**Q&A Session of Prof Stephen Hawking's Inaugural Lecture**
**At Institute for Advanced Study, HKUST**

**Q1: Questions from Cheng Ka Lung: Could gravity distort light?**

A1: Gravity does indeed distort light. It was one of the predictions made by Einstein in 1915, when he proposed the general theory of relativity. The gravity of the Sun curves the space near it, and deflects light passing through it. This was verified by observations during the eclipse of 1919. Light from a distant star passing near the Sun was bent through a small angle, causing a slight shift in the apparent position of the star, relative to other stars.

**Q2: Questions raised by a group of physically challenged: how do you face up to such a major physical challenge and maintain a positive world view?**

A2: Even if one is physically challenged, there is a lot one can achieve, as I have shown. You can't afford to be disabled in spirit, as well as physically. People won't have time for you.

**Q3: We have many constants in this universe, e.g.: speed of light, boiling point of water, gravity. Where do these constants come? Why are they here? What will happen if the values of these constants are changed?**

A3: The constants of nature are determined by the parameters of the standard model. According to M theory, these are given by the geometry of the six dimensions of space that are curled up small. There is a whole landscape of possible values for these parameters, but most of them give universes that are not suitable for the development of life. Only in a few universes will intelligent life appear, and ask why the constants of nature, have the values they do.

**Q4: Is there a role for God in this universe?**

A4: The French scientist, La Place, explained to Napoleon how the laws of science would determine the evolution of the universe. But where does God fit into this picture, asked Napoleon. I have not needed that hypothesis, was the reply.

**Q5: Is the Universe a black hole?**

A5: At first sight, the big bang looks rather like the time reverse of a collapse to a black hole. However, there is an important difference. In the big bang, the universe starts out smooth and uniform, with only tiny fluctuations. On the other hand, the collapse to a black hole, will be highly irregular and non uniform. This difference can be explained by the no boundary proposal. The history of the universe in imaginary time, will be a closed almost smooth surface. However, there will be small fluctuations because of the uncertainty principle. On continuing back to real time, these fluctuations grow with time. They are small in the early universe, and large in gravitational collapse. The early universe is not the time reverse of black hole formation.

**Q6: Why do you have an American accent?**

A6: The voice that I use, is a very old hardware speech synthesizer, made in 1986. I keep it, because I have not heard a voice I like better, and because by now, I have identified with it. But the hardware is large and fragile, and uses components that are no longer made. Thus I have been trying to get a software version. But that seems very difficult. One version had a french accent. I said if I used it, my wife would divorce me.