Why Einstein Has Been Influential?

Has anyone ever wondered why year 2005 was named "The World Year of Physics"? The reason was to commemorate the 100th anniversary of the miracle year when Einstein published his four famous papers. (The papers were about photoelectric effect, Brownian motion, special relativity and mass-energy equivalence respectively.) There is, probably, no other scientist receiving recognition as high as Einstein in such a way. In terms of his contribution to the development of physics, to the changes in our understanding of the physical world and to the changes in our life, he has been influential.

Every time we mention Einstein, most likely people will relate this great name to the terms such as nuclear bombs, E=mc^2, and the theory of relativity. The theory of relativity has two constituent parts, being special relativity and general relativity. Special relativity overturned our understanding of motion, mass and time. It challenged the long existing Newtonian classical mechanics. The mass-energy equation, derived from special relativity, for the first time, showed a possibility to produce energy in a “magical” way and subsequently it led human beings to unlock energy inside nucleus. Should those two papers have not been published, we would not understand the mechanism of energy production in the sun, produce energy in such an efficient way, or enjoy highly precise GPS positioning. However, we would not have suffered the terror of nuclear arm race either. Thus, it is fair to say that Einstein and his work changed our life in both ways.

General relativity went some steps even further to explain the essentials of gravity in macroscopic scale and, thus, changed our understanding of space-time structure. For the first time, we are mathematically exposed to the elegant, but yet mysterious, things such as black hole, gravitational lensing and gravitational red shift. He also pointed out the possibility to curve the space-time to perform inter-stellar travel. May be one day, when we are able to perform that through wormholes or hidden dimensions, we will appreciate Einstein again for building the foundation of this milestone.

Einstein’s contribution to establish the other equal important physics theory, quantum mechanics, is less known by the public. Being a determinist, Einstein did not support quantum mechanics, but he did fuel the development in this field with his explanation in photoelectric phenomenon. Einstein was awarded Nobel Prize in 1921 for explaining photoelectric effect. His theory states that energy can be quantized, which means energy can be considered to be discrete packages. The basic thought of quantization in the paper has led us to practical applications including lasers, semiconductors, solar cells and etc. The first two applications obviously changed our everyday life. Solar cells, being a clean solution to future energy demand, will play more and more important roles to help human race achieve sustainable development.

Setting his contributions to statistical physic, thought experiment and Unified Field Theory apart, relativity and quantum mechanics are more than enough to make Einstein so famous in the world. It is fair to conclude that Einstein directed us towards a new area full of unknowns and hopes. He has being leading the way for physicists in a whole century and will continue to influence the scientists in the future. That is probably the reason that despite the fact Einstein passed away 54 years ago, his is still influential.

Bibliography: <http://en.wikipedia.org/wiki/Einstein>

550 words

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