there and he could observe them in the CMB. These tiny ripples gradually grew by attracting dark matter with gravity, eventually becoming big tsunamis to form galaxies. Not only he saved the Big Bang, cosmology became science.

We at IPMU wish to follow his footsteps. Studying the Universe is no longer what Greek philosophers did; it is now a subject in science. And this pursuit is a big drama involving many people collaborating and competing, making mistakes and working hard. We would like to understand the entire history of the Universe by observations and experiments, and predict our future. We are lucky to be a part of this exciting scientific pursuit.

