

Professor Stephen Hawking turns 70

Arguably, the greatest living theoretical physicist and cosmologist, Prof. Stephen Hawking turned 70 on 8th January 2012. He achieved great heights as a theoretical physicist and cosmologist. Together with Roger Penrose he used Einstein's equations to prove that the universe could have originated from a singularity, a point of infinite density, gravity and temperature. Initially Hawking described the singularity as a point of infinite density, temperature and gravity. He changed this from 'infinite' to 'incredible', because he realized that the universe could not have evolved from a point of infinite gravity.

In the late 1970's and 1980's Stephen Hawking became the leading theoretic physicist in the world to describe a black hole. He realized that the area of a black hole's event horizon can never decrease but will always increase in terms of the second law of thermodynamics. He became the first physicist to apply quantum mechanics to a macroscopic object, the event horizon of a black hole. He proved mathematically that if a particle/anti-particle pair developed from a quantum fluctuation near the event horizon, the positively charged particle could escape to infinity and the negatively charged particle could fall into the black hole. The black hole would lose mass and energy in a process which became known as the "Hawking radiation".

Hawking realized that if enough pressure is applied to mass, no matter how small the mass is, a black hole would form. The place where such a force could have existed was in the early universe. This led him to suggest that quantum sized black holes could have formed in the early universe. His calculations showed, however that a quantum sized black hole would evaporate and explode more quickly. He calculated that a quantum size black hole would have an average radius of about 10^{-13} cm weighing a billion times more than a proton.

Stephen Hawking can be described as one of the most influential theoretical physicists and cosmologist alive. Perhaps his greatest achievement is that he accomplished it all against all odds, a debilitating disease of amyotrophic lateral sclerosis.

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